AGENDA

City of University Heights, Iowa
City Council Meeting
Tuesday, March 29, 2016
City Hall
1004 Melrose Avenue
7:00-8:00pm.

Meeting called by Mayor Pro Tem Jerry Zimmermann

Time		Topic	Owner
7:00	Call to Order Meeting	Roll Call	Jerry Zimmermann
		Public Input	**Public Comments**
		-Consideration of **Resolution No. 16-16A** (without bid alternate work) or **Resolution No. 16-16B** (with bid alternate work) accepting the proposal from and awarding a contract to the lowest responsible bidder who submitted a bid for the One University Place – Public Improvements Project.	Josiah Bilskemper
		-Consideration of **Resolution No. 16-17** approving and accepting a **Plat of Survey** and **Quit Claim Deed** for property dedicated to the City as additional street right-of-way.	
	Announcements		Anyone
8 :00	Adjournment		Jerry Zimmermann

Next Regular City Council Meeting is April 12, 2016: Horn School Library room

March ’16 Special Meeting – City Attorney's Report

1. **OUP – Awarding Contract for Public Improvements Project.** The Council will consider a Resolution accepting the proposal from and awarding a contract to the lowest responsible bidder received in response to the City’s advertisement for bids for the One University Place – Public Improvements Project.

    - The advertisement requested a “bid alternate” related to storm water quality, as requested by the Council. Josiah Bilskemper will be opening bids and making a recommendation to the Council on March 28 concerning the award of a contract.

    - The recommendation will be in two parts – one if the Council elects to undertake the storm water quality work, the other if not.

    - The form of the contract was approved by the Council at the March 8 meeting.

    - The Council has the right to reject any and all bids; the Council is not obligated to award the contract just because it sought bids.

    - As discussed at the regular March Council meeting, the OUP documents require Jeff Maxwell to reimburse the City for the cost of the OUP Public Improvements Project costs within 15 days of receiving an invoice from the City.

    - Resolution No. 16-16A (without bid alternate work) and Resolution No. 16-16B (with bid alternate work) – both with blank spaces where the contractor’s name, bid amount, and other pertinent information will be added – are attached. The form of the proposed contract is also attached (contained in the “Bid Set”).

2. **OUP – Approving and Accepting Deed and ROW Dedication.** The Council will consider Resolution No. 16-17, which approves and accepts a Plat of Survey and Quit Claim Deed from the OUP owner. The plat identifies and the deed conveys a small portion of real property (land) at the northwest corner of Melrose Avenue and Sunset Street. The land is conveyed to the City and dedicated to the public as additional street/intersection right-of-way – the land will be used as part of the intersection realignment, the left-turn lane from Melrose Avenue, and the OUP project overall. The OUP Developer is required by the approved PUD approved documents to convey this land, and the resolution simply accepts the Plat of Survey and the Quit Claim Deed. The Resolution, Plat of Survey, and Quit Claim Deed are attached.

3. **My Schedule.** I will be out of the office starting March 24 through March 30. I will have limited access to email and phone. Please call or text (319-430-3350) or email if you have questions or wish to discuss this report with me; I will return messages as soon as I am able

Subject: March Special Meeting Information - OUP Public Improvements Project
From: "Josiah D. Bilskemper" <jbilskemper@shive-hattery.com>
Date: Sat, March 26, 2016 1:03 pm
To: council@university-heights.org, staff@university-heights.org
Priority: Normal
Options: View Full Header | Print | Download this as a file | View as plain text

All:

1. As Steve noted in his legal report, the bids are due for the OUP Public Improvements project at 11:00 AM on Monday, March 28th here at our office. Ron Amelon from MMS developed a bid alternate for a storm water quality component from the discussion at the March 8 council meeting. This additional design was issued as an addendum to the plans, and the due date for contractor's to submit bids was moved from Thursday, March 24th to this coming Monday to allow additional time for contractors to review this bid alternate work.

   We will open the bids at 11:00 AM on Monday here at our office, and then Ron will put together a bid tabulation to check the math on each of the bids received, and issue a recommendation letter for awarding the bids. Each bid will have a "base bid" amount (all the original project work), and then a separate "bid alternate" amount (for the storm water quality component). All this information will be sent to council by the end of the day on Monday.

   As of Thursday last week, there were 7 general contractors who had requested plans for review, and 2 electrical contractors (for the traffic signals).

2. I am attaching the drawings of the storm water quality component that was issued as a bid alternate (the last two pages of the "Drawings" attachment, Page SD-9 and SD-10). It is a bio-retention cell at the NE corner of the intersection, placed in the widened green space that results from shifting over the roadway. This alternate would require a drop in the curb along the east curb line of Sunset Street, and the portion of water that comes from the intersection would run through this curb drop and into the bio-retention cell.

   Water would filter down through the mulch, soil mix and rock aggregate and either disperse into the surrounding soil, or (most likely) into the perforated drain tile at the bottom of the cell. The water would then run through this pipe, and into the next pipe running east under the road and to the existing storm manhole in the east ravine. There is an elevated pipe with a grate on top at the north end of the bio-retention cell (labeled as Proposed Intake #3 on the drawing) that is set 9-inches above the mulch layer (but still lower than the adjacent sidewalk or street curb). In a heavy rain event where water ponds in the cell faster than it can drain down through the layers of the cell, this raised inlet means that once the water reaches a depth of 9-inches, it will automatically start draining into this raised pipe and flow directly into the pipe that goes east into the manhole in the ravine.

   There is also a drawing showing the planting list and layout for the bio-retention cell.

3. There are several other sheets that Ron issued with his addendum to update some water main details as requested by the City of Iowa City water department, and adjust the curb ramp work. I reviewed the

location of the proposed NW curb ramp with the MPOJC staff. Based on recent issues they have been involved with at another intersection with a similar offset crosswalk in Iowa City, we made an adjustment to shift the curb ramp to the east about 12-feet. Recall that this is one of the items that Virginia addressed with Council last month.

The drawing also updates that some existing sidewalk will need to be removed and replaced when the new traffic signals are installed on the south side of the intersection.

4. The discussion at the March 8th meeting centered on the use of permeable pavers for a bid alternate. Ron and I met after the March 8th meeting and discussed the permeable paver option several times. Based on the information available to us at this time (some limited design experience, guidance from the Iowa Stormwater Management Manual, some of the lessons learned from other Iowa communities, protecting the uniformity and integrity of the subgrade below the new street, differences in types of permeable pavers and how that impacts long-term maintenance both in terms of maintenance frequency, costs, and equipment needed), neither of us was comfortable proceeding with a permeable paver design, because we did not think it was the right fit for this particular location.

   Therefore, we focused on the overall goal expressed by the council (consideration of storm water quality features) to develop another approach that fits a water quality feature into the already designed project.

5. As I noted at the March 8th meeting, we (Shive-Hattery) have site visits planned in April to other communities with permeable paver public streets and also have an informational meeting with representatives from King's Material at the end of this month to discuss permeable paver options. We have a list of staff from other Iowa cities with permeable paver streets that we are making calls to discuss their experience. So far we've gotten a lot of insightful information from the City of West Union and the City of Davenport, with several other cities still to make contact with. Foremost in my mind is gathering this information to try and determine if this is a feasible option for use on the Olive Court reconstruction project.

Please let me know if you have any questions, thanks.

Josiah D. Bilskemper, P.E.

Shive-Hattery, Inc.

2839 Northgate Drive

Iowa City, IA 52245

(319) 354-3040

RESOLUTION NO. 16-16A

RESOLUTION ACCEPTING THE BID AND AWARDING THE CONSTRUCTION CONTRACT FOR THE ONE UNIVERSITY PLACE – PUBLIC IMPROVEMENTS PROJECT (WITHOUT BID ALTERNATE WORK) TO _____ OF _____ AND AUTHORIZING THE MAYOR TO SIGN A CONTRCT WITH _____ IN THE PRINCIPAL AMOUNT OF $_____.__ FOR THIS PROJECT.

WHEREAS, the City Council of University Heights, Iowa, previously deemed it necessary and desirable to undertake the "One University Place Public Improvements Project", comprising work to widen Melrose Avenue to provide for a left-turn lane into the One University Place ("OUP") development and to realign the Melrose Avenue and Sunset Street intersection to accommodate and improve traffic flow and ingress and egress from the OUP development ("the Project"); and

WHEREAS, the City Council held a public hearing on the plans, specifications, form of contract, and estimated costs for the Project, after first publishing notice of the public hearing as required by law; and

WHEREAS, the plans, specifications, form of contract, and estimated costs for the Project were approved by the City Council and bids for the Project were solicited and notice published, with the bid deadline initially established as 2:00 p.m. March 24, 2016, and later extended to 11:00 a.m. March 28, 2016, so a bid alternate related to storm water quality could be accommodated; and

WHEREAS, the City received ___ construction bids for the Project, and the bids were opened and tabulated; and

WHEREAS, the Council hereby elects to award a contract for the Project without the storm water quality work contemplated by the requested bid alternate; and

WHEREAS, _____ of _____ submitted a bid for construction of the Project in the principal amount of $_____.__; and

WHEREAS, the City Engineer has determined that _____ is the lowest responsive, responsible bidder and recommends that the City award the construction contract for the project to _____; and

WHEREAS, the City held a public meeting March 29, 2016, pursuant to published notice, and considered awarding of a construction contract, including plans, specifications, and form of contract, for the Project;

NOW, THEREFORE, BE IT RESOLVED by the City Council of University Heights, Iowa, that the City determines and concludes that _____ is the lowest responsive, responsible bidder; the City accepts the bid of and awards the construction contract for the Project (without bid alternate work) to _____; and the Mayor is authorized to sign the Contract with

_____ in the principal amount of $_____.__, in the form attached as Exhibit “A”.

Upon motion by _____, and seconded by _____, the vote was as follows:

	AYES:	NAYS	ABSENT
Haverkamp	_____	_____	_____
Lane	_____	_____	_____
Maher	_____	_____	_____
Quezada	_____	_____	_____
Zimmermann	_____	_____	_____

Upon Roll Call thus recorded, the Resolution is declared adopted this 29th day of March, 2016.

_____
Jerry Zimmermann, Mayor Pro Tempore
City of University Heights

ATTEST:

_____
Christine M. Anderson, City Clerk

RESOLUTION NO. 16-16B

RESOLUTION ACCEPTING THE BID AND AWARDING THE CONSTRUCTION CONTRACT FOR THE ONE UNIVERSITY PLACE – PUBLIC IMPROVEMENTS PROJECT (WITH BID ALTERNATE WORK) TO _____ OF _____ AND AUTHORIZING THE MAYOR TO SIGN A CONTRCT WITH _____ IN THE PRINCIPAL AMOUNT OF $_____.__ FOR THIS PROJECT.

WHEREAS, the City Council of University Heights, Iowa, previously deemed it necessary and desirable to undertake the "One University Place Public Improvements Project", comprising work to widen Melrose Avenue to provide for a left-turn lane into the One University Place ("OUP") development and to realign the Melrose Avenue and Sunset Street intersection to accommodate and improve traffic flow and ingress and egress from the OUP development ("the Project"); and

WHEREAS, the City Council held a public hearing on the plans, specifications, form of contract, and estimated costs for the Project, after first publishing notice of the public hearing as required by law; and

WHEREAS, the plans, specifications, form of contract, and estimated costs for the Project were approved by the City Council and bids for the Project were solicited and notice published, with the bid deadline initially established as 2:00 p.m. March 24, 2016, and later extended to 11:00 a.m. March 28, 2016, so a bid alternate related to storm water quality could be accommodated; and

WHEREAS, the City received ___ construction bids for the Project, and the bids were opened and tabulated; and

WHEREAS, the Council hereby elects to award a contract for the Project with the storm water quality work contemplated by the requested bid alternate; and

WHEREAS, _____ of _____ submitted a bid for construction of the Project in the principal amount of $_____.__; and

WHEREAS, the City Engineer has determined that _____ is the lowest responsive, responsible bidder and recommends that the City award the construction contract for the project to _____; and

WHEREAS, the City held a public meeting March 29, 2016, pursuant to published notice, and considered awarding of a construction contract, including plans, specifications, and form of contract, for the Project;

NOW, THEREFORE, BE IT RESOLVED by the City Council of University Heights, Iowa, that the City determines and concludes that _____ is the lowest responsive, responsible bidder; the City accepts the bid of and awards the construction contract for the Project (with bid alternate work) to _____; and the Mayor is authorized to sign the Contract with

_____ in the principal amount of $_____.__, in the form attached as Exhibit “A”.

Upon motion by _____, and seconded by _____, the vote was as follows:

	AYES:	NAYS	ABSENT
Haverkamp	_____	_____	_____
Lane	_____	_____	_____
Maher	_____	_____	_____
Quezada	_____	_____	_____
Zimmermann	_____	_____	_____

Upon Roll Call thus recorded, the Resolution is declared adopted this 29th day of March, 2016.

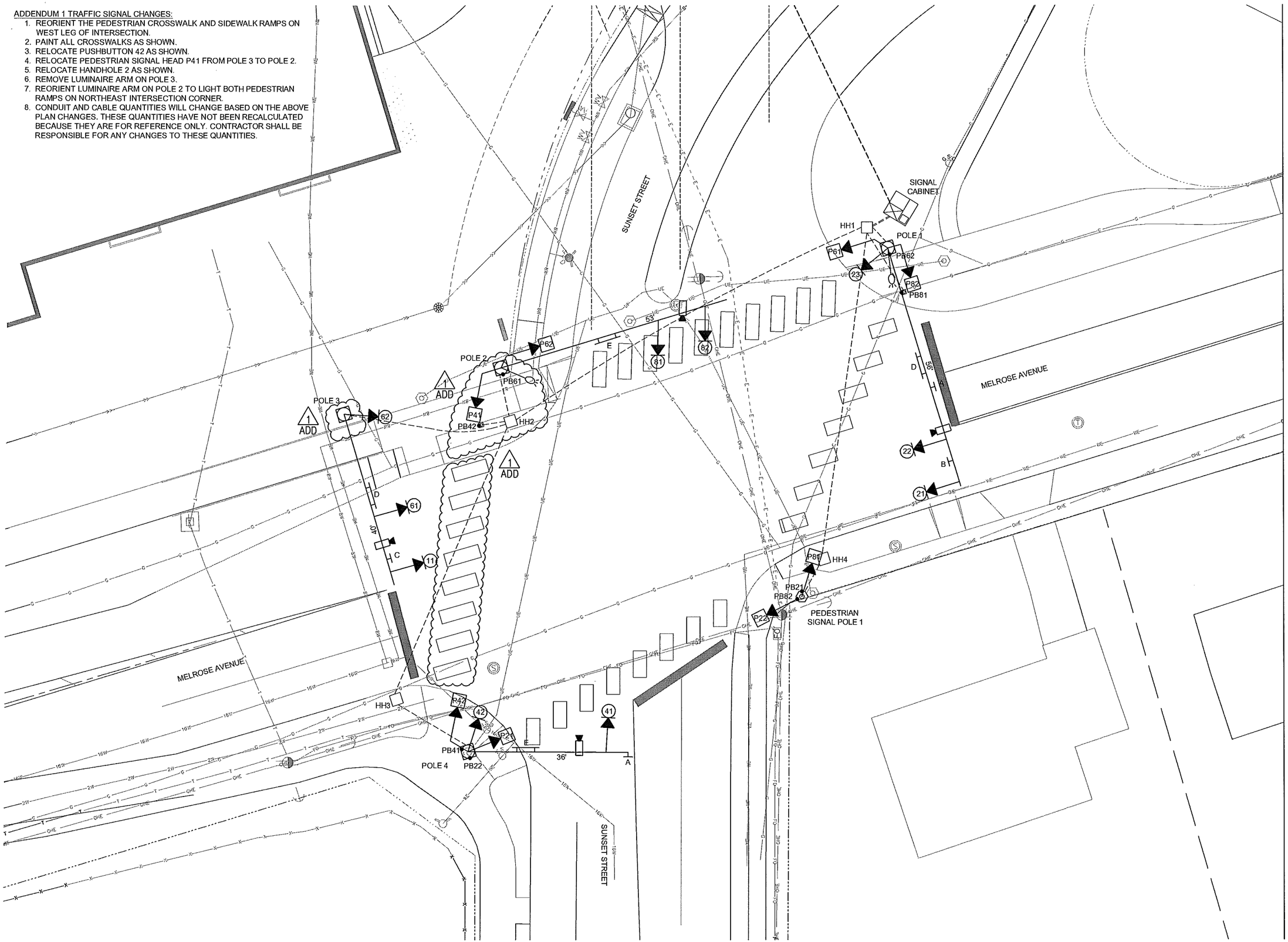
_____
Jerry Zimmermann, Mayor Pro Tempore
City of University Heights

ATTEST:

_____
Christine M. Anderson, City Clerk

ADDENDUM 1 TRAFFIC SIGNAL CHANGES:

1. REORIENT THE PEDESTRIAN CROSSWALK AND SIDEWALK RAMPS ON WEST LEG OF INTERSECTION.
2. PAINT ALL CROSSWALKS AS SHOWN.
3. RELOCATE PUSHBUTTON 42 AS SHOWN.
4. RELOCATE PEDESTRIAN SIGNAL HEAD P41 FROM POLE 3 TO POLE 2.
5. RELOCATE HANDHOLE 2 AS SHOWN.
6. REMOVE LUMINAIRE ARM ON POLE 3.
7. REORIENT LUMINAIRE ARM ON POLE 2 TO LIGHT BOTH PEDESTRIAN RAMPS ON NORTHEAST INTERSECTION CORNER.
8. CONDUIT AND CABLE QUANTITIES WILL CHANGE BASED ON THE ABOVE PLAN CHANGES. THESE QUANTITIES HAVE NOT BEEN RECALCULATED BECAUSE THEY ARE FOR REFERENCE ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY CHANGES TO THESE QUANTITIES.



CIVIL ENGINEERS
LAND PLANNERS
LAND SURVEYORS
LANDSCAPE ARCHITECTS
ENVIRONMENTAL SPECIALISTS

1917 S. GILBERT ST.
IOWA CITY, IOWA 52240
(319) 351-8282

www.mmsconsultants.net

SHIVEHATTERY
ARCHITECTURE + ENGINEERING

316 2nd St. SE Suite 500
Cedar Rapids, IA 52401
319.364.0227
shive-hattery.com

Iowa | Illinois | Missouri | Indiana

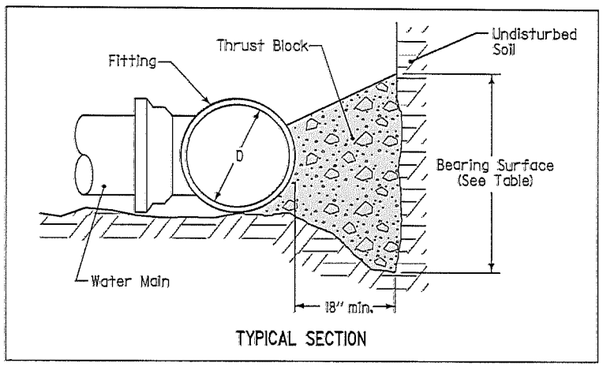
REFER TO SHEET 24

ONE UNIVERSITY PLACE - PUBLIC IMPROVEMENTS

UNIVERSITY HEIGHTS
JOHNSON COUNTY
STATE OF IOWA

MMS CONSULTANTS, INC.

Date: 03-21-2016	
Designed by: CDB	Scale: 1"=20'
Drawn by: CDB	Addendum No: 1
Checked by: JHC	Supplemental Drawing No:
Project No: IC 5136-012	SD-1



TYPICAL SECTION

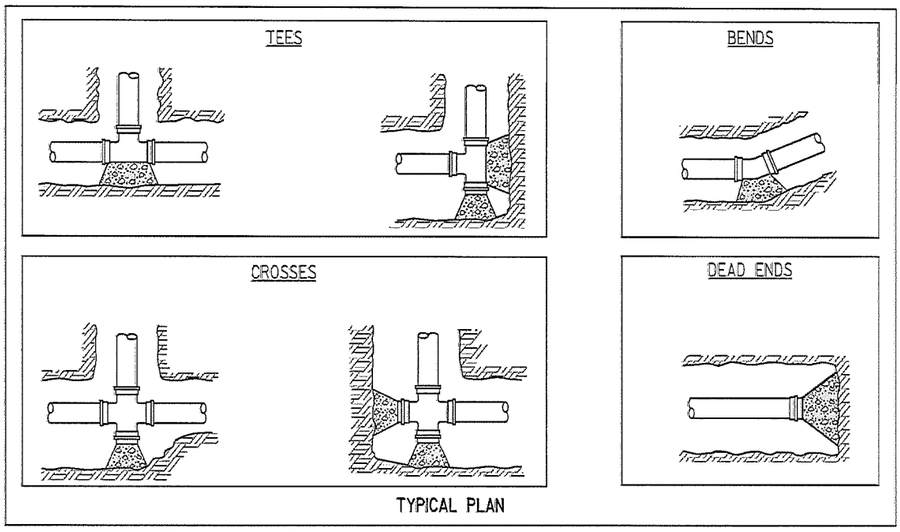
Extend thrust blocks to undisturbed soil. Excavation into trench wall may be necessary.

Form vertical surfaces of poured concrete thrust blocks except on bearing surface.

Encase all fittings in polyethylene wrap. Do not allow concrete to directly contact joints or fitting bolts.

Diameter of Pipe, D (inches)	MINIMUM BEARING SURFACE (sf)				
	Bends				Tees and Dead Ends
	11¼°	22½°	45°	90°	
4	1	1	2	4	3
6	1	2	4	8	6
8	2	4	7	14	10
10	3	6	11	21	15
12	4	8	16	29	21
14	5	11	21	39	28
16	7	14	27	50	36
18	9	17	34	63	45
20	11	21	42	78	55
24	15	31	60	111	78
30	24	47	92	171	120
36	34	67	132	244	173

Minimum surface area based on water pressure of 150 psi and allowable soil pressure of 1,000 psf.



TYPICAL PLAN

SUDAS | Iowa Department of Transportation | REVISION NEW 04-21-09

FIGURE 5010.101 | STANDARD ROAD PLAN | WM-101 | SHEET 1 of 2

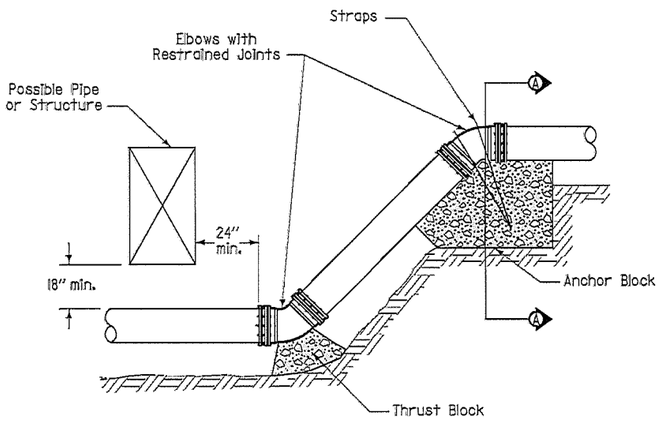
REVISIONS: New. Replaces SUDAS Figure 5010.1

SUDAS DIRECTOR | DESIGN METHODS ENGINEER

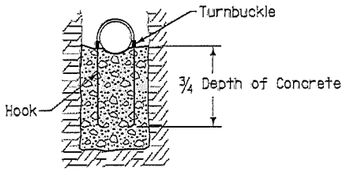
THRUST BLOCKS

FIGURE 5010.101 SHEET 1 OF 2

CHANGES IN PIPE DEPTH



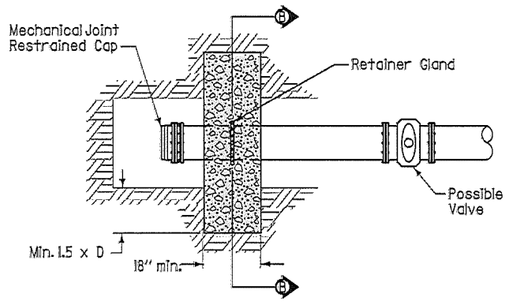
ELEVATION



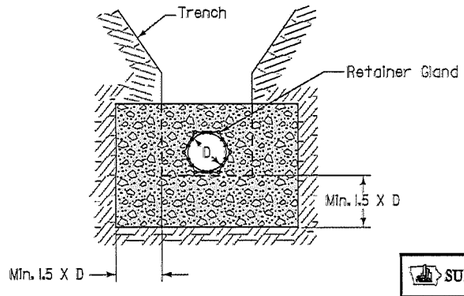
SECTION A-A

DEAD ENDS (ALTERNATE METHOD)

Use only when allowed by the Engineer, or when specified in the contract documents.



PLAN



SECTION B-B

SUDAS | Iowa Department of Transportation | REVISION NEW 04-21-09

FIGURE 5010.101 | STANDARD ROAD PLAN | WM-101 | SHEET 2 of 2

REVISIONS: New. Replaces SUDAS Figure 5010.1.

SUDAS DIRECTOR | DESIGN METHODS ENGINEER

THRUST BLOCKS

FIGURE 5010.101 SHEET 2 OF 2

REFER TO SHEET 2

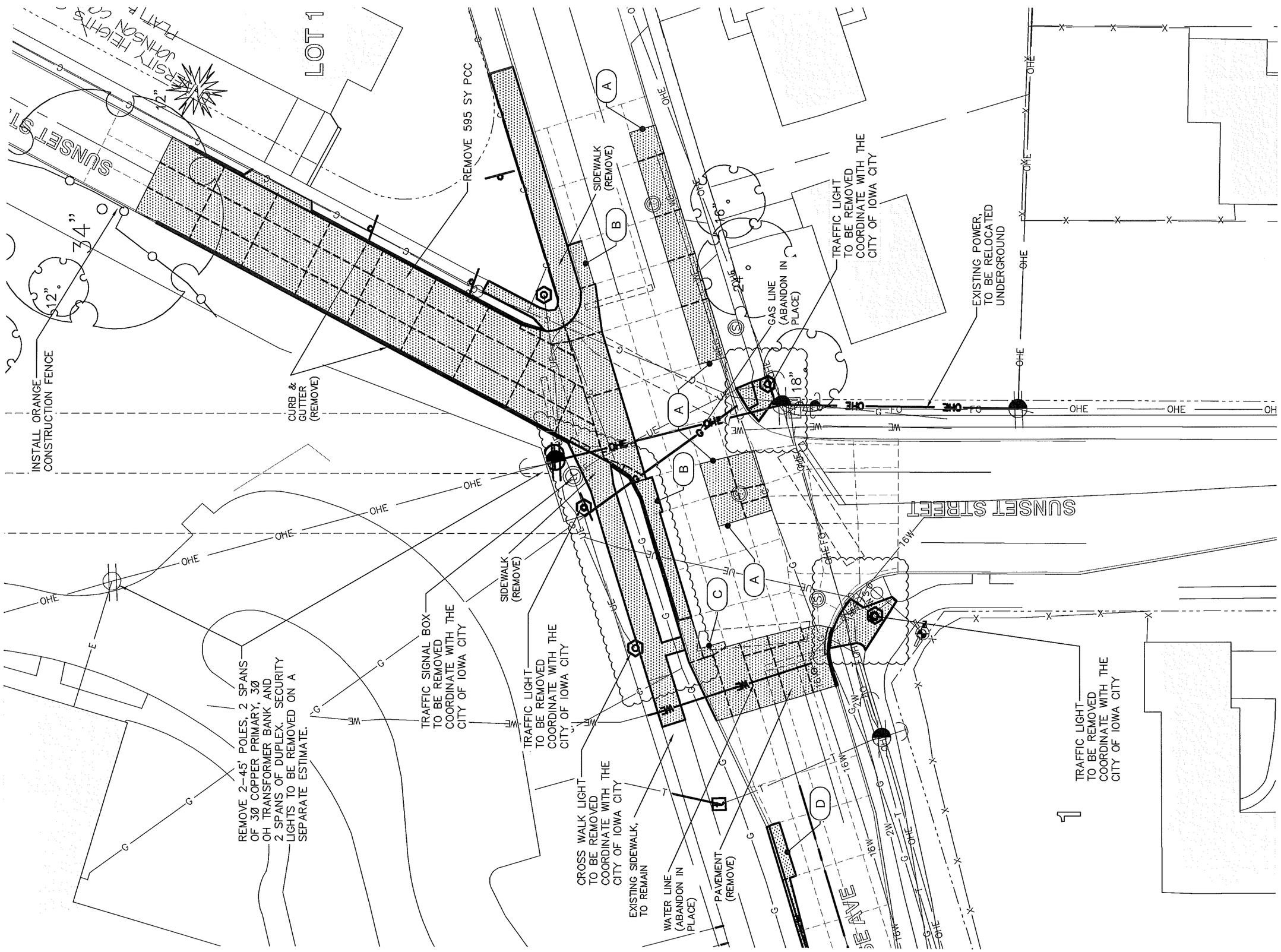
ONE UNIVERSITY PLACE
- PUBLIC IMPROVEMENTS
UNIVERSITY HEIGHTS
JOHNSON COUNTY
STATE OF IOWA

MMS CONSULTANTS, INC.

Date: 03-21-2016
Designed by: RLA
Scale: -
Drawn by: MAK
Addendum No: 1
Checked by: RLA
Supplemental Drawing No: SD-2
Project No: IC 5136-012

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

C:\5130\5136-012-\5130012-CONST.dwg, 3/21/2016 2:10:28 PM, mak



CIVIL ENGINEERS
LAND PLANNERS
LAND SURVEYORS
LANDSCAPE ARCHITECTS
ENVIRONMENTAL SPECIALISTS

1917 S. GILBERT ST.
IOWA CITY, IOWA 52240
(319) 351-8282

www.mmsconsultants.net

C:\5136\5136-012-\5136012-CONST.dwg, 3/21/2016 2:16:07 PM, mak

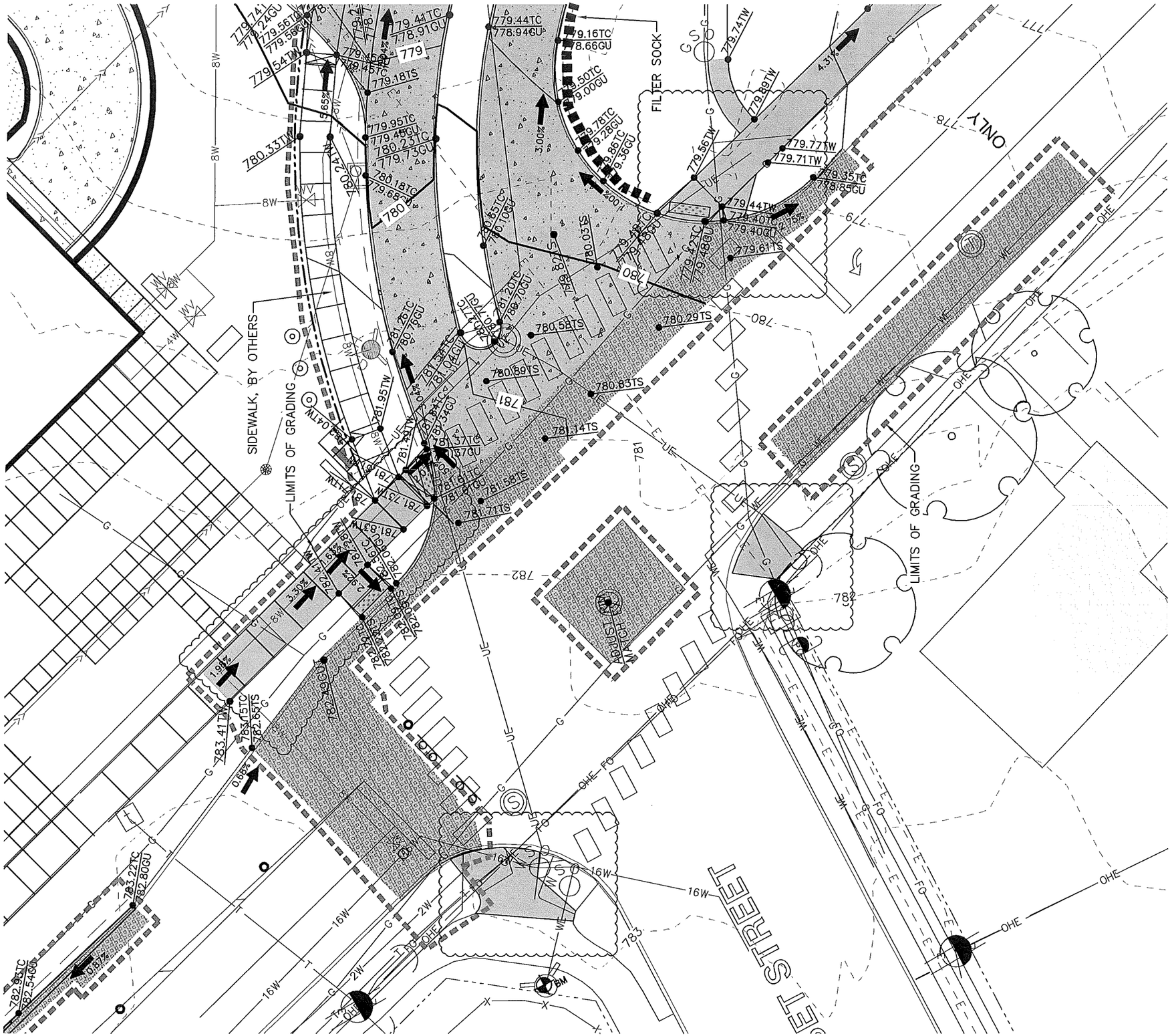
REFER TO SHEET 4

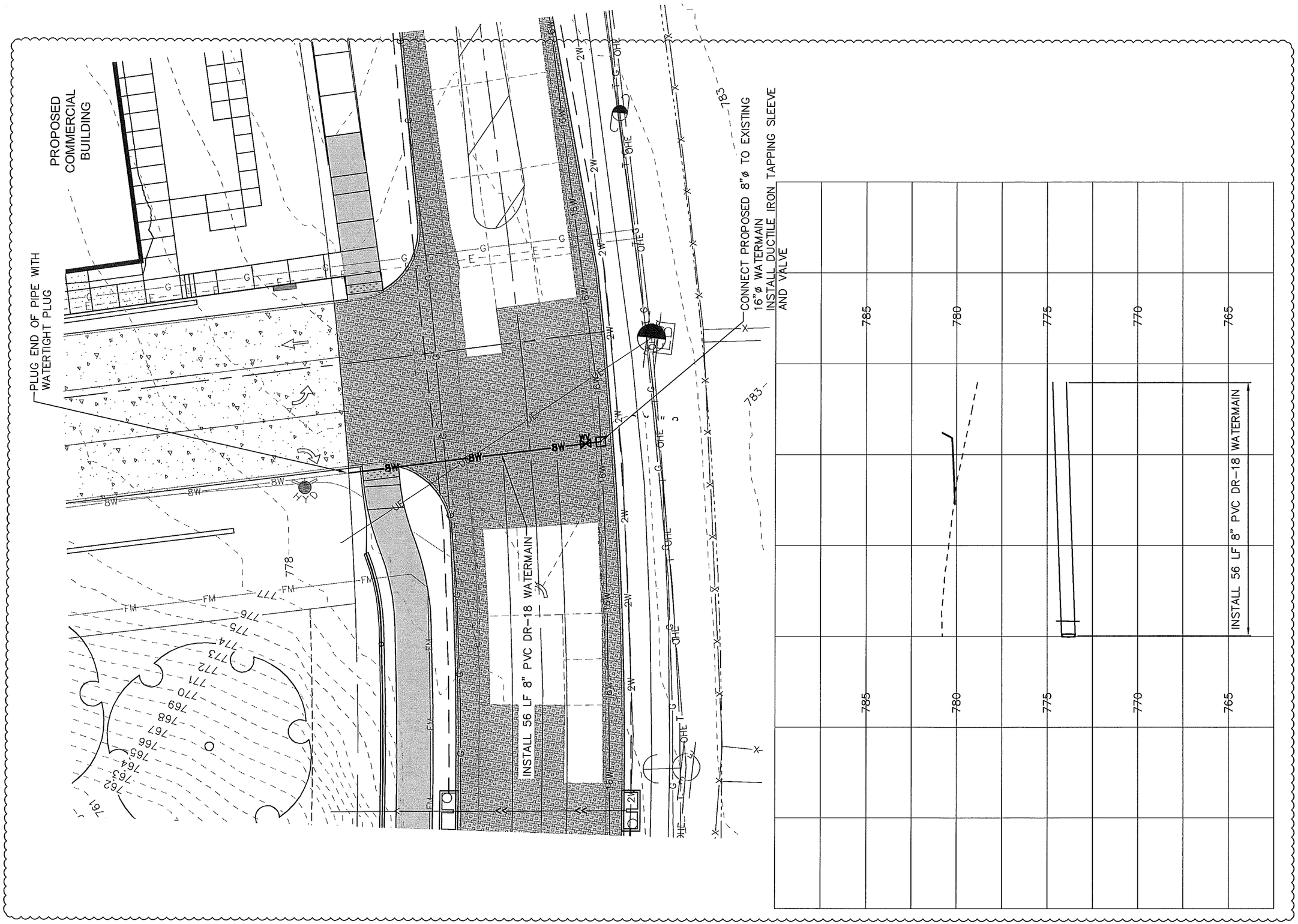
ONE UNIVERSITY PLACE - PUBLIC IMPROVEMENTS

UNIVERSITY HEIGHTS
JOHNSON COUNTY
STATE OF IOWA

MMS CONSULTANTS, INC.

Date: 03-21-2016	
Designed by: RLA	Scale: 1"=30'
Drawn by: MAK	Addendum No: 1
Checked by: RLA	Supplemental Drawing No:
Project No: IC 5136-012	SD-3


FILTER SOCK
SIDEWALK, BY OTHERS
LIMITS OF GRADING
LIMITS OF GRADING
ONLY
ADJUST TO MATCH
BM
779.74TW
779.89TW
779.77TW
779.71TW
779.35TC
778.85GU
779.44TW
779.40TW
779.40GU
779.61TS
779.56TW
779.44TC
778.94GU
779.16TC
778.66GU
779.50TC
779.00GU
779.78TC
779.28GU
779.86TC
779.36GU
780.03TS
780.29TS
780.58TS
780.89TS
780.83TS
781.14TS
781.71TS
781.58TS
781.95TW
781.37TC
781.37GU
781.61TC
781.61GU
781.73TW
781.83TW
782.36TC
782.06GU
782.49GU
783.41TW
783.15TC
782.65TS
783.22TC
782.80GU
782.95TC
782.54GU
780.33TW
779.54TW
779.95TC
779.45GU
780.23TC
779.73GU
780.18TC
779.68GU
780.24TW
779.41
779.24GU
779.56TC
779.56GU
779.44TC
778.91GU
779.18TS
780.65TC
780.10GU
781.26TC
780.76GU
781.20TC
780.70GU
781.04GU
781.34GU
781.84TC
781.34GU
781.43TW
781.04TW
781.37TW
781.83TW
782.41TW
782.49TW
782.29TW
782.36TW
782.06TW
782.49TW
782.29TW
782.36TW
782.06TW
782.49TW
782.29TW
782.36TW
782.06



CIVIL ENGINEERS
LAND PLANNERS
LAND SURVEYORS
LANDSCAPE ARCHITECTS
ENVIRONMENTAL SPECIALISTS

1917 S. GILBERT ST.
IOWA CITY, IOWA 52240
(319) 351-8282

www.mmsconsultants.net

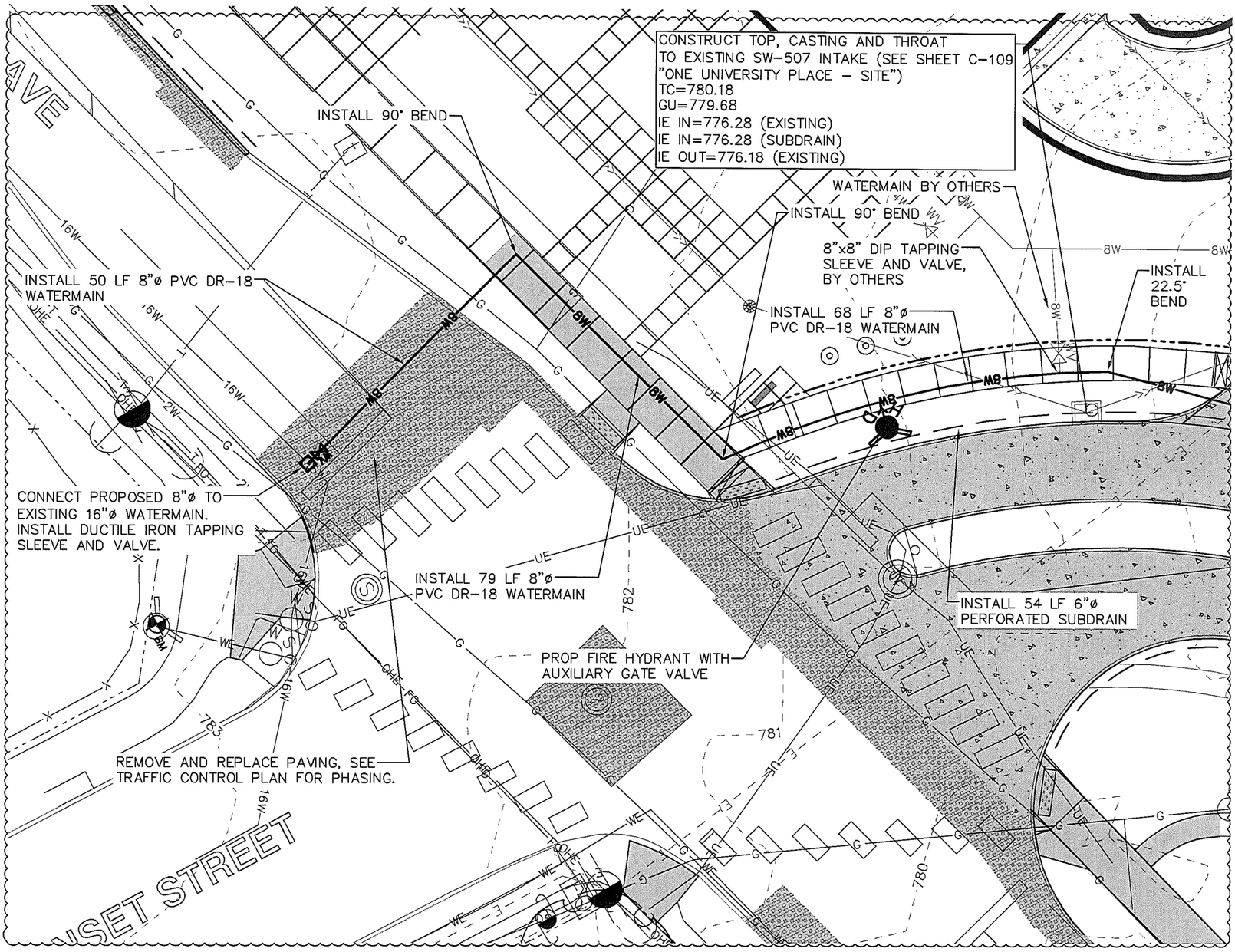
REFER TO SHEET 8

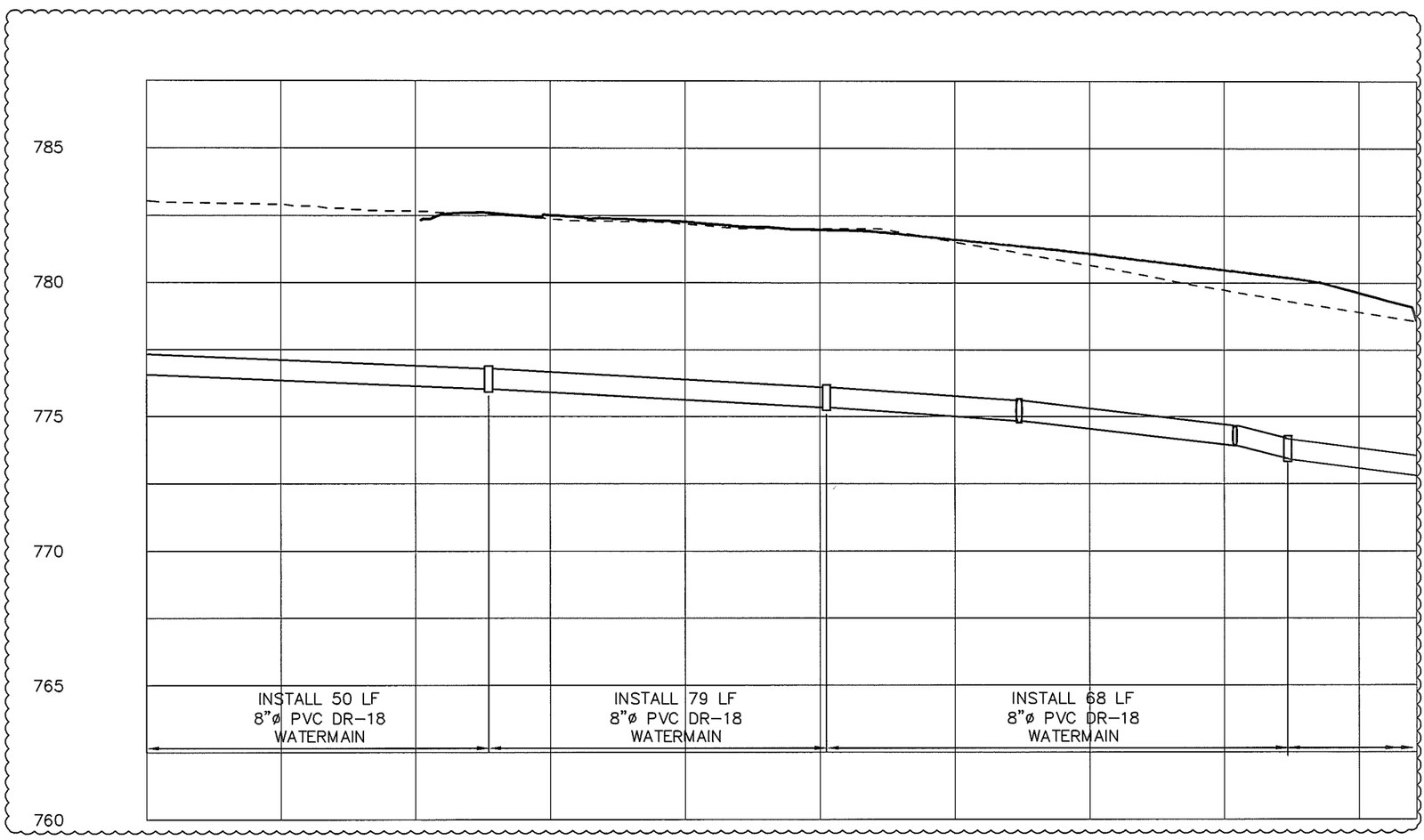
ONE UNIVERSITY PLACE - PUBLIC IMPROVEMENTS

UNIVERSITY HEIGHTS
JOHNSON COUNTY
STATE OF IOWA

MMS CONSULTANTS, INC.

Date: 03-21-2016	
Designed by: RLA	Scale: 1"=20'H,1"=5'V
Drawn by: MAK	Addendum No: 1
Checked by: RLA	Supplemental Drawing No:
Project No: IC 5136-012	SD-5





REFER TO SHEET 8

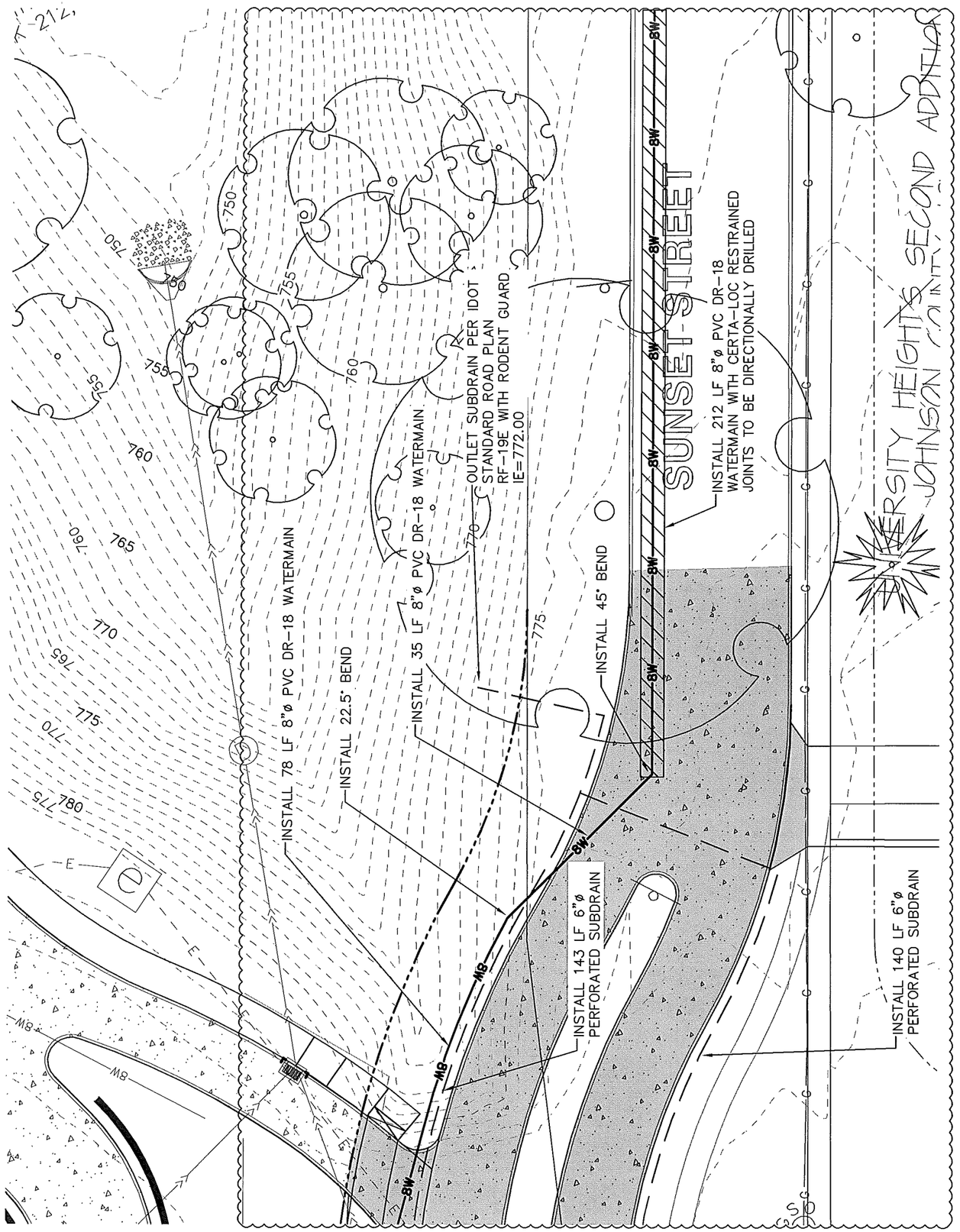
ONE UNIVERSITY PLACE
- PUBLIC IMPROVEMENTS
UNIVERSITY HEIGHTS
JOHNSON COUNTY
STATE OF IOWA

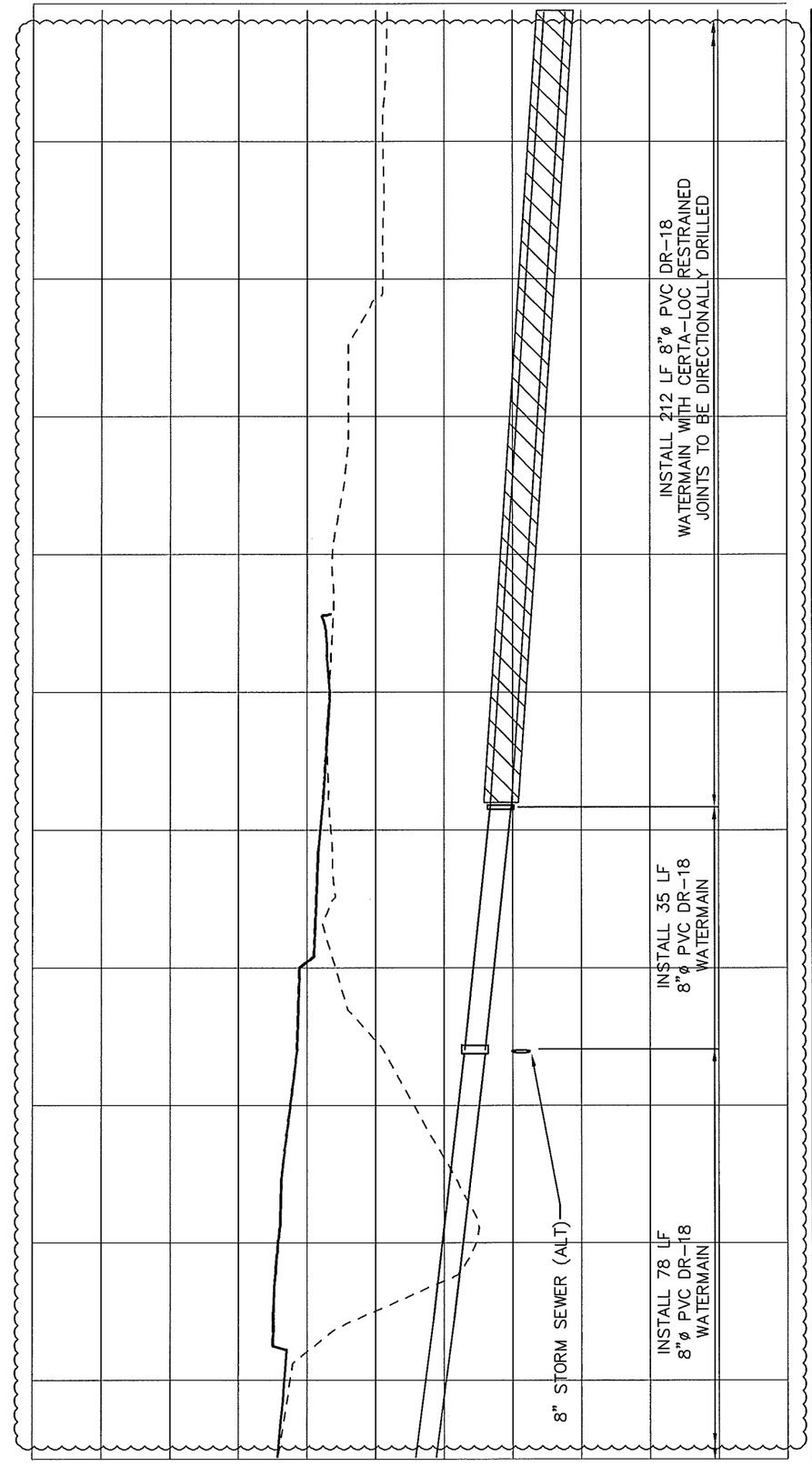
MMS CONSULTANTS, INC.

Date: 03-21-2016
Designed by: RLA
Scale: 1"=20'H1"=5'V
Drawn by: MAK
Addendum No: 1
Checked by: RLA
Supplemental Drawing No:
Project No: IC 5136-012
SD-6

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

c:\5136\5136-012-\5130012-CONST.dwg, 3/21/2016 2:38:10 PM, mak





CIVIL ENGINEERS
LAND PLANNERS
LAND SURVEYORS
LANDSCAPE ARCHITECTS
ENVIRONMENTAL SPECIALISTS

1917 S. GILBERT ST.
IOWA CITY, IOWA 52240
(319) 351-8282

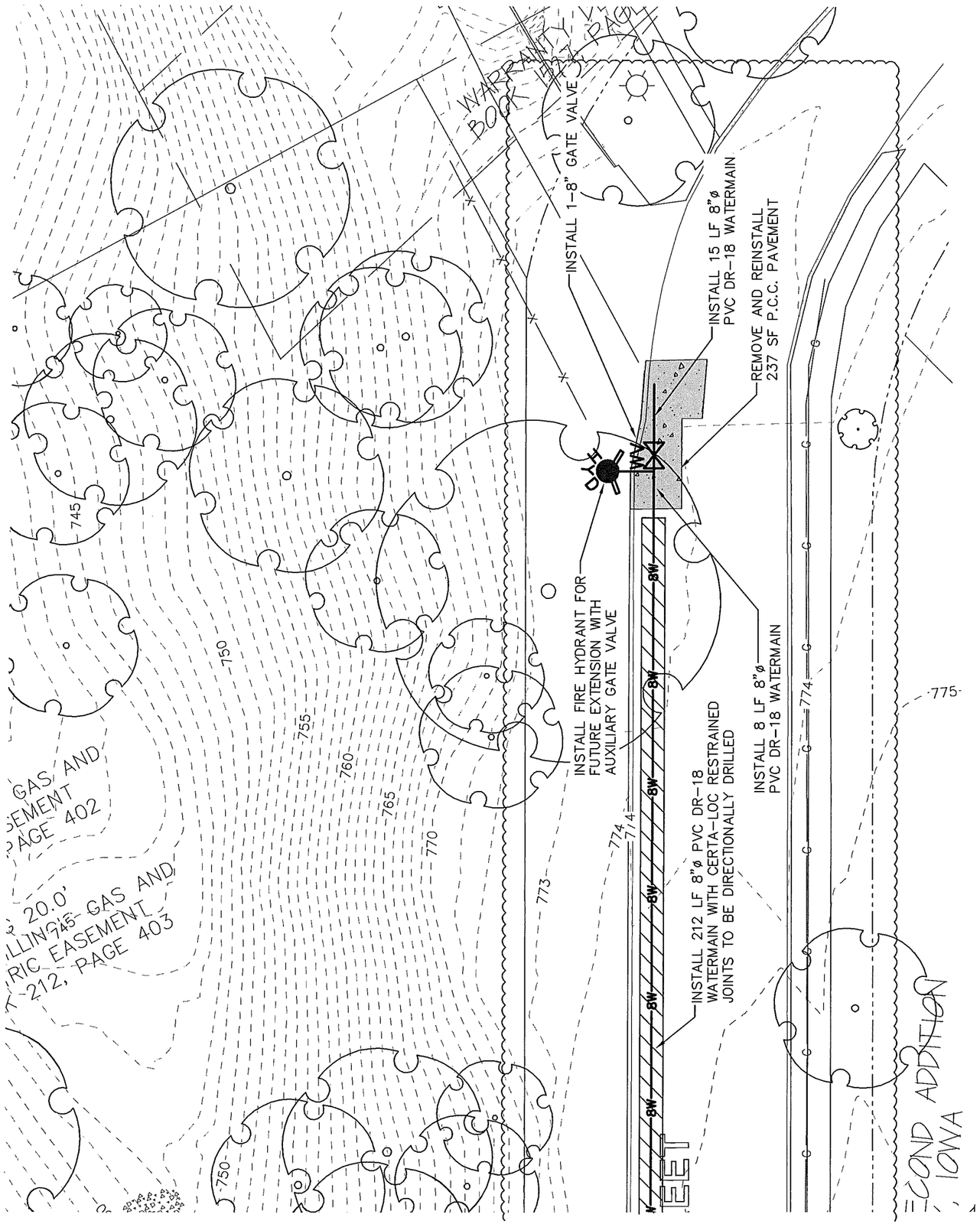
www.mmsconsultants.net

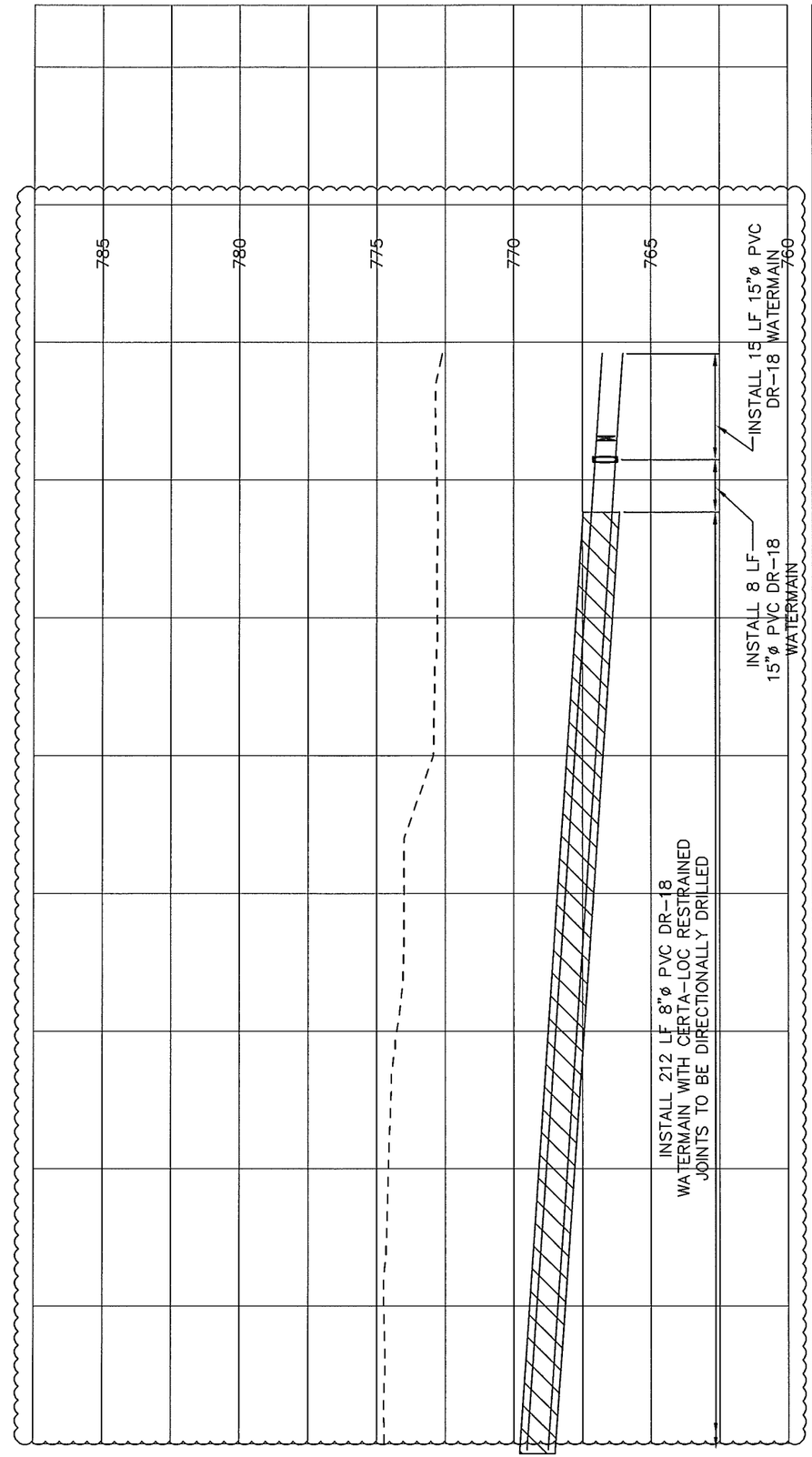
REFER TO SHEET 8

ONE UNIVERSITY PLACE
- PUBLIC IMPROVEMENTS
UNIVERSITY HEIGHTS
JOHNSON COUNTY
STATE OF IOWA

MMS CONSULTANTS, INC.

Date: 03-21-2016	
Designed by: RLA	Scale: 1"=20'H1"=5'V
Drawn by: MAK	Addendum No: 1
Checked by: RLA	Supplemental Drawing No:
Project No: IC 5136-012	SD-7





CIVIL ENGINEERS
LAND PLANNERS
LAND SURVEYORS
LANDSCAPE ARCHITECTS
ENVIRONMENTAL SPECIALISTS

1917 S. GILBERT ST.
IOWA CITY, IOWA 52240
(319) 351-8282

www.mmsconsultants.net

REFER TO SHEET 8

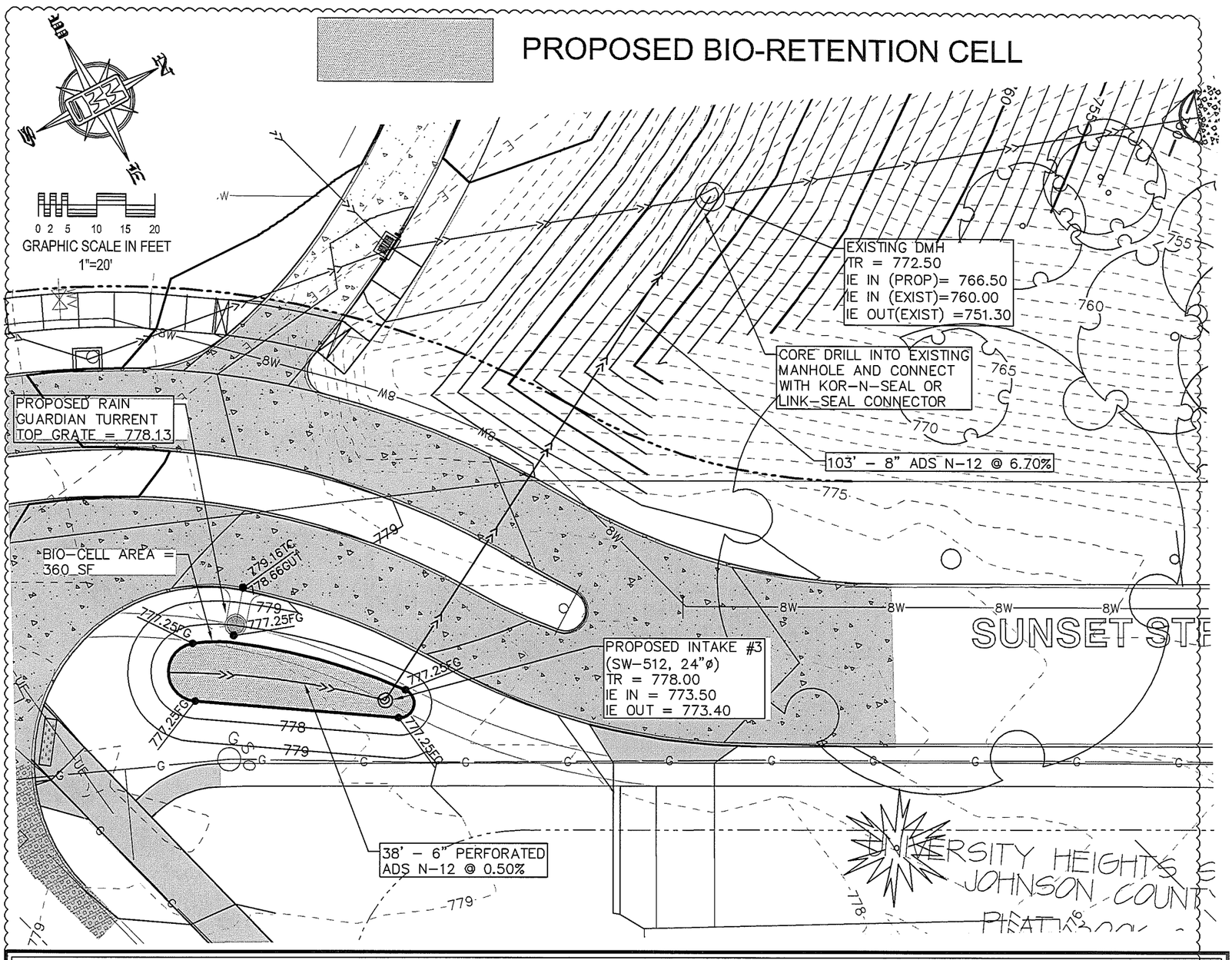
ONE UNIVERSITY PLACE - PUBLIC IMPROVEMENTS

UNIVERSITY HEIGHTS
JOHNSON COUNTY
STATE OF IOWA

MMS CONSULTANTS, INC.

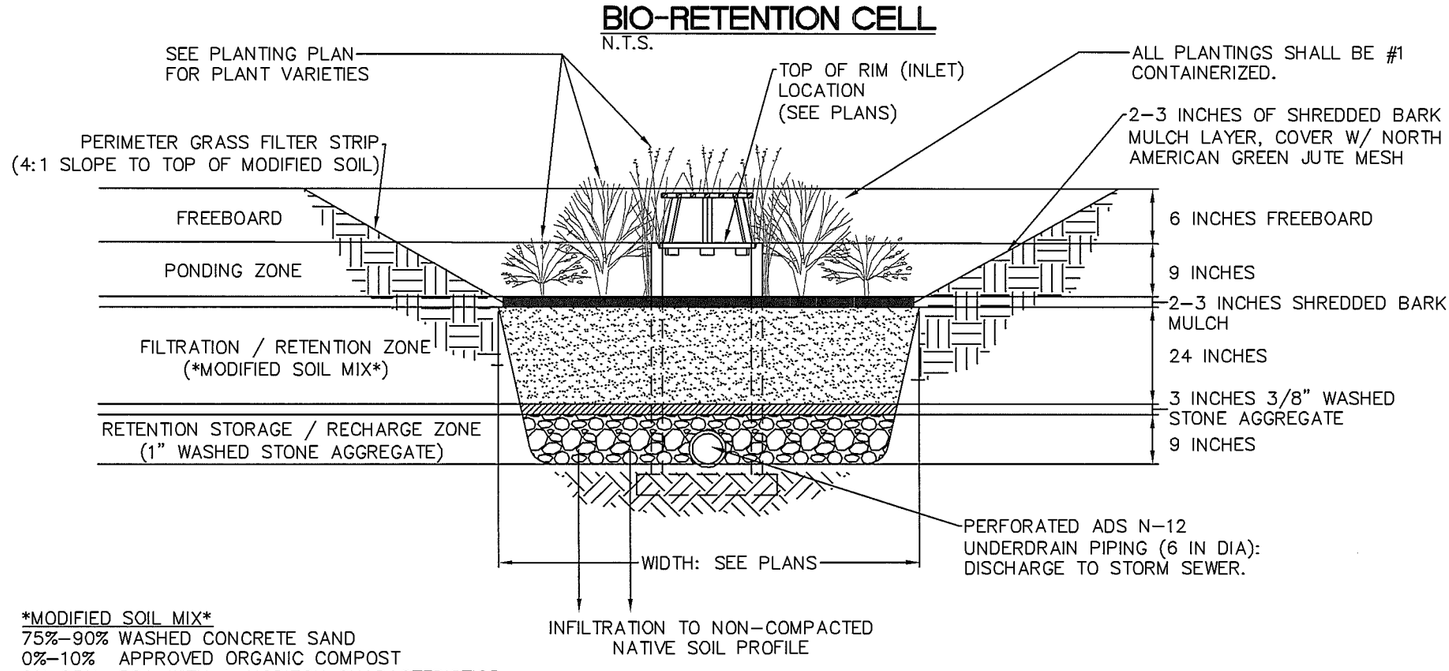
Date: 03-21-2016	
Designed by: RLA	Scale: 1"=20'H1"=5'V
Drawn by: MAK	Addendum No: 1
Checked by: RLA	Supplemental Drawing No:
Project No: IC 5136-012	SD-8

PROPOSED BIO-RETENTION CELL



BIO-RETENTION CELL

N.T.S.



MODIFIED SOIL MIX
75%-90% WASHED CONCRETE SAND
0%-10% APPROVED ORGANIC COMPOST
0%-25% SOIL WITH A-HORIZON CHARACTERISTICS

CONSTRUCTION NOTES: (REFER TO THE IOWA STORMWATER MANAGEMENT MANUAL SECTION 2E-4, C)

1. CONTRACTOR SHALL PLACE MODIFIED SOIL WITHOUT COMPACTING. GRADE SHALL BE LEFT 1" HIGH TO ALLOW FOR NATURAL SETTLING.

2. CONTRACTOR SHALL PROVIDE NO LESS THAN 72 HOURS NOTICE TO INSPECTOR PRIOR TO CONSTRUCTION OF STORMWATER QUALITY PRACTICES.

3. BIO-RETENTION CELL SHALL NOT BE INSTALLED UNTIL AFTER PAVING AND STABILIZATION SEEDING OF THE TRIBUTARY AREA.

4. SURFACE AREA AND BOTTOM OF BIO-RETENTION CELL SHALL BE GRADED LEVEL END TO END AND SIDE TO SIDE.

REFER TO SHEET 8

ONE UNIVERSITY PLACE
-PUBLIC IMPROVEMENTS
UNIVERSITY HEIGHTS
JOHNSON COUNTY
STATE OF IOWA

MMS CONSULTANTS, INC.

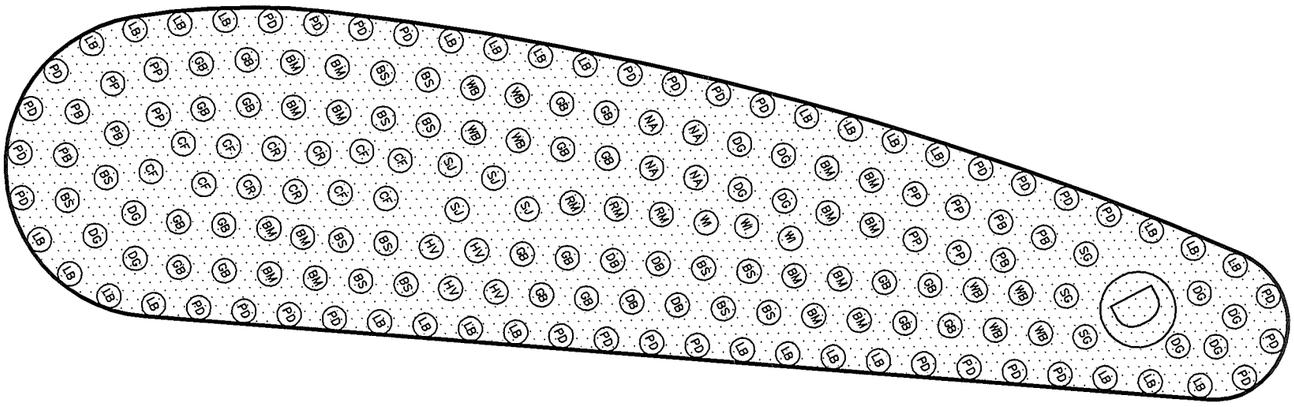
Date:	03-21-2016
Designed by: RLA	Scale: 1"=20'
Drawn by: MAK	Addendum No: 1
Checked by: RLA	Supplemental Drawing No:
Project No: IC 5136-012	SD-9

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

C:\5136\5136-012-\5136012-CONST.dwg, 3/21/2016 2:18:38 PM, mak

PLANT LIST – BIO-RETENTION CELL		
KEY	BOTANICAL NAME	COMMON NAME
DG	GENISTA LYDIA	DYER'S GREENWOOD
LB	SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM
PD	SPOROBOLUS HETEROLEPIS	PRAIRIE DROPSEED
NA	ASTER NOVAEANGLIAE	NEW ENGLAND ASTER
SJ	EUPATORIUM MACULATUM	SPOTTED JOEPYE WEED
PB	LIATRIS PYCNOSTACHYA	PRAIRIE BLAZING STAR
CF	LOBELIA CARDINALIS	CARDINAL FLOWER
DB	LIATRIS SPICATA	DENSE BLAZING STAR
BM	ASCLEPIAS TUBEROSA	BUTTERFLY MILKWEED
PP	DALEA PURPUREA	PURPLE PRAIRIE CLOVER
GB	LOBELIA SIPHILITICA	GREAT BLUE LOBELIA
WB	MONARDA FISTULOSA	WILD BERGAMOT
HV	VERBENA STRICTA	HOARY VERVAIN
OS	TRADESCANTIA OHIENSIS	OHIO SPIDERWART
RM	ERYNGIUM YUCCIFOLIUM	RATTLESNAKE MASTER
CR	VERONICASTRUM VIRGINICUM	CULVERS ROOT
WI	BAPTISIA ALBA	WHITE WILD INDIGO
SG	SOLIDAGO SPECIOSA	SHOWY GOLDENROD
BS	RUDBECKIA HIRTA	BLACK EYED SUSAN

NOTE:
PLANTS SHALL BE #1 CONTAINER PLANTED AT 18 INCHES ON CENTER.



REFER TO SHEET8

ONE UNIVERSITY PLACE
-PUBLIC IMPROVEMENTS
UNIVERSITY HEIGHTS
JOHNSON COUNTY
STATE OF IOWA

MMS CONSULTANTS, INC.

Date: 03-21-2016
Designed by: RLA
Scale: 1"=5'
Drawn by: MAK
Addendum No. 1
Checked by: RLA
Supplemental Drawing No.
Project No: IC 5136-012
SD-10

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

C:\5136\5136-012-\5136012-CONST.dwg, 3/21/2016 2:44:43 PM, mak

March 21, 2016

To Holders of Plans and Specifications for:

One University Place Public Improvements
City of University Heights, Iowa

Attached is **ADDENDUM NO. 1** to the Contract Documents for this project.

Proposals received until 11 am, Monday, March 28, 2016, at the office of Shive-Hattery, Inc. at 2839 Northgate Drive, Iowa City.

Please acknowledge receipt of Addendum No. 1 by signing this letter and faxing it to 319-351-8476 (or scan and email to r.amelon@mmsconsultants.net).

Sincerely,

Ronald L. Amelon

Receipt acknowledged _____, **2016**

By_____

Company_____

ADDENDUM NO. 1

One University Place Public Improvements
City of University Heights, Iowa

Addendum dated: March 21, 2016

The following changes, additions and/or deletions are hereby made a part of the Contract Documents for the One University Place Public Improvements project. In case of a conflict, this Addendum shall govern. All bidders shall indicate receipt of this addendum by using the attached revised proposal form and by properly marking "1" in the appropriate blank on page PR-1.

1. The bid date and time has changed. Bids will be received until **11:00 A.M., Monday March 28, 2016.** Bids will be received at Shive-Hattery, Inc., 2839 Northgate Drive, Iowa City, Iowa 52245.

2. The attached revised proposal form shall be used when submitting bids. The sidewalk removal and the sidewalk quantities have changed and alternate number 1 has been added.

3. Supplemental Drawing SD-1 is attached and shall be incorporated into the work. This supplemental drawing shows the following changes to the proposed traffic signal.
   a. Reorient the pedestrian crosswalk and sidewalk ramps on the west leg of the intersection.
   b. Relocate pushbutton 42 as shown.
   c. Relocate pedestrian signal head P41 from pole 3 to pole 2.
   d. Relocate handhole 2 as shown.
   e. Remove luminaire arm on pole 3.
   f. Reorient luminaire arm pole 2 to light both pedestrian ramps on northeast intersection corner.

4. Supplemental Drawing SD-2 is attached and shall be incorporated into the work. This supplemental drawing shows the updated thrust block details.

5. Supplemental Drawing SD-3 is attached and shall be incorporated into the work. This supplemental drawing shows the revised sidewalk removal for the placement of the traffic signal poles.

6. Supplemental Drawing SD-4 is attached and shall be incorporated into the work. This supplemental drawing shows the new location of the sidewalk ramp and the additional sidewalk replacement that will be required for the placement of the traffic signal poles.

7. Supplemental Drawing SD-5 is attached and shall be incorporated into the work. This supplemental drawing shows the profile for the water main and additional notes calling out the water main fittings.

8. Supplemental Drawing SD-6 is attached and shall be incorporated into the work. This supplemental drawing shows the profile for the water main and additional notes calling out the water main fittings.

9. Supplemental Drawing SD-7 is attached and shall be incorporated into the work. This supplemental drawing shows the profile for the water main and additional notes calling out the water main fittings.

10. Supplemental Drawing SD-8 is attached and shall be incorporated into the work. This supplemental drawing shows the profile for the water main and additional notes calling out the water main fittings.

11. Supplemental Drawing SD-9 is attached and shall be incorporated into the work. This supplemental drawing shows the grading, pipework, stone aggregate, modified soil mix, and other items required for the bio retention cell.

12. Supplemental Drawing SD-10 is attached and shall be incorporated into the work. This supplemental drawing shows the planting plan for the bio retention cell.

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

Signed:

Ronald L. Amelon, P.E. IA. Reg. No. 14201
My biennial license renewal date is December 31, 2017.
All pages in this document are covered by this seal.

Attachments:

Revised Proposal Form
Supplemental Drawing SD-1
Supplemental Drawing SD-2
Supplemental Drawing SD-3
Supplemental Drawing SD-4
Supplemental Drawing SD-5
Supplemental Drawing SD-6
Supplemental Drawing SD-7
Supplemental Drawing SD-8
Supplemental Drawing SD-9
Supplemental Drawing SD-10

REVISED PROPOSAL

ONE UNIVERSITY PLACE – PUBLIC IMPROVEMENTS PROJECT
for the CITY OF UNIVERSITY HEIGHTS, IOWA

NOTICE TO BIDDERS:

PLEASE DO NOT REMOVE THE FORM OF PROPOSAL INCLUDED IN THE BOUND VOLUME OF THE SPECIFICATIONS. SEPARATE COPIES OF THIS PROPOSAL WILL BE PROVIDED TO BIDDERS UPON REQUEST TO THE ENGINEER OR COPIES MAY BE MADE FROM THE VERSION CONTAINED IN THE BOUND SPECIFICATION BOOK.

Name of Bidder _____

Address of Bidder _____

Telephone Number _____ FAX No. _____

TO: **Josiah Bilskemper**
Shive-Hattery
2839 Northgate Drive
Iowa City, IA 52245

Project:
One University Place -
Public Improvements Project

The undersigned bidder submits herewith bid security in the amount of $_____, in accordance with the terms set forth in the "Project Specifications."

The undersigned bidder has carefully examined the site of the proposed Work and is fully informed and satisfied as to the conditions there existing, the character and requirements of the proposed Work, the difficulties attendant upon its execution and the accuracy of all estimated quantities stated in this BID, and bidder has carefully read and examined the Drawings, the annexed proposed AGREEMENT, the Specifications, any addenda and other Contract Documents therein referred to and knows and understands the terms and provisions thereof.

The undersigned bidder agrees that if this BID is accepted, bidder will contract with the Owner, as provided in the copy of the Contract Documents deposited in the office of the City Clerk, this BID form being part of said Contract Documents, and that bidder will perform all the work and furnish all the materials and equipment, and provide all labor, services, plant, machinery, apparatus, appliances, tools, supplies and all other things required by the Contract Documents in the manner and within the time therein prescribed, and that Bidder will take in full payment therefore the lump sum or unit price applicable to each item of the work as stated in the schedule below.

The undersigned bidder, having examined and determined the scope of the Contract Documents, hereby proposes to provide the required labor, services, materials and equipment and to perform the Project as described in the Contract Documents, including Addenda _____, _____, _____, and _____, and to do all work at the prices set forth herein.

REVISED PROPOSAL (cont.)

ONE UNIVERSITY PLACE - PUBLIC IMPROVEMENTS

BASE BID

NO.	ITEM DESCRIPTION	UNIT	EST. QUANT.	UNIT PRICE	EXTENDED PRICE
1	MOBILIZATION	LS	1	$	$
2	CONSTRUCTION STAKING	LS	1	$	$
3	TRAFFIC CONTROL	LS	1	$	$
4	EXCAVATION & SUBGRADE COMPACTION	LS	1	$	$
S	PAVEMENT REMOVAL, 10 INCH PCC	SY	707	$	$
6	PAVEMENT REMOVAL, 7 INCH PCC	SY	586	$	$
7	PAVEMENT REMOVAL, SIDEWALKS	SY	471	$	$
8	PAVEMENT REMOVAL, DRIVEWAYS	SY	97	$	$
9	GRIND EXISTING CURB	LF	4	$	$
10	REMOVE EXISTING RETAINING WALL	LS	1	$	$
11	REMOVE EXISTING HANDRAIL	LS	1	$	$
12	REMOVE EXISTING INTAKE	EA	1	$	$
13	REMOVE EXISTING PAVEMENT STRIPING	LS	1	$	$
14	REMOVE EXISTING TRAFFIC SIGNALS	LS	1	$	$
15	REMOVE AND REINSTALL EXISTING TRAFFIC SIGN	EA	S	$	$
16	REMOVE 12" DIA RCP STORM SEWER	LF	28	$	$
17	STORM SEWER, 12" DIA. RCP	LF	38	$	$
18	STORM INTAKE SW-S09	EA	2	$	$
19	STORM INTAKE SW-S07 TOP AND THROAT	EA	1	$	$
20	WATER MAIN 8" PVC DR-18	LF	361	$	$
21	WATER MAIN 8" CERTA-LOK PVC DR-18 DIRECTIONALLY DRILLED	LF	212	$	$
22	16" X 8" TAPPING SLEEVE AND VALVE	EA	2	$	$
23	8" GATE VALVE	EA	1	$	$
24	FIRE HYDRANT WITH AUXILIARY GATE VALVE	EA	2	$	$
25	ABANDON EXISTING 2 INCH WATER SERVICE	EA	1	$	$
26	SIDEWALK 6" PCC	SY	396	$	$
27	DRIVEWAY 6" PCC	SY	10	$	$
28	PAVEMENT 7" PCC	SY	760	$	$
29	PAVEMENT 10" PCC	SY	1,160	$	$
30	GRANULAR SUBBASE, IDOT GRADATION 12 OR 14, 6" THICK	SY	2,269	$	$
31	SUBDRAIN, LONGITUDINAL, 6"	LF	1,107	$	$
32	RETAINING WALL	LS	1	$	$
33	HANDRAIL	LS	1	$	$
34	PAVEMENT MARKINGS	LS	1	$	$
3S	SOD	SY	1,249	$	$
36	RIVER ROCK	SF	409	$	$
37	FILTER SOCK	LF	410	$	$

38	CONSTRUCTION SAFETY FENCE	LF	320	$	$
39	HAPPY RETURNS DAYLILY	EA	120	$	$
40	TARA DROPSEED	EA	42	$	$
41	HARDWOOD MULCH	SF	690	$	$
42	TRAFFIC SIGNALIZATION	LS	1	$	$
43	SWPPP MANAGEMENT	LS	1	$	$

TOTAL BASE BID: $

ALTERNATE NUMBER ONE BID

NO.	ITEM DESCRIPTION	UNIT	EST. QUANT.	UNIT PRICE	EXTENDED PRICE
1	EXCAVATION FOR BIO-CELL	LS	1	$	$
2	BIO-CELL MODIFIED SOIL MIX	CY	27	$	$
3	3/8" WASHED STONE AGGREGATE	TON	5.4	$	$
4	1" WASHED STONE AGGREGATE	TON	16.2	$	$
S	PERENNIAL PLANT (#1 CONTAINER)	EA	180	$	$
6	HARDWOOD BARK MULCH	SF	360	$	$
7	JUTE MESH	SF	360	$	$
8	RAIN GUARDIAN TURRET	EA	1	$	$
9	STORM INTAKE, SW-S12	EA	1	$	$
10	6" PERFORATED ADS N-12	LF	38	$	$
11	8" ADS N-12	LF	103	$	$
12	CORE DRILL EXISTING STORM MANHOLE	EA	1	$	$
13	KOR-N-SEAL OR LINK SEAL MANHOLE CONNECTOR	EA	1	$	$

TOTAL ALTERNATE NUMBER ONE BID: $

The undersigned bidder further agrees to do all "Extra Work" which may be required to complete the work contemplated, at unit prices or lump sums to be agreed upon in writing prior to starting such work. The names of those persons, firms, companies or other parties with whom we intend to enter into a subcontract, together with the type of subcontracted work and approximate dollar amount of the subcontract, are as follows:

_____

_____

_____

The work under the contract shall commence within ten (10) days after date set forth in written Notice to Proceed. All work shall be complete by July 22, 2016.

Liquidated damages in the amount of $500.00 per calendar day will be assessed for each calendar day that work on the total project shall remain uncompleted after the end of the contract period, with due allowance for extensions of the contract period due to conditions beyond the control of the Contractor.

The undersigned bidder certifies that this proposal is made in good faith, and without collusion or connection with any other person or persons bidding on the work.

The undersigned bidder states that this proposal is made in conformity with the Contract Documents and agrees that, in the event of any discrepancies or differences between any conditions of this proposal and the Contract Documents prepared for the City, the more specific shall prevail.

The bidder hereby agrees that bidder will not withdraw this BID within 50 consecutive calendar days after the actual date of the opening of Bids and that, if the Owner shall accept this Bid, the bidder will duly execute and acknowledge the AGREEMENT and furnish, duly executed and acknowledged, the required CONTRACT BONDS within ten (10) days after notification that the AGREEMENT and other Contract Documents are ready for signature.

Should the bidder fail to fulfill any of the agreements a herein above set forth, the Owner shall have the right to retain as liquidated damages the amount of the bid bond check which shall become the Owners property. If a bid bond was given, it is agreed that the amount thereof shall be paid as liquidated damages to the Owner by the Surety.

By _____ _____
Signature of Authorized Person Date

Title _____

SEAL (if corporation)

PROJECT MANUAL
for the

ONE UNIVERSITY PLACE PUBLIC IMPROVEMENTS

in the

CITY OF UNIVERSITY HEIGHTS, IOWA

February 25, 2016

Prepared By:

MMS CONSULTANTS, INC.
1917 South Gilbert Street
Iowa City, Iowa
Ph (319) 351-8282
www.mmsconsultants.net

	Certification: I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa. Signed: Date: _____ Ron L. Amelon, P.E. Iowa Cert. No. 19546 Discipline – Civil Engineer My bi-annual license renewal date is December 31, 2017. Pages or sheets covered by this seal: Specification section 028790, Traffic Signalization

	Certification: I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa. Signed: Date: _____ Justin A. Campbell, P.E. Iowa Cert. No. 14201 Discipline – Civil Engineer My bi-annual license renewal date is December 31, 20_. Pages or sheets covered by this seal: All Pages except Specification section 028790, Traffic Signalization

Project Manual for the
ONE UNIVERSITY PLACE – PUBLIC IMPROVEMENTS
UNIVERSITY HEIGHTS, IOWA

TABLE OF CONTENTS

	Page Number
NOTICE	N-1
PUBLIC HEARING	PH-1
ADVERTISEMENT FOR BIDS	AB-1
BID BOND	BB-1
PROPOSAL FORM	PR-1
PERFORMANCE and PAYMENT BOND	PB-1
AGREEMENT	AG-1
SPECIAL PROVISIONS	SP-1
SPECIFICATIONS	

The 2016 EDITION of the SUDAS STANDARD SPECIFICATIONS, published by the Iowa SUDAS Corporation, as modified by SUPPLEMENTAL SPECIFICATIONS are hereby incorporated into this project manual and shall be taken and considered as a part of the latter the same as if it were completely set out therein.

SUPPLEMENTAL SPECIFICATIONS	
SECTION 02660–CITY OF IOWA CITY WATER DISTRIBUTION SPECIFICATIONS	02660-1
SECTION 02890 – TRAFFIC SIGNALIZATION	

PROJECT NOTICE

PROJECT: One University Place – Public Improvements - City of University Heights, Iowa

PROPOSALS RECEIVED: Until 2:00 P.M., March 24, 2016, by the City Engineer of the City of University Heights, Iowa, at Shive-Hattery, Inc., 2839 Northgate Drive, Iowa City, Iowa, 52245.

PROJECT LOCATION: The project is located along Melrose Avenue between Sunset Street and Birkdale Court, in the city of University Heights, Iowa.

DESCRIPTION OF WORK: The project includes all labor, materials and equipment necessary to widen Melrose Avenue to add a turn lane, to realign Sunset Street at the north side of the intersection of Melrose Avenue and Sunset Street, and to install a new traffic signal at the intersection of Melrose Avenue and Sunset Street. The work will include pavement removal, storm sewer, retaining wall, water main, grading and subgrade preparation, paving, traffic signalization, surface restoration, and other related work.

All work is to be done in strict compliance with the plans and specifications prepared by MMS Consultants, Inc.

ENGINEER'S ESTIMATE: $643,000

SCHEDULE: Work shall begin after April 5, 2016 and be completed by July 22, 2016. Liquidated damages in the amount of $500 per day shall be included in the project.

BID SECURITY: Bid bond in the amount of five percent (5%) of the bid.

PERFORMANCE BOND: Equal to one hundred percent (100%) of the contract price, said bond to be issued by a responsible surety approved by the City Council, and shall guarantee the prompt payment of all materials and labor, and also protect and save harmless the City from all claims and damages of any kind caused directly or indirectly by the operation of the contract, and shall also guarantee the maintenance of the improvement for a period of two (2) years from and after its completion and formal acceptance by the City.

MAINTENANCE BOND: Upon completion of the project the contractor shall provide a 5-year maintenance bond covering defects in materials and workmanship for all paving. The contractor shall provide a 5-year maintenance bond for the storm sewer system and water main improvements.

PAYMENTS: Monthly estimates equivalent to 95% of the contract value of the work completed during the preceding calendar month.

BIDDING DOCUMENTS: Available beginning March 10, 2016 from MMS Consultants, Inc., 1917 South Gilbert Street, Iowa City, Iowa, 52240, telephone # 319-351-8282 or fax # 319-351-8476. Hard copies of bid documents shall be provided at no charge to the bidder. Electronic PDF format bid documents are also available.

PROJECT ENGINEER: Ronald L. Amelon, P.E.

NOTICE OF PUBLIC HEARING ON PROPOSED PLANS, SPECIFICATIONS, FORM OF CONTRACT AND ESTIMATED COST FOR CONSTRUCTION FOR THE ONE UNIVERSITY PLACE – PUBLIC IMPROVEMENTS PROJECT FOR THE CITY OF UNIVERSITY HEIGHTS, IOWA.

To all taxpayers of the City of University Heights, Iowa, and to other interested persons:

Public notice is hereby given that the City Council of the City of University Heights, Iowa, will conduct a public hearing on plans, specifications, form of contract and estimated cost for the construction of the One University Heights – Public Improvements Project in said City at 7:00 pm on the 8th day of March, 2016, said meeting to be held in the at Horn School, 600 Koser Avenue.

Said plans, specifications, form of contract and estimated cost are now on file in the office of the City Engineer at Shive-Hattery, Inc., 2839 Northgate Drive, Iowa City, IA 52245, and may be inspected by any interested persons.

Any interested persons may appear at said meeting of the City Council for the purpose of making objections to and comments concerning said plans, specifications, contract or the cost of making said improvement.

Published upon order of the City Council of the City of University Heights, Iowa and as provided by law.

Christine M. Anderson, University Heights City Clerk.

NOTICE TO BIDDERS – ADVERTISEMENT FOR BIDS FOR THE ONE UNIVERSITY PLACE – PUBLIC IMPROVEMENTS PROJECT FOR THE CITY OF UNIVERSITY HEIGHTS, IOWA.

Sealed proposals for the "One University Place – Public Improvements Project" (the Project) will be received by the City Engineer of the City of University Heights, Iowa, until 2:00 P.M. on the 24th day of March, 2016, and shall be received in the Shive-Hattery, Inc. office at 2839 Northgate Drive, Iowa City, IA 52245 no later than said date and time. Sealed proposals will be opened immediately thereafter by the City Engineer. Bids submitted by fax machine shall not be deemed a "sealed bid" for purposes of this Project. Proposals will be acted upon by the City Council following at 7:00 P.M. on the 29th day of March 2016, or at such later time and place as may then be scheduled.

The project will involve the following: 1,847 SY pavement removal, 38 LF 12" storm sewer, 573 LF water main, 2,324 SY paving, traffic signalization, seeding and other related work.

All work is to be done in strict compliance with the plans and specifications prepared by MMS Consultants, Inc., of Iowa City, Iowa which have heretofore been approved by the City Council, and are on file for public examination in the Office of the Shive-Hattery, Inc.

Payment for the Project will be made from such funds as are legally available for such purpose. Monthly estimates will be paid to the Contractor as the work progresses in amounts equal to ninety five percent (95%) of the contract value of the work completed during the preceding calendar month, including the actual cost (exclusive of overhead or profit to the Contractor) of materials and equipment of a permanent nature to be incorporated in the work and delivered to and stored at the job site. Such monthly payments shall in no way be construed as an act of acceptance for any part of the work, partially or totally completed. Final payment of the remaining amount due the Contractor will be

made in accordance with the provisions of Chapters 26 and 573 of the Code of Iowa.

Each proposal shall be made on the proposal form prepared for this purpose, which form may be obtained from MMS Consultants, Inc. or reviewed at the City Engineers office. Each proposal shall include the certifications or documents listed in the Instructions to Bidders. Each proposal shall be accompanied bid bond issued by a corporate surety satisfactory to the City of University Heights, or certified check, or cashier's check or a credit union certified share draft in a separate, sealed envelope in an amount equal to five percent (5%) of the total amount of the bid. The certified check or cashier's check shall be drawn on a bank in Iowa or a bank chartered under the laws of the United States of America, the certified share draft shall be drawn on a credit union in Iowa or a credit union chartered under the laws of the United States; and such check shall be made payable to the City of University Heights as security that if awarded a contract, the Bidder will enter into a contract at the prices bid and furnish the required Performance Bond and Certificates of Insurance. The certified check or cashier's check or credit union share draft may be cashed, or the Bid Bond forfeited, and the proceeds retained as liquidated damages if the Bidder fails to execute a contract or file acceptable Performance Bond or provide acceptable Certificate of Insurance within ten (10) days after the acceptance of his proposal by resolution of the City Council. No bidder may withdraw a proposal within fifty (50) days after the date set for opening bids. Bid security of the unsuccessful bidders will be returned as soon as the successful bidder is determined or within 30 days, whichever is sooner. Bid security of successful bidder will be returned upon execution of contract and furnishing of bond. Other bid bonds will be returned after the canvass and tabulation of bids is completed and reported to the City Council.

The successful bidders will be required to furnish a bond in an amount equal to one hundred percent (100%) of the contract price, said bond to be issued by a responsible surety ap-

proved by the City Council, and shall guarantee the prompt payment of all materials and labor, and also protect and save harmless the City from all claims and damages of any kind caused directly or indirectly by the operation of the contract, and shall also guarantee the maintenance of the improvement for a period of two (2) years from and after its completion and formal acceptance by the City.

The following limitations shall apply to this Project:

Early Start Date: April 5, 2016
Specified Completion Date: July 22, 2016
Liquidated Damages: $500 per calendar day

The plans, specifications and proposed contract documents may be examined at the office of the City Engineer located at Shive-Hattery, Inc., 2839 Northgate Drive, Iowa City, IA 52245. Copies of said plans and specifications and form of proposal blanks may be secured from the office of MMS Consultants, Inc., 1917 S. Gilbert Street, Iowa City, Iowa, 52240.

By virtue of statutory authority, preference will be given to products and provisions grown and coal produced within the State of Iowa, and to Iowa domestic labor, to the extent lawfully required under Iowa Statutes. The Iowa Reciprocal Preference Act applies to the contract with respect to bidders who are not Iowa residents.

The City reserves the right to reject any or all proposals, and also reserves the right to waive technicalities and irregularities.

Published upon order of the City Council of the City of University Heights, Iowa and as provided by law.

Christine M. Anderson, University Heights City Clerk

BID BOND

_____, as Principal, and _____, as Surety declare that we are held and are firmly bound unto the City of University Heights, hereinafter called "OWNER," in the sum of _____ _____ Dollars ($_____) to pay said sum as herein provided. We as Principal and Surety further promise and declare that these obligations shall bind our heirs, executors, administrators, and successors jointly and severally. This obligation is conditioned on the Principal submission of the accompanying bid, dated _____ for the One University Place – Public Improvements Project.

NOW, THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the form specified, and the Principal shall then furnish a bond for the Principal's faithful performance of said Project, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the Project, as agreed to by the Owner's acceptance of said Bid,

then this obligation shall be void. Otherwise this obligation shall remain in full force and effect, provided that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the amount of the obligation stated herein.

By virtue of statutory authority, the full amount of this bid bond shall be forfeited to the Owner in the event that the Principal fails to execute the contract and provide the bond, as provided in the Project specifications or as required by law.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall in no way be impaired or affected by any extension of the time within which the Owner may accept such Bid or may execute such contract documents, and said Surety does hereby waive notice of any such time extension.

The Principal and the Surety hereto execute this bid bond this the _____ day of

_____, A.D., 2016

_____	_____ (Seal)
Witness	Principal
	By _____ (Title)
	_____ (Seal)
	Surety
_____	By _____
Witness	(Attorney-in-fact)
	Attach Power-of-Attorney

PROPOSAL

ONE UNIVERSITY PLACE – PUBLIC IMPROVEMENTS PROJECT
for the CITY OF UNIVERSITY HEIGHTS, IOWA

NOTICE TO BIDDERS:

PLEASE DO NOT REMOVE THE FORM OF PROPOSAL INCLUDED IN THE BOUND VOLUME OF THE SPECIFICATIONS. SEPARATE COPIES OF THIS PROPOSAL WILL BE PROVIDED TO BIDDERS UPON REQUEST TO THE ENGINEER OR COPIES MAY BE MADE FROM THE VERSION CONTAINED IN THE BOUND SPECIFICATION BOOK.

Name of Bidder _____

Address of Bidder _____

Telephone Number _____ FAX No. _____

TO: **Josiah Bilskemper**
Shive-Hattery
2839 Northgate Drive
Iowa City, IA 52245

Project:
One University Place -
Public Improvements Project

The undersigned bidder submits herewith bid security in the amount of $_____, in accordance with the terms set forth in the "Project Specifications."

The undersigned bidder has carefully examined the site of the proposed Work and is fully informed and satisfied as to the conditions there existing, the character and requirements of the proposed Work, the difficulties attendant upon its execution and the accuracy of all estimated quantities stated in this BID, and bidder has carefully read and examined the Drawings, the annexed proposed AGREEMENT, the Specifications, any addenda and other Contract Documents therein referred to and knows and understands the terms and provisions thereof.

The undersigned bidder agrees that if this BID is accepted, bidder will contract with the Owner, as provided in the copy of the Contract Documents deposited in the office of the City Clerk, this BID form being part of said Contract Documents, and that bidder will perform all the work and furnish all the materials and equipment, and provide all labor, services, plant, machinery, apparatus, appliances, tools, supplies and all other things required by the Contract Documents in the manner and within the time therein prescribed, and that Bidder will take in full payment therefore the lump sum or unit price applicable to each item of the work as stated in the schedule below.

The undersigned bidder, having examined and determined the scope of the Contract Documents, hereby proposes to provide the required labor, services, materials and equipment and to perform the Project as described in the Contract Documents, including Addenda _____, _____, _____, and _____, and to do all work at the prices set forth herein.

ONE UNIVERSITY PLACE - PUBLIC IMPROVEMENTS

NO.	ITEM DESCRIPTION	UNIT	EST. QUANT.	UNIT PRICE	EXTENDED PRICE
1	MOBILIZATION	LS	1	$	$
2	CONSTRUCTION STAKING	LS	1	$	$
3	TRAFFIC CONTROL	LS	1	$	$
4	EXCAVATION & SUBGRADE COMPACTION	LS	1	$	$
5	PAVEMENT REMOVAL, 10 INCH PCC	SY	707	$	$
6	PAVEMENT REMOVAL, 7 INCH PCC	SY	586	$	$
7	PAVEMENT REMOVAL, SIDEWALKS	SY	457	$	$
8	PAVEMENT REMOVAL, DRIVEWAYS	SY	97	$	$
9	GRIND EXISTING CURB	LF	4	$	$
10	REMOVE EXISTING RETAINING WALL	LS	1	$	$
11	REMOVE EXISTING HANDRAIL	LS	1	$	$
12	REMOVE EXISTING INTAKE	EA	1	$	$
13	REMOVE EXISTING PAVEMENT STRIPING	LS	1	$	$
14	REMOVE EXISTING TRAFFIC SIGNALS	LS	1	$	$
15	REMOVE AND REINSTALL EXISTING TRAFFIC SIGN	EA	5	$	$
16	REMOVE 12" DIA RCP STORM SEWER	LF	28	$	$
17	STORM SEWER, 12" DIA. RCP	LF	38	$	$
18	STORM INTAKE SW-509	EA	2	$	$
19	STORM INTAKE SW-507 TOP AND THROAT	EA	1	$	$
20	WATER MAIN 8" PVC DR-18	LF	361	$	$
21	WATER MAIN 8" CERTA-LOK PVC DR-18 DIRECTIONALLY DRILLED	LF	212	$	$
22	16" X 8" TAPPING SLEEVE AND VALVE	EA	2	$	$
23	8" GATE VALVE	EA	1	$	$
24	FIRE HYDRANT WITH AUXILIARY GATE VALVE	EA	2	$	$
25	ABANDON EXISTING 2 INCH WATER SERVICE	EA	1	$	$
26	SIDEWALK 6" PCC	SY	394	$	$
27	DRIVEWAY 6" PCC	SY	10	$	$
28	PAVEMENT 7" PCC	SY	760	$	$
29	PAVEMENT 10" PCC	SY	1,160	$	$
30	GRANULAR SUBBASE, IDOT GRADATION 12 OR 14 6" THICK	SY	2,269	$	$
31	SUBDRAIN, LONGITUDINAL, 6"	LF	1107	$	$
32	RETAINING WALL	LS	1	$	$

33	HANDRAIL	LS	1	$	$
34	PAVEMENT MARKINGS	LS	1	$	$
35	SOD	SY	1,262	$	$
36	RIVER ROCK	SF	409	$	$
37	FILTER SOCK	LF	410	$	$
38	CONSTRUCTION SAFETY FENCE	LF	258	$	$
39	HAPPY RETURNS DAYLILY	EA	120	$	$
40	TARA DROPSEED	EA	42	$	$
41	HARDWOOD MULCH	SF	690	$	$
42	TRAFFIC SIGNALIZATION	LS	1	$	$

TOTAL BID: $

The undersigned bidder further agrees to do all "Extra Work" which may be required to complete the work contemplated, at unit prices or lump sums to be agreed upon in writing prior to starting such work.
The names of those persons, firms, companies or other parties with whom we intend to enter into a subcontract, together with the type of subcontracted work and approximate dollar amount of the subcontract, are as follows:

_____

_____

_____

The work under the contract shall commence within ten (10) days after date set forth in written Notice to Proceed. All work shall be complete by July 22, 2016.

Liquidated damages in the amount of $500.00 per calendar day will be assessed for each calendar day that work on the total project shall remain uncompleted after the end of the contract period, with due allowance for extensions of the contract period due to conditions beyond the control of the Contractor.

The undersigned bidder certifies that this proposal is made in good faith, and without collusion or connection with any other person or persons bidding on the work.

The undersigned bidder states that this proposal is made in conformity with the Contract Documents and agrees that, in the event of any discrepancies or differences between any conditions of this proposal and the Contract Documents prepared for the City, the more specific shall prevail.

The bidder hereby agrees that bidder will not withdraw this BID within 50 consecutive calendar days after the actual date of the opening of Bids and that, if the Owner shall accept this Bid, the bidder will duly execute and acknowledge the AGREEMENT and furnish, duly executed and acknowledged, the required CONTRACT BONDS within ten (10) days after notification that the AGREEMENT and other Contract Documents are ready for signature.

Should the bidder fail to fulfill any of the agreements a herein above set forth, the Owner shall have the right to retain as liquidated damages the amount of the bid bond check which shall become the Owners property. If a bid bond was given, it is agreed that the amount thereof shall be paid as liquidated damages to the Owner by the Surety.

By _____ _____
Signature of Authorized Person Date

Title _____

SEAL (if corporation)

PERFORMANCE AND PAYMENT BOND

_____as Principal, hereinafter called the Contractor and

_____,
(Here insert the legal title of the Surety)

as Surety, hereinafter called the Surety, are held and firmly bound unto the City of University Heights, Iowa, as obligee, hereinafter called the Owner, in the amount of _____ Dollars ($) for the payment for which Contractor and Surety hereby bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally.

WHEREAS, Contractor has, as of _____, entered into a written
(date)
Agreement with Owner for the said construction of the One University Place – Public Improvements Project; and

WHEREAS, the Agreement requires execution of this Performance and Payment Bond, to be completed by Contractor, in accordance with plans and specifications prepared by MMS Consultants, Inc., which Agreement is by reference made a part hereof, and the agreed-upon work is hereafter referred to as the Project.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that, if Contractor shall promptly and faithfully perform said Agreement, then the obligation of this bond shall be null and void; otherwise it shall remain in full force and effect until satisfactory completion of the Project.

A. The Surety hereby waives notice of any alteration or extension of time made by the Owner.

B. Whenever Contractor shall be, and is declared by Owner to be, in default under the Agreement, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:
   1. Complete the Project in accordance with the terms and conditions of the Agreement, or
   2. Obtain a bid or bids for submission to Owner for completing the Project in accordance with the terms and conditions of the Agreement; and upon determination by Owner and Surety of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available, as work progresses (even though there may be a default or a succession of defaults under the Agreement or subsequent contracts of completion arranged under this paragraph), sufficient funds to pay the cost of completion, less the balance of the Contract Price, but not exceeding the amount set forth in the first paragraph hereof. The term "balance of the Contract Price," as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Agreement, together with any addenda and/or amendments thereto, less the amount properly paid by Owner to Contractor.

C. The Contractor and Contractor's Surety shall, in accordance with the provisions of Chapter 384, Code of Iowa, be obligated to keep the improvements covered by this bond in good repair for a period of two (2) years from the date of formal acceptance of the improvements by the Owner.

D. No right of action shall accrue to or for the use of any person, corporation or third party other than the Owner named herein or the heirs, executors, administrators or successors of Owner.

IT IS A FURTHER CONDITION OF THIS OBLIGATION that the Principal and Surety, in accordance with provisions of Chapter 573, Code of Iowa, shall pay to all persons, firms or corporations having contracts directly with the Principal, including any of Principal's subcontractors, all claims due them for labor performed or materials furnished in the performance of the Agreement for whose benefit this bond is given. The provisions of Chapter 573, Code of Iowa, are a part of this bond to the same extent as if it were expressly set out herein.

SIGNED AND SEALED THIS _____ DAY OF _____, 2015**.**

IN THE PRESENCE OF:

_____
(Principal)

_____
Witness

_____
(Title)

_____
(Surety)

_____
Witness

_____
(Title)

_____
(Address)

FORM OF AGREEMENT

THIS AGREEMENT is made and entered into by and between the City of University Heights, Iowa ("City"), and _____("Contractor").

Whereas the City has caused to be prepared certain plans, specification forms for proposal and bid documents dated February 25, 2016, for the One University Place – Public Improvements Project ("Project"), and

Whereas, said plans, specifications, proposal and bid documents accurately and fully describe the terms and conditions upon which the Contractor is willing to perform the Project.

NOW, THEREFORE, IT IS AGREED:

1. The City hereby accepts the attached proposal and bid documents of the Contractor for the Project, and for the sums listed therein.
2. This Agreement consists of the following component parts which are incorporated herein by reference:
    a. Addendum Number ___;
    b. Plans;
    c. Specifications;
    d. Notice of Public Hearing and Advertisement for Bids;
    e. Instructions to Bidders;
    f. Performance and Payment Bond;
    g. Proposal and Bid Documents; and
    h. This Instrument.

The above components are deemed complementary and should be read together. In the event of a discrepancy or inconsistency, the more specific provision shall prevail.

3. The names of subcontractors, together with quantities, unit prices, and extended dollar amounts, are as follows (or shown on an attachment):

_____

_____

_____

_____

4. Payments are to be made to the Contractor in accordance with the Specifications and General Conditions.

DATED this _____ day of _____, 2016

City	Contractor
By_____	By_____
_____ Mayor	(Title)_____
ATTEST:	ATTEST: _____
_____ City Clerk	(Title)_____ (Company Official)

SPECIAL PROVISIONS

ONE UNIVERSITY PLACE – PUBLIC IMPROVEMENTS PROJECT
CITY OF UNIVERSITY HEIGHTS, IOWA

1. The early start date for this project is April 5, 2016 and is when the Notice to Proceed is anticipated to be issued. Final project completion, including satisfactory completion of all corrective work identified on the project "Punchlist," is July 22, 2016. Liquidated damages of $500.00 per working day shall be assessed for work beyond the completion date.

2. This project is a sales tax exempt project. The City of University Heights will issue certificates to the awarded bidder and subcontractors as needed.

3. The City of University Heights shall obtain and pay for NPDES General Permit #2 and prepare the project's SWPPP Narative Document before the start of the project. The Contractor shall be responsible for all required weekly and event inspections and maintaining and updating the SWPPP for the duration of the project. Sheet 5, GRADING AND EROSION CONTROL PLAN, shall serve as the SWPPP Drawing that the Contractor shall use for maintaining an updated SWPPP.

4. All work shall be completed within the designated right of way for the project. Contractor shall install orange safety fence as shown on the plans to clearly identify the work area. The contractor shall be solely responsible for damage to any property outside of the designated right of way. Access to the site will be allowed along the right of way of Melrose Avenue and Sunset Street. Other access to the site may be negotiated with other adjacent property owners by the Contractor.

5. Strip topsoil from all work areas to a depth of 8 inches. Stockpile the topsoil within the easement areas during construction. Respread topsoil evenly at least 8 inches deep over disturbed areas at the completion of the project just prior to final stabilization.

6. The Contractor shall provide and maintain insurance throughout the construction period in the following minimum amounts. Such insurance shall name the owner as "Additional Insured" under the policy as well as the contractor. (See Exhibit "A" below for the language).

   A. Workman's compensation and occupational disease insurance in accordance with laws of the State of Iowa covering all employees who perform any obligations assumed under the contract. All Workers' Compensation policies shall contain provisions that the insurance companies will have no right of recovery or subrogation against the City of University Heights.

State: Iowa	Statutory
Federal, if applicable (e.g., Longshoreman's):	Statutory
Employer's Liability:	
Bodily injury, each accident	$1,000,000
Bodily injury by disease, each employee	$1,000,000
Bodily injury/disease aggregate	$1,000,000
For work performed in monopolistic states, stop-gap liability coverage shall be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of:	$1,000,000

B. Commercial General Liability—Claims Covered: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees; claims for damages insured by reasonably available personal injury liability coverage; claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

General Aggregate	$2,000,000
Products - Completed Operations Aggregate	$2,000,000
Personal and Advertising Injury	$1,000,000
Each Occurrence (Bodily Injury and Property Damage)	$1,000,000

C. Automobile liability: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

Combined Single Limit (Each Accident)	$1,000,000

D. Umbrella or excess liability: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

Per Occurrence	$2,000,000
General Aggregate	$2,000,000

E. Public liability and property damage liability insurance covering all operations under the contract; limits for bodily injury or death not less than $1,000,000 for one person and $2,000,000 for each accident; for property damage not less than $1,000,000 for each accident and $2,000,000 aggregate for accidents during policy period.

<u>The Contractor shall furnish Certificates of Insurance to the City Engineer made in favor of the Owner showing compliance with the foregoing requirements:</u>

EXHIBIT "A"

"The Companies affording coverage and the Additional Insured, City of University Heights, Johnson County, Iowa, expressly agree and state that the purchase of this policy of insurance by the Insured and the listing of the City of University Heights as an Additional Insured hereunder do not waive any of the defenses of government immunity available to the Additional Insured under Iowa Code Section 670.4 as it now exists and as it may be amended from time to time.

The Companies and the Additional Insured further agree that this policy of insurance shall cover only those claims not subject to the defense of government immunity under Iowa Code Section 670.4 as it now exists and as it may be amended from time to time.

The Additional Insured shall be responsible for asserting any defense of government immunity, and may do so at any time and shall do so upon the timely written request of the Companies.

The Companies shall not deny coverage under this policy and the Companies shall not deny any of the rights and benefits accruing to the Insured or the Additional Insured under this policy for reasons of government immunity unless and until a court of competent jurisdiction has ruled in favor of the defense(s) of government immunity asserted by the Additional Insured."

SECTION 02660
CITY OF IOWA CITY WATER DISTRIBUTION SPECIFICATIONS
(Revised November 2015)

PART 1 GENERAL

1.1 SUMMARY

A. Furnish, install and test water distribution system and water services as indicated and specified.

B. Water Division maintains salvage rights to all fire hydrants designated as public. Samples of water main and its appurtenances may also be retained by the Water Division for testing or documentation purposes.

C. Reuse of materials is not allowed without prior permission. Reuse of materials previously attached to another system shall not be allowed.

D. All piping shall be isolated from the existing water system until it has passed all testing procedures and is approved for service.

E. In the event that field conditions prevent the isolation of the new piping from the existing water system, any existing main and valving, and any appurtenances that will be tested against, shall be well flushed and pass the pressure test per part 4.7 of this section before any new system installation is permitted. Any costs associated with testing the existing water main prior to connecting the new pipe will not be paid for separately, but shall be considered incidental to the water main disinfection and pressure testing for the new water main.

F. The approval of reusing any private service main, piping, valves, or appurtenances by the Water Division does not infer any guarantee that it will perform as required. The Water Division accepts no fault for any issues arising from, or possibly related to, the approved reuse of any material on a private service.

1.2 REFERENCES

A. This specification references the following documents. In their latest edition, the referenced documents form a part of this specification to the extent specified herein. In case of conflict, the requirements of this specification shall prevail.

B. City of Iowa City
   1. Reference Manual: City Code of Ordinances Chapter 3, 4, & 10
   2. Iowa City Municipal Design Standards
   3. Earth Excavating, Backfill & Grading Specifications - Section 02220
   4. Accepted Products for Water Distribution Materials
   5. Iowa City Water Division Policies & Procedures Manual
   6. Backflow Ordinance - Chapter 5

C. American National Standards Institute and American Water Works Combined Standards:
   1. ANSI/AWWA-C104/A21.4: Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
   2. ANSI/AWWA-C105/A21.5: Polyethylene Encasement for Ductile-Iron Pipe

Systems

3. ANSI/AWWA-C110/A21.10: Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
4. ANSI/AWWA-C111/A21.11: Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
5. ANSI/AWWA-C150/A21.50: Thickness Design of Ductile-Iron Pipe
6. ANSI/AWWA-C151/A21.51: Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
7. ANSI/AWWA-C153/A21.53: Ductile-Iron Compact Fittings, 3-inch through 24-inch, and 54-inch through 64-inch for Water Service
8. ANSI/AWWA C502: Dry-Barrel Fire Hydrants
9. ANSI/AWWA C504: Rubber-Seated Butterfly Valves
10. AWWA C509: Resilient-Seated Gate Valves for Water Supply Service
11. ANSI/AWWA C510: Double Check Valve Backflow-Prevention Assembly
12. ANSI/AWWA C511: Reduced-Pressure Principal Backflow-Prevention Assembly
13. ANSI/AWWA C550: Protective Epoxy Interior Coatings for Valves and Hydrants
14. ANSI/AWWA C600: Installation of Ductile-Iron Water Mains and Their Appurtenances
15. ANSI/AWWA C651: Disinfecting Water Mains
16. ANSI/AWWA C800: Underground Service Line Valves and Fittings.
17. ANSI/AWWA C900: Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 8-inch for Water Distribution

D. American Water Works Association:
1. AWWA Manual M23: PVC Pipe-Design and Installation
2. AWWA Manual M17: Installation, Field Testing, and Maintenance of Fire Hydrants

E. American Society for Testing Materials:
1. ASTM A48: Gray Iron Castings
2. ASTM B62: Composition Bronze or Ounce Metal Castings
3. ASTM B75: Seamless Copper Tubing
4. ASTM B88: Seamless Copper Water Tube
5. ASTM B584: Copper Alloy Sand Castings for General Applications
6. ASTM D2241: Polyvinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series)

F. Manufacturers Standardization Society:
1. MSS-SP-58 Pipe Hangers and Supports, Materials Design and Manufacture
2. MSS-SP-69 Pipe Hangers and Supports Selection and Application

G. Uni-Bell PVC Pipe Association:
1. UNI-B-3-88 Recommended Practice for the Installation of Polyvinyl Chloride (PVC) Pressure Pipe (nominal diameters 4-36 inch) complying with AWWA Standard C-900

H. Occupational Safety and Health Administration (OSHA):
1. Standard 1926, Subpart P-Excavations

1.3 SUBMITTALS

A. Submit to the Engineer the following drawings or details for approval prior to installation. One copy of each with the approval stamp shall be kept at the work site at all times.

B. Plans for initial operations and final operations: Special prepared drawings and typed list of sequences of steps are needed prior to any operation of water distribution system. Submit 2 weeks prior to date of planned operation.

C. Shop, Working Drawings or Construction Plans showing:
   1. Pipe layout with valves, fittings and hydrants shown
   2. Bolts
   3. Joints
   4. Tapping sleeves, couplings, and special piping materials
   5. Polyethylene
   6. Thrust block designs and details
   7. Special backfill

D. Certificates: Sworn certificates of shop tests showing compliance with appropriate standard for all piping materials.

1.4 QUALITY ASSURANCE

A. Engineer reserves the right to inspect and test by independent service at manufacturer's plant or elsewhere at Engineer's expense.

B. Contractor shall conduct visual inspection before installation.

1.5 RECEIVING, STORAGE AND HANDLING

A. The City may mark materials which are found on the job site and which are determined to be defective or not approved. The marking may be done with spray paint. The Contractor shall promptly remove defective or unapproved materials from the site.

B. While unloading all piping materials:
   1. Do not allow the pipe units to strike anything.
   2. Do not handle pipe units with individual chains or single cables, even if padded.
   3. Do not attach cables to pipe unit frames or banding for lifting.

C. Within the "Storage" language of AWWA M23, change "should" to "shall."

D. Within the "Handling" language of AWWA M23, change "should" to "shall."

E. Follow AWWA C600 for proper storage, handling, and installation of DIP.

1.6 TIME

A. All work which requires shutdown of active water mains must be completed as quickly as possible to minimize inconvenience to the consumers and risk to the community.

B. Amount of advance notice required to the Iowa City Water Division when materials or services are supplied by the Division are listed below. Serve notice to the Water Division at 356-5160.

1. For tapping service, provide 24 hours notice.
2. For notice to customers of disruption of water service, provide 48 hours notice. This work will be completed with the assistance of Water Division personnel.
3. For review, comments, and approval of plans of operation, provide 3 days notice.
4. For locations of underground facilities, provide notice as required by Iowa One-Call system.

1.7 LICENSES AND APPLICATIONS

A. City of Iowa City

1. Contractor's superintendent on the job must have a license as a sewer and water service installer issued by the City to construct water and sewer mains and services in Iowa City.
2. The Contractor or their agent will be responsible for submitting tapping application forms and record drawings.

PART 2 PRODUCTS

2.1 All products used for this work shall be from the list of "Accepted Products for Water Distribution and Water Service Materials" maintained by the Iowa City Water Division. Any special exception requests shall be submitted to the Water Division in a timely manner for review.

2.2 PIPE

A. Polyvinyl Chloride (PVC) Pipe: Comply with AWWA C900 or AWWA C905 with gray iron pipe equivalent outside diameters.

1. Minimum Wall Thickness:
   a. 4 inch through 24 inch sizes: DR 18.
   b. Sizes over 24 inch: As specified in the contract documents.
2. Joint Type: Use push-on joint type, except as otherwise specified in the contract documents or as authorized by the Engineer.
   a. Push-on: According to AWWA C900 or AWWA C905.
   b. Integral Restrained Joint: AWWA C900 or AWWA C905 pipe with restraining system manufactured integrally into pipe end.
   c. Mechanical Restrained Joint: Ductile iron mechanical device designed for joint restraint of AWWA C900 or AWWA C905 pipe complying with the requirements of ASTM F 1674.
3. Markings on Pipe:
   a. Name of manufacturer.
   b. Size and class.

c. Spigot insertion depth gauge.
d. National Sanitation Foundation (NSF) seal.

B. Ductile Iron Pipe (DIP):
1. Minimum Thickness Class:
a. 4 inch through 24 inch sizes: Special thickness Class 52 according to AWWA C151. For restrained joint pipe and pipe suspended from structures use special thickness Class 53.
b. Sizes over 24 inches: As specified in the contract documents.
2. Cement-mortar Lined: According to AWWA C104 with asphalt seal coat.
3. External Coating: Asphalt according to AWWA C151.
4. Joint Type: Use push-on type, unless otherwise specified in the contract documents or as authorized by the Engineer.
a. Push-on: According to AWWA C111.
b. Mechanical: According to AWWA C111.
c. Restrained, Buried: Pipe manufacturer's standard field removable system.
d. Restrained, in Structures: Restraining gland, flanged or grooved.
e. Flanged: According to AWWA C111.
f. Grooved: According to AWWA C606.
g. Gaskets: According to AWWA C111.
5. Markings on Pipe:
a. Name of manufacturer.
b. Size and class.
c. Spigot insertion depth gauge.

2.3 BOLTS FOR WATER MAIN AND FITTINGS

Use corrosion resistant bolts.

A. Tee-bolts and Hexagonal Nuts for Mechanical Joints:
1. High-strength, low-alloy steel manufactured according to AWWA C111.
2. Provide ceramic-filled, baked-on, fluorocarbon resin coating for bolts and nuts.
3. Include factory-applied lubricant that produces low coefficient of friction for ease of installation.

B. Other Bolts and Nuts:
1. Stainless steel.

2.4 FITTINGS

A. For DIP and PVC Pipe: Comply with AWWA C110 (ductile iron or gray iron) or AWWA C153 (ductile iron).
1. Joint Type:
a. For pipe sizes 16 inches and less, use mechanical joint complying with AWWA C111.

b. For pipe sizes greater than 16 inches, use restrained mechanical joint system. Provide follower gland using breakaway torque bolts to engage thrust restraint.

1) Minimum pressure rating same as connecting pipe. For fittings between dissimilar pipes, the minimum pressure rating is the lesser of the two pipes.

2) Suitable for buried service.

3) Joint restraint system to be field installable, field removable, and re-installable.

c. Use of alternate restraint systems must be approved by the Engineer.

2. Lined: Cement mortar lined according to AWWA C104 with asphalt coating.
3. Wall Thickness: Comply with AWWA C153.
4. Gaskets: Comply with AWWA C111.

B. Flange Adapter:
1. Body: Ductile iron complying with ASTM A 536.
2. End Rings (Follower Rings): Ductile iron complying with ASTM A 536.
3. Gaskets: New rubber compounded for water service and resistant to permanent set.
4. Bolts and Nuts: High strength, low alloy corrosion resistant steel or carbon steel bolts complying with ASTM A 307.

C. Pipe Coupling:
1. Center Sleeve (Center Ring): Steel pipe or tubing complying with ASTM A 53 or ASTM A 512, or formed carbon steel with a minimum yield of 30,000 psi.
2. End Ring (Follower Ring): Ductile iron complying with ASTM A 536, or steel meeting or exceeding the requirements of ASTM A 576, grade 1010-1020.
3. Gaskets: New rubber compounded for water service and resistant top permanent set.
4. Bolts and Nuts: Stainless steel.

2.5 CONCRETE THRUST BLOCKS

A. Use Iowa DOT Class C concrete.
B. Comply with the contract documents for dimensions and installation of thrust blocks. Comply with SUDAS Figure 5010.101.
C. Use for all pipe sizes 16 inches in diameter or smaller or when specified.

2.6 PIPELINE ACCESSORIES

A. Polyethylene Wrap:
1. Comply with AWWA C105.
2. Provide tubes or sheets with 8 mil minimum thickness.

B. Tracer System: Comply with Figures CIC-5010.100 through 104.
1. Tracer Wire:

a. Solid Single Copper Conductor:

1) Size: #12 AWG

2) Insulation Material: Linear low-density polyethylene (LLDPE) installation suitable for direct burial applications.

3) Insulation Thickness: 0.045 inches, minimum.

b. Bimetallic Copper Clad Steel Conductor:

1) Size: #12 AWG.

2) Rating: Direct burial.

3) Operating Voltage: 30 volts.

4) Conductivity: 21%.

5) Copper Cladding: 3% of conductor diameter, minimum.

6) Insulation Material: High density polyethylene.

7) Insulation Thickness: 0.030 inches, minimum.

2. Ground Rod: 3/8 inch diameter minimum, 60 inch steel rod uniformly coated with metallically bonded electrolytic copper.
3. Ground-rod Clamp: High-strength, corrosion-resistant copper alloy.
4. Splice Kit: See "Accepted Products for Water Distribution Materials."
5. Tracer Wire Station: Reference figures CIC-5010.100 through 104.

2.7 SPECIAL GASKETS

A. For soils contaminated with gasoline, use nitrile gaskets.

B. For other soil contaminants, contact the Engineer for the required gasket.

2.8 SMALL WATER SERVICE PIPE AND APPURTENANCES

A. Copper Tubing: No couplings or connections are permitted under paving.

1. Comply with ASTM B75 and ASTM B88.
2. Wall Thickness: Type K.
3. Packaging: Shall be in coils for sizes 3/4-inch through 1 ½-inch, and in coils or straight pipe for size 2-inch.

B. Service Saddles:

1. Comply with ANSI/AWWA C800 and ASTM B62.
2. Pressure Rating: Equal, but not to exceed, 200 PSIG.
3. Body Composition: 85-5-5-5 cast brass
4. Strap: Wide band, 304L stainless steel with 304L stainless steel studs.
5. Nuts and Washers: 304 stainless steel, nuts supplied with fluorocarbon coating.
6. Threading: AWWA tap thread (CC thread).
7. Gaskets: Nitrile gaskets within leaking underground storage tank (LUST) areas.

C. Corporation Valves:

1. Comply with ANSI/AWWA C800 and ASTM B62.
2. Pressure Rating: 300 PSIG maximum working pressure.
3. Body: "No lead brass" alloy, meeting ASTM B584.
4. Connections: Inlet shall be AWWA taper thread, outlet shall be conductive

compression connection for CTS OD tubing.

5. Valve: Compression ball type.

D. Ball Curb Valves:

1. Comply with ANSI/AWWA C800 and ASTM B62.
2. Pressure Rating: 300 PSIG maximum working pressure.
3. Body: "No lead brass" alloy, meeting ASTM B584.
4. Connections: Inlet and outlet shall be compression connection for CTS OD tubing.
5. Valve: Shall have a quarter turn check with fluorocarbon coated ball and stainless steel reinforced seat, and end pieces shall have o-ring sealed with double o-ring seals.

E. Curb Box:

1. Comply with ANSI/AWWA C800.
2. Style: Arch pattern, slide style.
3. Length: 5-foot box, 1-foot telescope, shall telescope up and down inside the base casting.
4. Coating: Black dip inside and out.
5. Rod: 5/8-inch diameter with small key-clamp welded to rod; stainless steel road and cotter pin; 42-inches long.

F. Curb Box Lids:

1. All lids:
   a. Brass components shall conform to ASTM B62 and ASTM B584, UNS C83600—85-5-5-5 (latest revision).
   b. Lids shall be made of cast iron per ASTM A48, Class 25.
   c. Lid shall be coated with black dip.
2. Regular applications:
   a. Shall be tapped 1" with brass insert.
   b. Shall be 2-hole Erie pattern with the "W" in a raised letter.
3. Cement applications:
   a. Shall be tapped with 1" brass pentagon plug with word "Water" in raised letters.
   b. All pentagon brass plugs shall have a 27/32" point to flat side.

G. Straight Three-Part Unions:

1. Comply with ANSI/AWWA C800 and ASTM B62.
2. Body: "No lead brass" alloy, meeting ASTM B584.
3. Connections: Conductive compression connection for CTS OD on both ends.
4. Gripper band shall be stainless steel and overlap itself so no gasket material can get underneath.
5. Conductor spring shall provide metal to metal contact between copper tubing and the fitting for electrical conductivity.
6. Entire gasket shall be enclosed.
7. Fluorocarbon coating shall be on inside surface of nut.
8. Union pressure rating shall be greater than the valve or fitting with which it is used.

H. Yard Hydrants: Shall be freezeless style.

2.9 NON-SHRINK GROUT

Comply with Iowa DOT Materials I.M. 491.13.

2.10 VALVES

A. General:
   1. Valve Body: Manufacturer's name and pressure rating cast on valve body.
   2. Direction of Opening: The opening direction is counterclockwise as viewed from the top.
   3. Joints:
      a. For buried installations, use mechanical joints per AWWA C111. Comply with 2.3 of this section for joint nuts and bolts.
      b. For installation within structures, flanged with dimensions and drillings according to AWWA C110 or ANSI B16.1 class 125.
   4. Valve shall have been manufactured within 5 years of installation date.

B. Gate Valves:
   1. Standards: Comply with AWWA C509 (gray iron or ductile iron) or AWWA C515 (ductile iron) and NSF 61.
   2. Stem Seals: Double O-rings permanently lubricated between seals. Lubricant certified for use in potable water.
   3. External Bolts and Hex Nuts: Stainless steel according to ASTM A 240, Type 304.

C. Butterfly Valves:
   1. Standards: Comply with AWWA C504 class 150B or class 250B (gray iron or ductile iron) and NSF 61.
   2. Stem: Stainless steel according to ASTM A 240, Type 304, turned, ground, and polished.
   3. For Seat on Body Valves:
      a. Disc: Ductile iron or gray iron with plasma applied nickel-chromium edge or stainless steel edge according to ASTM A 240, Type 316, and mechanically fixed stainless steel pins.
      b. Seat: Synthetic rubber compound mechanically retained to the body.
   4. For Seat on Disc Valves:
      a. Disc: Ductile iron according to ASTM A 536 with synthetic rubber compound seat mechanically retained to the disc.
      b. Seat: Continuous Type 316 stainless steel seat.
   5. External Bolts and Hex Nuts: Stainless steel according to ASTM A 240, Type 304.

D. Tapping Valve Assemblies:
   1. Tapping Valve: Gate valve complying with AWWA C509.
   2. Sleeve:
      a. Minimum 14 gauge.
      b. Stainless steel according to ASTM A240, Type 304.

c. Minimum working pressure 150 psi.
d. Must fully surround pipe.
e. Flanged with dimensions and drillings according to AWWA C110 or ANSI B16.1 class 125.

2.11 FIRE HYDRANT ASSEMBLY

A. Material: Comply with AWWA C502.
B. Manufacturers: See "Accepted Products for Water Distribution Materials."
C. Fire hydrant assembly shall have been manufactured within 5 years of installation date.
D. Features:
   1. Breakaway Items: Stem coupling and flange.
   2. Inlet Nominal Size: 6 inch diameter.
   3. Inlet Connection Type: Mechanical joint.
   4. Hose Nozzles: Two, each 2 1/2 inches in diameter, with caps attached with chains.
   5. Direction of Opening: Clockwise.
   6. Items to be specified:
      a. Operating nut: 1½ inch, standard pentagon.
      b. Pumper nozzle one 4½-inch pumper nozzle.
      c. Nozzle threads: National Standard Hose Threads.
      d. Main valve nominal opening size: 4.5" on main smaller than 12" in diameter, 5.25" on main 12" and larger
E. Painting:
   1. Shop coating according to AWWA C502.
   2. Color: Safety Red, unless otherwise indicated by the Water Division.
F. External Bolts and Hex Nuts: Stainless steel according to ASTM A193, Grade B8.
G. Gate Valve: Comply with this section.
H. Pipe and Fittings: Comply with this section.

2.12 APPURTENANCES

A. Flushing Device: As specified in the contract documents.
B. Valve Box:
   1. Applicability: For all buried valves.
   2. Manufacturer: As allowed by the Jurisdiction or specified in the contract documents.
   3. Type: Slip (slide) type.
   4. Material: Gray iron.
   5. Cover: Gray iron, labeled "WATER"
   6. Wall Thickness: 3/16 inch, minimum.
   7. Inside Diameter: 5 inches, minimum.
   8. Length: Adequate to bring top to finished grade, including valve box extensions, if necessary.
   9. Factory Finish: Asphalt coating.

10. Valve Box Centering Ring: Include in installation.

C. Valve Stem Extension: For all buried valves, provide as necessary to raise 2 inch operating nut to within 3 feet of the finished grade. Stem diameter according to valve manufacturer's recommendations, but not less than 1 inch. Shall be stainless steel.

D. Stainless Steel Repair Clamps:
   1. All stainless steel, single section, double section, or triple section, depending upon size of main.
   2. Shall have stainless steel bolts and nuts.

2.13 LUMBER

A. Lumber for bracing or supports shall be hardwood. (i.e. oak, maple). Do not use creosoted lumber in contact with piping materials.

2.14 WATER

A. Reasonable amounts of water will be provided for use in the final operations of water main flushing, disinfecting and testing. Prior notice must be given to the Water Division.

B. Contractor will not be charged for the water used as long as there is reasonable care to control and conserve the rate and volume used. If there is waste or carelessness, Contractor will be charged for water.

2.15 DISINFECTION AGENT - CHLORINE

A. Liquid Chlorine complying with AWWA B300 and AWWA B301.

B. Sodium Hypochlorite complying with AWWA B300.

C Calcium Hypochlorite complying with AWWA B300.

D. All disinfecting agents to be NSF 60 certified. Supply and store in the original container.

PART 3 EXECUTION

3.1 REFERENCES AND DOCUMENTS

A. Contractor must have all required documents on the site before commencing with the work. Water mains, valves, hydrants, and special fittings shall be installed in the locations shown on the plans or as directed by the Engineer.

B. Valves, fittings, hydrants and ductile-iron pipe shall be installed in accordance with ANSI/AWWA C600 except as noted herein.

C. PVC pipe must be furnished and installed in accordance with AWWA M23, ANSI/AWWA-C605 and Uni-Bell PVC Pipe Association UNI-B-3-88 except as noted herein.

D. Contractor must prepare and retain a set of "as-built" drawings on the job site with accurate and current information on the location of all valves, pipe and special construction features. Survey or GPS points are accepted, but not in lieu of written

as-built information. Minimum information required for submittal to the Water Division:

1. Pipe size and material; length of pipe between fittings (center-to-center)
2. Fitting type, size, restraint type, note if installed vertically or horizontally
3. Tracer wire box locations
4. Any changes in pipe depth, and where the main is buried greater than 7 feet or less than 5 feet
5. Any special fittings or construction materials

E. Contractor shall have all buried utilities located by the Iowa One-Call Utility Location service and shall do exploratory excavation as necessary to determine specific conflicts between existing utilities and new water main.

3.2 PIPE INSTALLATION

A. General:

1. Do not use deformed, defective, gouged, or otherwise damaged pipes or fittings.
2. Keep trench free of water. Clean pipe interior prior to placement in the trench.
3. Clean joint surfaces thoroughly and apply lubricant approved for use with potable water and recommended by the manufacturer.
4. Push pipe joint to the indication line on the spigot end of the pipe before making any joint deflections.
5. Limit joint deflections to one degree less than pipe manufacturer's recommended maximum limit.
6. Tighten bolts in a joint evenly around the pipe.
7. Install concrete thrust blocks on all fittings 16 inches in diameter or smaller (comply with SUDAS Figure 5010.101). For fittings larger than 16 inches, install restrained joints, and when specified in the contract documents, also install concrete thrust blocks.
8. Keep exposed pipe ends closed with rodent-proof end gates at all times when pipe installation is not occurring.
9. Close the ends of the installed pipe with watertight plugs during nights and non-working days.
10. Do not allow any water from the new pipeline to enter the existing distribution system piping until testing and disinfection are successfully completed.

B. Additional requirements for DIP installation:

1. Utilize full-length gauged pipe for field cuts. Alternatively, field-gauge pipe selected for cutting to verify the outside diameter is within allowable tolerances.
2. Cut the pipe perpendicular to the pipe barrel. Do not damage the cement lining. Bevel cut the ends for push-on joints according to the manufacturer's recommendations.
3. Encase all pipe, valves, and fittings with polyethylene.

C. Additional requirements for PVC pipe installation:

1. Cut the pipe perpendicular to the pipe barrel. Deburr and bevel cut spigot end of the pipe barrel to match factory bevel. Re-mark the insertion line.
2. When connecting to shallow-depth bells, such as on some cast iron fittings or valves, cut the spigot end square to remove factory bevel. Deburr the end and form a partial bevel on the end.

3.3 POLYETHYLENE ENCASEMENT INSTALLATION

A. Apply polyethylene encasement to buried ductile iron pipe and to buried fittings, fire hydrants, and appurtenances. The polyethylene encasement is used to prevent contact between the pipe and the bedding material, but need not be airtight or watertight.
B. Install polyethylene encasement according to AWWA C105, using tubes or flat sheets, and pipe manufacturer's recommendations.
C. Do not expose the polyethylene encasement to sunlight for long periods before installation.
D. Remove all lumps of clay, mud, cinders, etc. on the pipe surface before encasing the pipe. Take care to prevent soil or bedding material from becoming trapped between the pipe and polyethylene.
E. Lift polyethylene-encased pipe with a fabric-type sling or padded cable.
F. Secure and repair encasement material using polyethylene tape, or replace as necessary.

3.4 TRACER SYSTEM INSTALLATION

A. Install with all buried water main piping. Comply with Figures CIC-5010.100 through 104 for tracer wire installation.
B. Begin and terminate the system at all connections to existing mains.
C. Install wire continuously along the ten or two position of the pipe. Do not install wire along the bottom of the pipe. Attach wire to the pipe at the midpoint of each pipe length; use 2 inch wide, 10 mil thickness polyethylene pressure sensitive tape.
D. Install splices only as authorized by the Engineer. Allow the Engineer to inspect all below grade splices of tracer wire prior to placing the backfill material.
E. Install ground rods adjacent to connections to existing piping and at locations specified in Figures CIC-5010.100 through 103 and Figures CIC-4C.1 and CIC-4C.2.
F. Bring two wires to the surface at each fire hydrant location and terminate with a tracer wire station (comply with Figure CIC-5010.100 and CIC-5010.101).
G. Final inspection of the tracer system will be conducted by the Water Division at the completion of the project and prior to acceptance by the owner. Verify the electrical continuity of the system. Repair discontinuities.
H. A minimum of 18 inches of wire slack at every tracer wire terminal box lid shall be installed.
I. Every splice along the tracer wire shall have a minimum of 18 inches of wire slack added to the line.

J. No uninsulated wire shall be installed along any length of run or at splice points. All exposed wire shall be mended as directed by Water Division personnel, and all splices shall include dielectric grease.

K. Ground rods should be placed 6 to 10 inches from the pipe and not make contact with any part of the water system or any other utility.

3.5 LOCATION, ALIGNMENT, SEPARATION & GRADE

A. No water pipe shall pass through or come in contact with any part of a sewer manhole.

B. Should physical conditions exist such that exceptions to this standard are necessary, the design engineer must detail how the sewer and water main are to be engineered to provide protection equal to that required by these sections.

C. Sewers constructed of standard sewer materials shall not be laid within 75 feet of a public well or 50 feet of a private well. Sewers constructed of water main materials may be laid within 75 feet of a public well and within 50 feet of a private well but no closer than 25 feet of either.

D. Horizontal Separation of Gravity Sewers from Water Mains:

1. Separate gravity sewer mains from water mains by a horizontal distance of at least 10 feet unless:
   - The top of a sewer main is at least 18 inches below the bottom of the water main, and
   - The sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet from the water main.
2. When it is impossible to obtain the required horizontal clearance of 3 feet and a vertical clearance of 18 inches between sewers and water mains, the sewers must be constructed of water main materials meeting the requirements set forth in this section. However, provide a linear separation of at least 2 feet.

E. Separation of Sewer Force Mains from Water Mains: Separate sewer force mains and water mains by a horizontal distance of at least 10 feet unless:

1. The force main is constructed of water main materials meeting a minimum pressure rating of 150 psi and the requirements of Section 02260, 2.2 and
2. The sewer force main is laid at least 4 linear feet from the water main.

F. Separation of Sewer and Water Main Crossovers:

1. Vertical separation of sanitary and storm sewers crossing under any water main should be at least 18 inches when measured from the top of the sewer to the bottom of the water main. If physical conditions prohibit the separation, the sewer may be placed not closer than 6 inches below a water main or 18 inches above a water main. Maintain the maximum feasible separation distance in all cases. The sewer and water pipes must be adequately supported and have watertight joints. Use a low permeability soil for backfill material within 10 feet of the point of crossing.

2. Where the sanitary sewer crosses over or less than 18 inches below a water main, locate one full length of sewer pipe of water main material so both joints are as far as possible from the water main.
3. Where the storm sewer crosses over or less than 18 inches below a water main, locate one full length of sewer pipe of water main material or reinforced concrete pipe (RCP) with flexible O-ring gasket joints so both joints are as far as possible from the water main.

G. Surface Water Crossings: Comply with the Recommended Standards for Water Works, 2012 Edition.
1. Above-water Crossings: Ensure the pipe is adequately supported and anchored; protected from vandalism, damage, and freezing; and accessible for repair or replacement.
2. Underwater Crossings: Provide a minimum cover of 5 feet over the pipe unless otherwise specified in the contract documents. When crossing water courses that are greater than 15 feet in width, provide the following:
a. pipe with flexible, restrained, or welded watertight joints,
b. valves at both ends of water crossings so the section can be isolated for testing or repair; ensure the valves are easily accessible and not subject to flooding, and
c. permanent taps or other provisions to allow insertion of a small meter to determine leakage and obtain water samples on each side of the valve closest to the supply source.

H. Separation to Other Utilities: Maintain minimum 18” clearance around water mains and appurtenances.

3.6 PIPE BEDDING, EXCAVATION, AND BACKFILLING

A. Ductile-iron pipe bedding shall conform to the project plan details or as otherwise specified or directed by the Engineer.
B. PVC pipe bedding shall conform to UNI-B-3-88 laying condition Type 2 including hand excavation for the bell holes. The bedding shall be loose, natural, fine soil which is compacted by hand tamping on the soil along the sides of the pipe to the top of the pipe.
C. Trench width within the pipe envelope shall conform to the plans or as directed by the Engineer.
D. Set valves and hydrants on precast concrete bases.
E. All excavations shall comply with the requirements of OSHA Standard 1926, Subpart P-Excavations.

3.7 PIPE RESTRAINT

A. Thrust Restraint:
1. For pipe smaller than 10" diameter, concrete block shall be used, placing the concrete block next to the fitting and undisturbed soil. For 10" and larger diameter pipe, blocking shall be by cast-in-place concrete. Cover fittings and joints with 8 mil polyethylene before placing concrete. Brace fittings with

hardwood to prevent shifting before placing concrete.

2. Do not pour excess concrete on top of pipe and fittings.

B. Socket Pipe Clamps, Tie Rods, and Bridles: Where indicated or necessary to prevent joints or sleeve couplings from pulling apart under pressure, provide suitable socket pipe clamps, tie rods, and bridles. Bridles and tie rod diameter shall be at least 3/4 in. except where they replace flange bolts of smaller size with nut on each side of flange.

C. Dead Ends:

1. Pipe ends or fittings left for future connections shall be plugged or capped using materials supplied by the pipe manufacturer.
2. All pipe ends or fittings left for future connections shall be blocked against thrust.

3.8 JOINTS AND COUPLINGS

A. Push-on Joints:

1. Inspect bell grooves and clean to assure complete gasket seating.
2. Use extreme care to prevent separation of joints already installed.
3. Do not use push-on joints when boring. Snap-Lok shall be used in casing with locking rubbers.

B. Mechanical Joints:

1. The range of torque for tightening bolts which is indicated in ANSI/AWWA C600 may be somewhat affected by the temperature. On cold days, more torque may be required.
2. Use extreme caution when tightening cast iron fittings to avoid breaking the ears of the flanges. An average worker should not use a wrench longer than 18 inches.
3. On PVC pipe connections to MJ joints, cut the bevel off the end of the PVC pipe to get full pipe diameter in the joint.
4. Do not deflect pipe at joint.

C. Sleeve-Type Coupling:

1. Clean pipe ends for distance of 12 inches.
2. Use soapy water as gasket lubricant.
3. Carefully mark and place the sleeve coupling in the center of the joint.

3.9 VALVES

A. Valve boxes should be centered over valve operating nut and run straight and true (not angled).

B. Valve boxes set in paving shall not be installed with an expansion joint.

3.10 FIRE HYDRANT

A. Install according to Figure CIC-5020.201.

B. If the fire hydrant valve is positioned adjacent to the water main, attach it to an anchor tee.

C. If the fire hydrant valve is positioned away from the water main, restrain all joints between the valve and water main.

D. Fire Hydrant Depth Setting:
   1. Use adjacent finished grade to determine setting depth.
   2. Set bottom of breakaway flange between 2 and 5 inches above finished grade.
   3. If finished grade is not to be completed during the current project, consult with the Engineer for proper setting depth.

E. Coordinate installation with tracer wire installation.

F. Orient fire hydrant nozzles as directed by the Engineer or Inspector.

3.11 TAPPED CONNECTIONS UNDER PRESSURE

A. Follow manufacturer's installation instructions.

B. Tapping mains for new connections 1-inch to 12-inch in diameter shall be done by the Water Division. This includes connections made on public and private mains.

C. A new and site specific tapping application must be prepared for each tap regardless of size, and submitted to the Water Division. The tapping application must be completed and include location, name, and address of water customer, schematic drawing, and materials of construction.

3.12 WATER MAIN OPERATIONS

A. All work which involves operating the active public water distribution system will require the notice, consent, approval and assistance of the Water Division.

B. An accurate and legible copy of the "as-built" drawings must be on file in the Water Division office prior to using the water supply.

C. If requested by the City, the contractor will work with Water Division personnel to submit a plan for initial operations and a plan for final operations to the Water Division for approval. The plans shall include a drawing and typed list of actions which show all the significant steps necessary to connect to the existing water distribution system or conduct the filling, flushing and testing operations. The purpose of both plans is to minimize the impact of service interruptions and pressure and flow variations on the water distribution system and existing customers.

PART 4 DISINFECTION AND TESTING FOR POTABLE WATER SYSTEMS

4.1 GENERAL

A. Upon completion of a newly installed water main or when repairs to an existing water system are made, the main shall be disinfected according to instructions listed in ANSI/AWWA C651 and the following specifications.

4.2 SCHEDULING AND CONFLICTS

A. Notify the City Inspector or Water Division two working days in advance of testing or disinfection operations to coordinate the operations.

B. The Engineer or his/her representative is required to be in attendance during testing or disinfection.

C. Entire testing sequence for a segment shall be completed within an appropriate timeframe. If testing sequence for a segment, including tracing, is not satisfactorily completed within two (2) weeks from initial disinfection, testing sequence for segment shall start over from initial disinfection. Testing schedules for other segments may be affected.

4.3 SEQUENCE OF TESTING AND DISINFECTION

Perform operations according to AWWA C651 in the sequence below. Successfully complete each operation before continuing to the next operation. All mains shall pass two bacteriological tests before pressure testing is allowed. Testing segments shall be no longer than 1200 feet along one main. All legs/lateral mains shall be tested as separate segments. Long main lines over 1200 feet in length shall be tested in discrete testing segments, and adjoining in-line testing segments shall not be tested together in any manner. Water mains must pass all testing before any main or service taps are allowed.

A. Tablet Method (Concurrent with Water Main Installation):
   1. Perform disinfection.
   2. Flush after disinfection.
   3. Perform bacteria tests.
   4. Perform pressure and leak testing.

B. Continuous-Feed or Slug Method (After Water Main Installation): Use this method only if approved by the Engineer. The sequence of testing and disinfection may be modified with approval of the Engineer.
   1. Perform initial flush.
   2. Perform disinfection.
   3. Flush after disinfection.
   4. Perform bacteria tests.
   5. Perform pressure and leak testing.

4.4 DISINFECTION

A. General:
   1. Disinfect according to AWWA C651.
   2. Keep piping to be chlorinated isolated from lines in service and from points of use.
   3. Coordinate disinfection and testing with the Engineer.
   4. Obtain and test water samples, unless otherwise provided by the Engineer.

B. Procedure:
   1. Induce a flow of potable water through the pipe.
   2. Introduce highly chlorinated water to the pipe at a point within 5 pipe diameters of the pipe's connection to an existing potable system, or within 5 pipe diameters of a closed end, if there is no connection to an existing system.

3. Introduce water containing a minimum of 25 mg/L free chlorine until the entire new pipe contains a minimum of 25 mg/L free chlorine.
4. Retain chlorinated water in the pipe for at least 24 hours and no more than 48 hours.

4.5 FLUSHING

A. Flush pipe using potable water until chlorine residual equals that of the existing potable water system.
B. Dispose of chlorinated water to prevent damage to the environment. Dechlorinate highly chlorinated water from testing before releasing into the ground or sewers. Obtain Jurisdiction approval prior to flushing activities.
   1. Check with the local sewer department for the conditions of disposal to the sanitary sewer.
   2. Chlorine residual of water being disposed will be neutralized by treating with one of the chemicals listed in the following table.

Table 5030.02: Amounts of Chemicals Required to Neutralize Various Residual Chlorine Concentrations in 100,000 Gallons of Water

Residual Chlorine Concentration mg/L	Sulfur Dioxide (SO2) lb	Sodium Bisulfite (NaHSO3) lb	Sodium Sulfite (Na2SO3) lb	Sodium Thiosulfate (Na2S2O3 + 5H2O) lb	Ascorbic Acid (C6O8H6) lb
1	0.8	1.2	1.4	1.2	2.1
2	1.7	2.5	2.9	2.4	4.2
10	8.3	12.5	14.6	12.0	20.9
50	41.7	62.6	73.0	60.0	104

4.6 BACTERIA SAMPLING

Test water mains according to AWWA C651, including collection of two consecutive sets of acceptable bacteria samples 24 hours apart. If the initial disinfection procedure fails to produce satisfactory bacteriological results or if other water quality is affected, repeat the disinfection procedure.

4.7 PRESSURE AND LEAK TESTING

A. Secure unrestrained pipe ends against uncontrolled movement.
B. Isolate new piping from the existing water system.
C. Fill and flush all new piping with potable water. Ensure all trapped air is removed.
D. Pressurize the new pipe to the test pressure at the highest point in the isolated system. Do not pressurize to more than 5 psi over the test pressure at the highest point in the isolated system.
E. Test and monitor the completed piping system at 1.5 times the system working pressure or 150 psi, whichever is greater, for 2 continuous hours.

F. If the measured pressure loss does not exceed 5 psi, the test will be considered acceptable.
G. Repair all visible leaks regardless of test.
H. Addition of makeup water is not allowed.

4.8 SYSTEMS CHECK

A. Valve Operations: All valves shall be located and tested to verify operation. Remove the valve box lid, insert the valve key and open and close each valve. Count the turns and record the results.
B. Hydrant Operations:
   1. After the hydrant has been installed and the main and hydrant have been pressure tested, each hydrant shall be flushed and checked for proper operation.
   2. After hydrant has been flushed, close it and check for drainage. This is done by placing a hand over the nozzle opening and checking for a vacuum. Then check the hose thread for proper fit.
   3. Replace nozzle cap, then open hydrant again and inspect all joints for leaks.
C. Final Trace: All tracer wire terminal boxes shall be to grade, located appropriate distance from hydrant/valve, and with tracer wire correctly attached. A Water Division locator shall complete a trace of the new pipe(s), including connections to existing main. Any tracing deficiencies noted by the locator shall be corrected before the water pipe is accepted and opened for service.

4.9 PUTTING WATER MAIN IN SERVICE

The Water Division shall put the completed water system in service only after system has satisfactorily passed all testing and documentation requirements.

SECTION 02890

TRAFFIC SIGNALIZATION

PART 1 GENERAL

1.01 - Section Includes

A. Electrical
B. Conduit
C. Concrete Bases and Handholes
D. Poles
E. Signals
F. Mast Arms
G. Controller
H. Fiber Optic Cable
I. Video Traffic Detection System

1.02 - Description of Work

A. Electrical

This item includes furnishing and installing all electrical components in accordance with the Contract Documents.

B. Conduit

This item includes furnishing and installing conduit fittings associated with traffic signals in accordance with the Contract Documents.

C. Concrete Bases and Handholes

This item includes furnishing and installing bases and handholes associated with traffic signals in accordance with the Contract Documents.

D. Poles

This item includes furnishing and installing the poles associated with traffic signals in accordance with the Contract Documents.

E. Signals

This item includes furnishing and installing the signals in accordance with the Contract Documents.

F. Mast Arms

This item includes furnishing and installing the Mast Arms in accordance with the Contract Documents.

G. Controller

This item includes furnishing and installing controllers in accordance with the Contract Documents.

I. Fiber Optic Cable

This item includes installation, termination, and testing fibers.

H. Video Traffic Detection System

This work shall consist of furnishing and installing a system that detects vehicles on a roadway using only video images of vehicle traffic and includes all hardware, software, equipment, labor, and materials necessary to complete the fully functioning system in place.

1.03 - Submittals

A. Submit test results as set forth in the Contract Documents.

B. Submit certificate of compliance indicating the materials incorporated into the Work comply with the Contract Documents.

C. The substitution of materials is allowed as set forth in General Conditions.

D. Supplier shall submit five (5) copies of Shop Drawings of Signal Poles and Mast Arms to the ENGINEER for review prior to manufacture of the mast arm assemblies. Manufacture shall not begin until the Shop Drawings have been approved by the ENGINEER. The intent of the ENGINEER's review and approval is to assist the supplier in interpreting the Specifications. Shop Drawing approval shall not relieve the supplier of the responsibility for errors in the Shop Drawing or the requirements of the Specifications.

E. Submit catalog cuts of each component incorporated into the project, showing the selected equipment meets the specifications.

1.04 - Delivery, Storage and Handling

A. Deliver only materials that fully conform to these Specifications, or for which substitution has been approved as set forth in General Conditions.

1. The Bidder awarded the Contract shall complete the equipment list by writing in the name of the equipment manufacturer and catalog number of each item listed which he proposes to install. Before beginning Work on the Project, the CONTRACTOR shall submit three copies of the equipment list, and three copies of catalog cuts for all materials supplied by the CONTRACTOR.

2. Prior to ordering any materials the CONTRACTOR shall provide certification from the manufacturers of all electrical equipment, conduit, and cable stating said material complies with the Specifications.

B. Store material in accordance with the manufacturers' recommendations and in locations which will minimize the interference with operations, minimize environmental damage, and protect adjacent areas.

C. Remove and dispose of unacceptable materials from the site in accordance with the Contract Documents.

1.05 - Scheduling and Conflicts

A. Schedule Work to minimize disruption of public streets and facilities.

B. Discontinue Work which will be affected by any conflicts discovered or any changes needed to accommodate unknown or changed conditions and notify the ENGINEER.

1.06 - Special Requirements

A. The use of explosives is not permitted unless provided for in the special provisions of the Contract Documents.

B. All work and materials incorporated into this Project shall conform to all applicable local, state, and Federal requirements.

C. The CONTRACTOR shall be prepared to furnish, upon request from the ENGINEER, a sample for evaluation, of any item or material which he proposes to furnish for this Project.

D. Any modifications of the installation are subject to the approval of the ENGINEER.

E. Unless otherwise specified in the Contract Documents, the installation of all signal equipment shall be in accordance with the Traffic Signal Manual of the International Municipal Signal Association (IMSA).

F. The painted surface of any equipment damaged in shipping or installation shall be retouched or repainted in a manner satisfactory to the ENGINEER.

PART 2 PRODUCTS

2.01 - Electrical

A. Service Conductor (Power Cable) shall be 600 volt, single conductor cable shall comply with 4185.12 of the Standard Specifications and shall be U.L. listed for type "USE." The sheath shall be black for the positive cable and white for the negative cables.

B. Signal cable shall be solid and conform to the requirements of IMSA 19-1 or 20-1, or latest revision thereof. The number and size of conductors shall be as specified on the plans.

C. Loop detector lead-in cable shall conform to the requirements of IMSA 50-2, latest revision thereof.

D. Detector loop wire shall conform to the requirements of IMSA 51-5, latest revision thereof. The encasing tube shall be polyvinyl chloride. Detector loop sealant in pavement saw cuts and holes shall be a flexible embedding sealer.

E. Connectors shall be either insulated spring steel connectors or insulated set screw connectors. The spring shall have sharp edges, round edges will not be approved.

The set screw connectors shall be ~~Ideal, Series 30-200; Holub, Catalog No. 10-307, Model SS-2 or~~ approved equal.

Connectors shall be approved by the ENGINEER prior to incorporation in the Work.

F. Communication and Interconnect Cable (For Underground Installation)

1. Fiber Optic Cable shall be 1 hybrid cable with 12strands of Multi-mode/ 12 strands of single-mode
2. Jacket. The overall jacket shall be made of virgin, black, low density, high molecular weight polyethylene.

G. Self-Supporting (Figure 8) Communication Cable

1. Self-Supporting (Figure 8) communication cable shall meet all requirements of Paragraph 2.01F for communication and interconnect cable except that the cable assembly is not required to be packed with petroleum jelly.
2. Self-Supporting (Figure 8) communication cable shall contain a messenger cable made of extra high strength, ¼ inch, 7 strand, Class A galvanized, steel of 6600 pound breaking strength.

H. Tracer wire shall be a #10 AWG wire single conductor, stranded copper, Type THHN, with UL approval and orange jacket.

I. Ground rods shall be high strength steel rods with chemically bonded copper coverings to provide high conductivity and to prevent electrolytic action. Rods shall be full length as shown on the plans and shall have a nominal diameter of five-eighths inch unless otherwise specified. Ground rods shall conform to the requirements of IMSA specification No. 62-1956.

J. All ground wires shall be #6 AWG, bare, solid annealed copper wire unless otherwise specified on the plans.

K. All electrical equipment shall conform to the standards of the National Electrical Manufacturers Association (NEMA). All Work shall conform with the requirements of the National Electrical Code. All miscellaneous electrical equipment shall be approved.

L. Circuit breakers shall conform to manufacturer's requirements.

M. Video Traffic Detection System: Iteris system is preferable

1. Cameras shall have color video.
2. As an option, programming the system shall be available with the computer. Using a RS-232 communication link, the following capabilities shall be available as a minimum:
   a. Continuous or single video snapshots. The user shall be able to select both the resolution and quality of the image.
   b. Remote detection zone setup.
   c. Detector File upload/download
   d. Ability to store the snapshot image.
   e. Security Protection to Prevent Unauthorized Remote Access.
3. The system shall detect vehicles in real time as they travel across each detector zone.
4. The system shall have an RS-232 port for communications with an external computer.The system shall be Ethernet ready.
5. The system shall accept new detector patterns from an external computer through the RS-232 port when that computer uses the correct communications protocol for downloading detector patterns.
6. The system shall send its detector patterns to an external computer through the RS-232 port when requested when that computer uses the correct communications protocol for uploading detector patterns.
7. Up to 144 detection zones shall be supported and each detection zone can be sized to suit the site and the desired vehicle detection region.
8. Detection zones may be ANDed or ORed together to indicate vehicle presence on a single detector output channel.
9. When a vehicle is detected crossing a detection zone, the detection zone will flash a symbol on the video overlay display to confirm the detection of the vehicle.
10. Detection shall be at least 99% accurate in good weather conditions, with slight degradation possible under adverse weather conditions (eg. rain, snow, or fog) which reduce visibility. Detection accuracy is dependent upon camera placement, camera quality and detection zone location, and these accuracy levels do not include allowances for occlusion or poor video due to camera location or quality.
11. The system shall provide 32 channels of detection through either a NEMA TS1 port or a NEMA TS2 port.
12. The system shall provide dynamic zone reconfiguration (DZR) to enable normal director operation of existing zones except the one being added or modified during the setup process. The system shall output a constant call on any detection channel corresponding to a zone being modified.
13. Detection zones shall be directional to reduce false detections from objects traveling in directions other than the desired direction of travel in the detection area.
14. The system shall process the video input from each camera at 30 frames per second.
15. The system shall output a constant call for each enabled detector output channel if a loss of video signal occurs. The system shall output a constant call during the background learning period.
16. The system shall operate satisfactorily in a temperate range from –34 C to +74 C and a humidity range from 0%RH to 95%RH, non-condensing as set forth in NEMA specifications.

17. The system shall include an RS-232 port or serial communications with a remote computer. This port shall be a 9 pin female "D" subminiature connector on the front of the system. The system shall have Ethernet card, ie, (edge connect).
18. The system shall include a ports for transmitting TS1 and TS2 detections to a traffic controller. The TS1 port shall be a 37 pin female "D" connector on the front of the system. The TS2 port shall be a 15 pin female "D" connector on the front of the system.
19. The video inputs to the system shall include transient voltage suppression and isolation. Amplification that shall assure the 1 volt peak to peak video signal integrity is maintained despite vide cabling losses and externally induced transients. The amplifier shall have a minimum common mode rejection at 60 Hz of 90 dB.
20. The system enclosure shall be bonded to a good earth ground.
21. The front face of the system shall contain indications to enable the user to view real time detections for up to 8 detector output channels at a time.
22. The video cameras used for traffic detection shall be furnished by the system supplier and shall be qualified by the supplier to ensure proper video detection system operation.
23. The camera shall produce a useable video image of the bodies of vehicles under all roadway lighting conditions, regardless of time of day. The minimum range of scene luminance over which the camera shall produce a useable video image shall be the minimum range from night time to day time, but not less than the range 0.1 lux to 10,000 lux.
24. The camera shall include auto-iris control based upon average scene luminance and shall be equipped with an auto-iris lens.
25. The camera shall include a variable focal length lens with variable focus that can be adjusted, without opening up the camera housing, to suit the site geometry.
26. The camera electronics shall include AGC to produce a satisfactory image at night.
27. The camera shall be housed in an environmentally sealed enclosure pressurized with dry gas to minimize the formation of condensate and extend the life of the camera and lens. The housing shall be field rotatable to allow proper alignment between the camera and the traveled road surface.
28. The camera enclosure shall be equipped with a sun shield. The sunshield shall include a provision for water diversion to prevent water from flowing in the cameras field of view. The camera enclosure with sunshield shall be less than 6" diameter, less than 26" long, and shall weigh less than 12 pounds when the camera and lens are mounted inside the enclosure.
29. The camera enclosure shall include a thermostatically controlled heater to assure proper operation of the lens iris at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure.
30. When mounted outdoors in the enclosure, the camera shall operate satisfactorily in a temperate range from –34/C to +55/C and a humidity range from 0% RH to 100% RH.

N. Pan-Tilt-Zoom Camera shall be installed. Must work with the current "Axis system".

2.02 - Conduit

A. Galvanized rigid steel conduit (R.S.) shall meet the requirements of ANSI Standard Specification C 80.1, latest revision. The number and size of conduits shall be as called for on the plans. Conduit shall be of standard length with each length bearing the UL approved label.

B. Polyvinyl Chloride (PVC) conduit shall be Schedule 80. Conduit shall be of standard length with each length bearing the UL approved label.

C. Conduit fittings shall conform to the requirements of ANSI Standard Specification C 80.4, latest revision. All fittings used with rigid steel conduit shall be galvanized steel. Fittings of aluminum or zinc alloys are not acceptable.

D. Unless otherwise specified, all conduit used for the electrical system shall be galvanized rigid steel having the Underwriters Laboratories approval.

E. Conduit couplers shall be threaded-type.

2.03 - Concrete Bases and Handholes

A. Concrete for bases shall be Class "C" structural concrete, C-4 mix.

B. Reinforcement for bases shall meet the requirements of Section 2404 of the IDOT Standard Specifications for Highway and Bridge Construction, Current Series.

C. Plastic loop handholes shall be Pencell PE-10, FiberProTek FC1800, Strongwell(Quazite) PT/LT, or an approved equal.

D. Precast concrete handholes shall be placed on course aggregate base, Iowa DOT Specification 4109, Gradation No. 5.

E. Lid for precast concrete handhole shall be cast-iron. Cover shall be Type 'C' (checkered top), with minimum weight 165 pounds. Manufacturer's name and "TRAFFIC SIGNALS" lettering shall be cast on top of the cover

F. Precast concrete pipe used in constructing handhole shall be Type 2000-D.

G. Handhole cable hooks shall be galvanized according to ASTM A 153.

2.04 - Pole and Mast Arm Assembly

A. General

1. The mast arms, support poles, and luminaire arms shall be continuous tapered, round or octagon steel poles of the anchor base type. The poles and mast arms shall be a minimum of 7 gauge fabricated from one length of steel sheet with one continuous arc welded vertical seam, unless otherwise approved by the ENGINEER. The poles and mast arms shall be fabricated from corrosion resistant steel meeting requirements of ASTM A595, Grade C, and A606, Type 4 sheets (with minimum chemical requirements of A588, Grade D), and the base and flange plates shall be fabricated from A588 structural steel. After manufacture, poles and mast arms shall have a minimum yield strength of 48,000 p.s.i. The base plate shall be attached to the lower end of the shaft by a continuous arc weld on both the inside and outside of the shaft.

   It may be permissible to fabricate poles and mast arms by welding two sections together. The method used for connecting the sections shall result in a smooth joint and shall be factory welded as follows:

   a. All longitudinal butt welds, except within one foot of a transverse butt-welded joint, shall have a minimum 60 percent penetration for plates 3/8 inch and less in thickness, and a minimum of 80 percent penetration for plates over 3/8 inch thickness.

   b. All longitudinal butt welds on poles and arms within one foot of a transverse butt-welded joint shall have 100 percent penetration.

   c. All transverse butt welds for connecting sections shall have 100 percent penetration achieved by back-up ring or bar.

   d. All transverse butt welds and all specified 100-percent-penetration longitudinal butt welds on poles and mast arms shall be examined 100 percent by ultrasonic inspection according to the requirements of AWS D1-1.80.

   Welding, fabrication, and inspection shall conform to the Iowa Department of Transportation Supplemental Specification for Structural Steel, a separate Specification.

Personnel performing nondestructive testing shall be qualified in accordance with the American Society for Nondestructive Testing Recommended Practice No. SNT-TC-1A and applicable Supplements B (Magnetic Paricle) and C (Ultrasonic). Evidence shall be presented for approval of the ENGINEER, concerning their qualifications. A report shall be required showing that welds have been inspected and either found satisfactory or found unsatisfactory but repaired and reinspected and found satisfactory. The cost of all nondestructive testing shall be paid by the supplier and will be considered incidental.

2. Pole manufacturers shall certify that only certified welding operators in accordance with Iowa Department of Transportation Supplemental Specification for Structural Steel were used. The welding consumables used shall be in accordance with the approved list furnished by the Iowa Department of Transportation.

B. Mast Arms

1. The mast arms shall be designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals and designed to support traffic signals and/or signs as shown on the attached tabulation. They shall be certified by the Fabricator that the mast arms are capable of withstanding winds up to 100 miles per hour without failure. The length of the mast arms shall be as specified on the Schedule of Prices.
2. When loaded with the signals and signs the mast arms shall have a slight rise. Unloaded the maximum angle between the mast arm and horizontal shall be 4 degrees, unless approved by the ENGINEER.

C. Poles

1. The pole shall be designed to support the mast arm so when it is equipped with the traffic signals and/or signs it will provide a minimum of 15.0 feet and a maximum of 19.0 feet clearance from the street surface to the bottom of the signal heads or signs.
2. The pole shall be equipped with two reinforced handholes with covers (4”x6-1/2” minimum). One handhole shall be located 18 inches above the base and 180 degrees with respect to the mast arm. The second handhole shall be located directly opposite the traffic signal mast arm. Securing the cover to the pole shall be done with the use of simple tools.
3. A lug shall be provided in the pole base near the handhole to permit connection of a #6 AWG grounding wire.

D. Signal Pole and Mast Arm Loading

1. Traffic signal poles and mast arms shall be fabricated according to the standard Specifications assuming the following signal head and signing loads:
   a. Maximum Loading for Arms 36 to 47 Feet Long

      5-section head on end, 24”x30” sign centered 2 ft. inboard, 3-section head 12 ft. inboard, 3-section head 24 ft. inboard, 18”x60” metro sign centered 28 ft. inboard, 2 3-section pole mounted heads, 2 2-section pole mounted pedestrian heads, luminaire, 6” backplates on all signal heads.

   b. Maximum Loading for Arms greater than 47 Feet Long

      5-section head on end, 24”x30” sign centered 2 ft. inboard, 3-section head 12 ft. inboard, 24”x30” sign centered 14 ft. inboard, 3-section head 24 ft. inboard, 3-section head 36 ft. inboard, 18”x60” metro sign centered 28 ft. inboard, 2 3-section pole mounted heads, 2 2-section pole mounted pedestrian heads, luminaire, 6” backplates on all signal heads.

E. Pole and Mast Arm Mounted Signs

1. The CONTRACTOR shall furnish and install all mast arm mounted and pole mounted signs shown on the traffic signal plans. All signs shall conform to the Manual on Uniform Traffic Control Devices. Prior to fabricating the street name signs, the CONTRACTOR shall submit Shop Drawings to the ENGINEER for review, detailing the legend, sign dimensions, and sign colors, and materials. Street name signs shall use Clearview font with the first letter being upper case and the others being lower case.
2. Sign mounting may be either a manufactured mounting bracket from a vendor or support bracketry assembled by the CONTRACTOR. All steel support bracketry shall be galvanized and the banding shall be stainless steel. Either method shall hold the sign firmly in place in winds up to 100 mph. The above Work shall include furnishing and installing all necessary signs, mounting brackets, stainless steel banding, and miscellaneous hardware to complete the sign installation in place.
3. A J-hook wire support shall be provided 6" to 12" above and 90 degrees with respect to the opening for each mast arm and luminaire arm. The J-hook shall be a curved 3/8" diameter steel bar.

F. Finish

1. Where called for on the plans, the poles and mast arms shall be weathering steel.
2. Where called for on the plans, the poles and mast arms shall be galvanized steel per the following:
   a. Surface Preparation

      Steel plates shall be blast cleaned as necessary to remove rolled-in mill scale, impurities, and non-metallic foreign materials. After assembly, all weld flux shall be removed.

      The iron or steel shall be degreased by immersion in caustic solution, pickled by immersion in sulfuric acid, and rinsed clean from any residual effects of the caustic or acid solutions by immersion in a fresh water bath.

      Final preparation shall be done by immersion in a concentrated zinc ammonium chloride flux solution with an acidity maintained between 4.5-5.0 pH. The assembly shall then be air dried to remove any moisture remaining in the flux coat and/or trapped within the product.

   b. Zinc Coating

      The assemblies shall be hot-dipped galvanized to the requirements of either ASTM A123 (fabricated products) or ASTM A153 (hardware items) by immersion in a molten bath of prime western grade zinc maintained between 810-850 degrees Fahrenheit. Maximum aluminum content of the path shall be controlled to 0.01% and Flux ash shall be skimmed from the bath surface prior to immersion and extraction of the assemblies to assure a debris free from coating.

G. Hardware

1. The mast arms and poles shall be equipped with all necessary hardware, shims and anchor bolts to provide for a complete installation without additional parts.
2. The anchor bolts shall meet the requirements of ASTM A36 or approved equal.
3. Bolts attaching the arms to the pole shall meet the requirements of ASTM A325 or approved equal.
4. The anchor bolts shall be hot dip galvanized for a minimum of 12 inches on the threaded end. The anchor bolts shall be threaded a minimum of 6 inches at one end and have a 4 inch long 90 degree bend at the other end. The Fabricator shall submit drawings for the anchor bolts and base plate design. All hardware shall be steel, hot dipped galvanized

meeting the requirements of ASTM A153, Class D, or shall have an electrodeposited coating of the same coating thickness, and so designed for this purpose.

5. Anchor bolt covers, pole top covers, and mast arm end covers shall be gray cast iron castings conforming to ASTM Designation: A48 Class 30. Items supplied with weathering steel poles shall be painted to match the weathering steel poles. Items supplied with powder coated galvanized poles shall be powder coated to match the poles.

H. Luminaire Extension

1. All mast arm assemblies will require luminaire extensions as noted in the plans. The pole for the luminaire extension shall provide a continuous shaft as required for the mast arm.
2. The pole for the luminaire extension shall be vertical, unless approved by the ENGINEER. Luminaire arm shall be a single curved arm, unless otherwise noted on the plans.
3. The end of the luminaire arm shall provide a 30-ft. luminaire mounting height, unless otherwise noted on the plans.

2.05 - Signals

A. General

1. The signal heads shall be complete with all fittings and brackets for a complete installation. Each signal shall consist of a main body assembly, optical units, necessary screws, wing nuts, eyebolts, etc., and shall be delivered completely assembled. All hardware including hinge pins, wing nuts, eye bolts or latch bolts shall be made of a solid non-corrosive metallic material to prevent seizure or corrosion by the elements. Each signal shall be smooth both inside and outside and shall contain no sharp fins or projections of any kind. The doors and visors shall be flat black. All metal parts shall be painted with one coat of primer and two coats of a high grade Federal Black enamel. All parts of the vehicle signals shall be in compliance with the last ITE Report on Adjustable Face Vehicle Traffic Control Signal Heads.
2. The electrical and optical system of the signal head shall be designed to operate on 115 volt, single phase, 60 Hertz alternating current.
3. All exterior surfaces shall be black.
4. Main Body Assembly of the signal unit shall consist of one or more polycarbonate sections have integral cast serrations so when assembled with the proper brackets they may be adjusted in increments and locked securely to prevent moving. The sections shall be designed so that when assembled they interlock with one another. All joints between sections shall be waterproof. The sections shall be held firmly together by locknuts or other means approved by the ENGINEER. Any open end on an assembled signal face housing shall be plugged with an ornament cap and gasket.
5. Doors and Optical Units
   a. The doors shall be made of polycarbonate. Each door shall be of the hinged type and shall beheld closed by a wing nut or other approved means. The hinge pins shall be designed so that the doors may be easily removed and reinstalled without the use of special tools. Each door shall have a polycarbonate visor designed to shield each lens. The inside of each visor shall be flat black.
   b. The optical system shall be so designed as to prevent any objectionable reflection of sunrays even at times of the day when the sun may shine directly into the lens. When the door of the opticalunit is closed, all joints in the assembly between the interior and exterior of the reflector shall be closed against suitable gaskets in order that the units may be dust tight. Between the door and the lens, there shall be a

neoprene gasket securely fastened around the outer surface of the lens. Said gasket to be engaged by the rim of the reflector holder when the door is closed to render the union between the reflector holder and the door assembly dust tight.

c. The reflector shall be parabolic in design and made a specular Alzak aluminum.

d. The reflector holder shall be of non-ferrous or rust proofed metal and designed to separately support the reflector and socket in proper relation to the lens. The reflector holder shall be hinged to the left-hand side of the signal body when viewed from the front. On the right-hand side, the reflector holder shall be held in place by a spring catch or other quickly releasable means.

e. Both the hinge device and the spring catch or equivalent shall be of a flexible nature which will permit the reflector holder to be pushed inwardly for at least one-sixteenth of an inch and to align itself correctly with the lens when the door of the optical unit is closed and pressed against the rim of the reflector holder. By such means, the joint between the reflector holder and the lens shall be rendered dust-tight. It shall not be necessary to remove any screws or nuts in order to swing the reflector holder out of the body section to obtain access to the light socket.

f. The socket shall be arranged with a lamp grip so it will be impossible for the lamp to be loosened by vibration.

6. The wire entrance fitting shall be made of malleable iron or other approved material equipped with a standard 1-1/2" pipe fitting for attachment to the signal head. It shall be provided with weatherproofing means so that when it is attached to the top of the signal a weatherproof assembly results. Positive locking means shall be provided so that the signal cannot loosen from the fitting. The fitting shall be provided with an insulation bushing at the point where wires enter. The fitting shall be provided with self-locking features to prevent the signal head from turning out of directional adjustment in a strong wind. It shall be painted in color to match that of the signal.

B. Vehicle Signals

1. In addition to meeting the requirements of Section A., Vehicle Signals shall meet the following requirements:

a. All signal indications shall use Light Emitting Diode (LED) Vehicle Signal Modules. All lenses shall be prismatic and long range. The lenses shall be 12 inches in diameter. All lenses shall be made of vandal resistant polycarbonate or acrylic plastic free from bubbles and flaws. The lenses shall meet the light transmittivity and chromaticity standards established by the ITE Standard for Adjustable Face Vehicle Traffic Control Signal Heads.

b. Visors shall be of the tunnel type not less than eight inches in length and shall be designed in a manner such that the visor may be easily installed or removed from the signal head.

c. A terminal block shall be mounted in the back of the second section of the signal head. The terminal blocks shall be secured at both ends.

d. Signals shall be shipped completely assembled with tunnel visors attached to the signal door.

C. Pedestrian Signals

1. In addition to meeting the requirements of Section A., Pedestrian Signals shall meet the following requirements:

a. Pedestrian signals shall consist of two signal sections with rectangular lenses and mounting attachments. The upper section shall display a "Hand/Man" symbol and shall display a "count down timer" symbol. The lower section shall be a count down timer. The two sections shall be of such design and construction as to fit rigidly and

securely together with or without a spacer. No spacer shall be more than ½ inch thick. The signals shall operate with LED.

b. The lenses shall be either sanded or prismatic lenses. The lenses shall be made of vandal resistant polycarbonate or acrylic plastic. The symbols on these lenses shall be at least 12 inches high and shall be designed to produce a maximum visibility both day and night. The Walk symbol shall be White LED modules and the Don't Walk symbol shall be Portland Orange LED. Both messages shall be screened on the lenses with a material which will not crack or peel. The background or field around both messages shall be black.

c. Each signal lens shall be equipped with a visor not less than seven inches in length, which encloses the top and both sides of the lens.

D. Optically Limiting Signal Heads

1. Optically limiting signal heads shall meet all of the applicable requirements of Section A through Section B except as hereafter provided:

a. Optically limiting signal heads shall permit the visibility zone of the indication to be determined optically. The field of light coverage vertically, laterally, and longitudinally shall be controllable within one degree of any axis, without the use of tunnel visors or louvers. The projected signal indication shall be visible or selectively veiled anywhere within 15 degrees of the optical axis.

b. The signal section shall be provided with a rigid connection that permits tilting from at least nine degrees above to nine degrees below the horizontal while maintaining a common vertical line through couplers and conduit. Head assemblies shall be adaptable for mounting on conventional mounting fixtures or in combination with conventional signal sections. The signal section shall be capable of mounting and servicing with ordinary tools.

c. The optical system shall include 120 volts, 150 watt, three prong sealed beam lamp with an average rated life of 6,000 hours with an integral reflector, and optical limiter-diffuser, an objective lens, and optical masking tape.

i. The optical limiter-diffuser combination shall provide an imaging surface, at focus on the optical axis for objects 900 to 1,200 feet distance, and permit an effective veiling system to be selectively applied as determined by the desired visibility zone. The optical limiter shall be composed of heat resistant glass and provided with positive indexing means.

ii. The objective lens shall be a high resolution, planar incremental lens hermetically sealed with a flat laminate of weather resistant acrylic plastic. The visible signal indication shall be at least 10-3/4 inches in diameter for circular indications, and the visible arrow indication shall conform to the requirements of the Institute of Transportation Engineer's Standards.

d. A voltage reducer shall be supplied to provide dimming of all the optically limiting signal lamps as the ambient light intensity drops below approximately three-foot candles.

e. Each signal housing shall be constructed of die-cast aluminum conforming to the Institute of Transportation Engineer's alloy and tensile requirements and shall have a chromate preparatory treatment. The exterior of the signal-housing, lamp housing and mounting flange shall be finished with a high quality baked enamel prime and finished painted flat black. The lens holder and interior of the signal housing shall be optically flat black.

f. Each signal lens shall be equipped with a visor, which encloses the top and both sides of the lens. The interior and exterior color shall be optical black.

E. Mounting Assemblies

1. Mounting assemblies shall consist of 1-1/2 inch standard pipe and fittings. All members shall be so fabricated such that they provide plumb, symmetrical arrangement, and securely fabricated assemblies. Construction shall be such that all conductors are concealed within assemblies. Cable guides shall be used to support and protect conductors entering assembly through poles. All threads shall be coated with rust preventive paint during assembly.
2. Support brackets, trunnions, and fittings shall be made of cast aluminum, steel, or cast iron. Bracket parts except for stainless steel parts shall be given one prime coat of metal primer and two coats of high quality Black exterior enamel.
3. Mounting assemblies shall be watertight and all open segments of the fittings shall be plugged with an ornamental plug and a gasket.
4. Mast arm mounting brackets shall be furnished with a completely adjustable stainless steel strap around arm, malleable clamp casting, vertical support tube, top and bottom signal head support with set screws, bolts, hole with rubber grommet in mast arm, and all incidentals necessary for complete installation.
5. Brackets for mounting the signal head on top of a pedestal shall provide support for both the top and bottom of the signal head.

F. Each signal shall be packed or crated separate and complete by itself. The outside of each package or crate shall clearly show the manufacturer, type, catalog number, Purchaser purchase order number and project. Mounting attachments may be shipped separate from the signals, but the boxes or crates shall be marked clearly with the same information as the signals. Mounting attachments of different types shall not be mixed in one box or crate.

2.05.1 – Traffic Signal LED's

A. LED Vehicle Signal Module

A. LED Vehicle Traffic Signal Modules shall comply with the latest revision of the "Equipment and Material Standards of the Institute of Transportation Engineers: Chapter 2a: VTCSH Part 2: Light Emitting Diode (LED) Vehicle Signal Modules (Interim)"

Note the following:

- **"Section 5.5 Dimming (Optional)"** is not required.
- **"Section 5.8 Failed State Impedance (Optional)"** is required.
- Compliance with all other sections of this standard is required.

2.05.2 - Backplates

A. Backplates shall be 0.125 inch thick thermoplastic and provide a minimum of a 5 inch black field around the assembly. Corners of the backplates shall be rounded with a 2½-inch radius.

B. Backplates shall be supplied with attaching bolts or screws in sufficient quantity to securely hold the backplates to the signal heads.

2.05.3 – Aluminum traffic Signal Pedestal

A. The pedestal shaft shall be fabricated of aluminum tubing with a wall thickness of not less than 0.125 inches. Shaft shall have a brushed aluminum finish.

B. The shaft shall be attached to a square cast-aluminum base with a handhole. The size of the handhole shall be at least 8½ inches by 8½ inches and equipped with a cover, which can be securely fastened to the base with the use of simple tools. A lug shall be provided near the handhole to permit connection of a #6 AWG grounding wire.

C. The length of the pedestal, from the bottom of the base to the top of the shaft, shall be 10 feet. The top of the shaft shall have an outer diameter of 4½ inches and shall be designed to receive a pole top mounting bracket to a traffic signal.

D. Pedestals shall be equipped with all necessary hardware, shims and anchor bolts to provide for a complete installation without additional parts.

E. The pedestal base shall be designed to mount on four ¾-inch anchor bolts spaced evenly around a 12¾-inch diameter bolt circle.

2.05.4 – Pedestrian Push Button Detectors

A. Pedestrian push button detectors shall be of the direct push without levers, handles or toggle switches. Buttons shall be ADA approved, (ie, EN2 - Ez communicator Navigator 2 wire push button station). The City of Iowa City shall provide custom voice message detail sheet. Push button detectors shall be quality Yellow exterior enamel.

2.06 - Controllers

A. General Design Requirements

1. Purpose. It is the purpose of Section A of these specifications to set forth minimum design and functional requirements for all actuated controllers included in this specification.

2. Electrical Requirement

a. Power

i. Nominal Voltage and Current. The controller shall be designed to operate from a nominal 120 volt alternating current, 60 hertz power source.

ii. Voltage and Current Ranges. The controller shall operate satisfactorily within a voltage range of 95 to 135 volts alternating current and a frequency range of 57 to 63 hertz.

b. Controller Connections. NEMA Connection Requirement. The controller shall contain a circular twist lock type connector meeting the requirements of Part 3, Section TS 1-3.05 "Pin Connections", paragraph A. NEMA Traffic Control Systems Standard TSI-1983.

c. Overcurrent Protection. The controller shall contain a front panel mounted AC power input fuse of suitable size to provide over-current protection.

d. Automatic Reorientation. In the event of a power interruption, the controller shall be capable of automatic reorientation upon power resumption and shall require no manual initiation or switching.

3. Constancy of Intervals. Minimum Requirements. The length of any interval or timing setting shall not change by more than +-100 milliseconds from its set value, so long as the voltage and frequency of the power supply and the ambient temperature inside the controller cabinet remain within the tolerances specified in these specifications.

4. Interval Sequence

a. General. The controller shall provide the proper intervals and interval sequence as required in the following section of these specifications.

b. Required Interval Sequence. The phase and interval sequence shall be programmable to provide from two through eight phase dual ring operation with 4 overlaps as described in the latest revision of the NEMA Standards for traffic control systems.

c. Skipping of Actuated Phases. If, prior to the end of the green interval of the terminating phase, neither vehicle nor pedestrian memory indicates a need for the next traffic phase, the intervals which comprise that phase shall be omitted from the interval sequence. However, once the green interval has been terminated, the phase causing the termination may not be omitted.

This does not, however, preclude the use of recall switches which when in the "on" position, shall cause the phase to be displayed even though no detector actuations have been received.

5. Interval Setting and Functions

   a. Provision for Setting. The controller shall provide for the setting of each interval, portion of interval, or function by means of a positive setting on a keyboard.

      i. Keyboard entry shall have a user friendly interface such that in every case the meaning of a number being displayed shall be clearly evident without reference to the sequence of key strokes preceding the display and without reference to a manual or instruction sheet. The method of finding current data and of changing data shall be intuitive to the extent that little or no training is required and keystroke sequences do not need to be memorized except for security access codes.

   b. Location of Controls. The interval and function controls shall be located on the front of the controller and shall be properly designated as to the function each control performs.

   c. Required Intervals/Functions and Ranges. The required intervals, portions of intervals, and functions for each phase of operation are listed in Table 1.

TABLE 1

Functions and Timing to be Provided On Each Phase of Operation

	Minimum Range (Sec.)	Increment (Sec.)
Minimum Initial	1 – 99	1.0
Maximum Initial *	0 – 99	1.0
Added initial Per Actuation	0 – 9	0.1
Passage Time	0 – 9	0.1
Minimum Gap	0 – 9	0.1
Time To Reduce to Minimum Gap	0 – 9	0.1
Time Before Reduction	0 – 99	1.0
Time Before Reduction	0 – 99	1.0
Maximum 1	1 – 99	1.0
Maximum 2	1 – 99	1.0
Yellow Change	0 – 9	0.1
Red Clearance	0 – 9	0.1
Walk	0 – 99	1.0
Pedestrian Clearance	0 – 99	1.0
Red Revert (One Per Controller)	3 – 9	1.0

* Maximum Initial may have fixed value of 30 Sec.

   d. Interval and Function Indication

      i. Indication. Long life light emitting diode indications or approved equal shall be provided and appropriately labeled on the controller to facilitate the determination of operation and termination of the intervals and functions contained therein. Indication shall include but not necessarily be limited to the following:

.Phase(s) next	.Dwell
.Phase(s) in service	.Walk
.Initial interval	.Ped clear
.Vehicle interval	.Force off
.Yellow change interval	.Hold
.Maximum termination	.Red clearance
.Gap termination	

ii. Call Indication. Indication shall be provided on the controller to display presence of vehicle call including memory and detector actuations and presence of a pedestrian call when pedestrian timing functions are included.

e. Vehicle Recall Switch(s). A recall switch shall be provided for each actuated vehicle phase which, when asserted, shall cause the automatic return of the right-of-way to that phase in accordance with the specified interval sequence.

f. Maximum Recall Switch(s). The recall switch(s) shall provide a maximum recall position which when asserted for a phase, shall cause the automatic return of the right-of-way to that phase for the duration of the maximum green interval in accordance with the specified interval sequence.

g. Vehicle Detector Non-Lock Memory Switch(s). A switch shall be provided for each actuated vehicle phase which, when placed in the non-lock position, shall cause the vehicle detector memory circuit for that phase to be disabled.

h. Pedestrian Recall Switch(s). A recall switch shall be provided for each actuated phase that includes pedestrian interval timing function, which when asserted, shall cause the automatic return of the controller to that phase and related pedestrian interval(s).

i. Flashing of Pedestrian Clearance Interval Functions. Means shall be provided to control the flashing of pedestrian signals during the pedestrian clearance interval(s).

6. Signal Circuits.

a. General. The controller shall be provided with suitable load switches, external to the controller, for closing and opening signal light circuits. Such shall be sufficient in quantity to provide the interval sequence as described in Subsection A.4.2 of this specification. Solid state load switches will be required for solid state controllers.

b. Closing and Opening of Circuits/Minimum Capacity. The closing or opening of signal circuits shall be positive without objectionable dark intervals, flickering of lights, or conflicting signal indications. Each switch shall have a capacity of not less than 10 amperes of incandescent lamp load at 120 volts AC.

c. NEMA Triple Signal Load Switch(s). External jack mounted load switches shall be provided in accordance with Part 5, "Solid-State Load Switches", Sec. TS 1-5.01, NEMA Traffic Control Systems Standards, TS1-1983.

7. MMU Minimum Requirements. For actuated controllers of solid state design and construction or actuated controllers utilizing solid state load switches, a separate external signal monitoring device shall be provided to monitor the occurrence of conflicting Green or Walk indications and shall cause the signals to go into flashing operation should such conflicts be sensed. This shall conform to Part 6, NEMA TS1-1983. The monitor shall have an LCD Screen and Ethernet port.

8. Flashing of Signals

a. Minimum Requirements. Means external to the controller shall be provided to permit the substitution of flashing signal indications for the normal specified

interval sequence. The indications to be flashed shall be as specified here or in the included interval sequence chart on the plans.All signals shall flash red.

i. Flashing Rate. Flashing shall be at the rate of not less than 50 nor more than 60 flashes per minute with approximately 50% on and 50% off periods. Flashing rate shall not vary so long as the power source remains within the specified limits.

ii. Capacity. The operation of the flashing circuit shall be accomplished in such a manner as to avoid undue pitting or burning or other damage to load switches at 10 amperes of tungsten lamp load at 120 volts, 60 hertz AC for 50 million times.

b. Control of Flasher Mode.

i. Police panel switch. Operation of flash mode from police panel shall put operation of controller into Stop Time Mode.

ii. Inside switch. An "auto-off-flash" mode switch shall be provided inside cabinet.

c. Flashing of Vehicular Signals. Flashing of vehicular signal indications shall be obtained from one or more flashers, each of which is a self-contained device designed to plug into a panel in the controller cabinet. If the flashing is provided by two flashers, they shall be wired to assure that the flashing of all lenses on the same approach is simultaneous.

d. Flashing of Pedestrian Signals (Pedestrian Clearance). When pedestrian interval timing functions are included, means shall be provided to permit flashing of the DON'T WALK pedestrian signals during the pedestrian clearance interval.

e. Solid State Flasher. A solid state flasher with no contact points or moving parts shall be provided. The solid state flasher shall utilize zero point switching. This shall conform to Part 8, NEMA Traffic Control Systems Standards, TS1-1983.

9. Manual Control.

a. Manual Control Enable. When specified, manual commands shall place vehicle calls and pedestrian calls (when pedestrian timing is included in the controller's sequence of operation) on all phases, stop controller timing in all intervals except vehicle clearances, and inhibit the operation of the external advance input during vehicle clearance.

b. Operation Without Pedestrian Timing. When concurrent pedestrian timing is not provided, one actuation of the interval advance input shall advance the controller to Green rest, from which it will immediately select a phase next and advance to the Yellow Vehicle Clearance, subject to the constraints of concurrent timing

c. Operation With Pedestrian Timing. When concurrent pedestrian service is provided, two sequential activations of the interval advance input shall be required to advance through a Green interval, the first actuation shall terminate the WALK interval, and the second shall terminate the GREEN interval including the Pedestrian Clearance Interval.

d. Automatic Timing of Vehicle Change/Clearance Intervals. All Vehicle Change/Clearance Intervals shall be timed internally by the controller. Actuations of the interval advance input during Vehicle Change/Clearance intervals shall have no effect on the controller.

10. Stop Timing. Suitable input from auxiliary equipment or other external sources, shall cause cessation of controller timing during assertion of such input. Upon removal of such input assertion, the interrupted interval, which was timing, shall resume normal timing. Provisions shall be made to insure that there is no conflict between the various

inputs to this function which would result in a stop time signal for one ring affecting the condition of the other ring.

11. Coordination
    a. Minimum Requirements. Means shall be provided within the controller to permit its interconnection into a coordinated traffic signal system when coordinating devices are added. As a minimum, this should include the provision of Yield circuit or Hold circuit, accessible to interruption by commands external to the controller.
    b. Hold Feature. The controller shall contain a Hold Feature which when asserted for a particular phase shall hold that phase in a rest condition. Upon release from the Hold, the phase shall immediately advance into the appropriate clearance interval or other unexpired portion of the green, provided there is an actuation on an opposing phase.
    c. Force-Off Feature. The controller shall contain a Force-off Feature which, when asserted shall cause termination of the current phase provided that phase is in the extension portion. In no case shall assertion of force-off cause termination in a clearance interval or during a minimum green for vehicles or pedestrians.
    d. NEMA Coordination Requirements. In addition to the minimum coordination requirements specified above, the controller shall contain the coordination features for the applicable configuration included in NEMA Traffic Control Systems Standard TS1-1983.
    e. Closed loop Compatibility. The controller shall be fully compatible with an Eagle Signal Company computer controlled signal system. It shall allow full use of all optional functions of that computer system. (Tactics)
12. Environmental and Testing.
    a. Minimum Requirements.
        i. General. The controller shall maintain all of its programmed functions and timing intervals when the ambient temperature and humidity are within the specified limits of this specification.
        ii. Ambient Temperature. The operating ambient temperature range shall be from -30 degrees to +165 degrees F.
        iii. Cooling/Heating Devices. No heating or cooling devices other than standard vent fan(s) shall be required for proper operation of the controller.
        iv. Humidity. The controller shall be designed to operate properly within a relative humidity range of 0 to 95% up to 110 degrees F.
    b. NEMA Requirements.
        i. Environmental and Operating. The controller shall fulfill the environmental and operating requirements as described in Part 2, Section 1, "Environmental and Operating Standards", NEMA Standards TS1-1983.
        ii. Testing. The controller shall fulfill the testing requirements as described in Part 2, Section 3, "Test Procedures", NEMA Traffic Control Systems Standard TS1-1983.
13. Cabinet.

    Basic Construction. The controller and all associated equipment shall be provided in weatherproof metal cabinet of clean-cut design and appearance. The controller cabinet must be large enough to accommodate a future master control unit (under separate contract, unless specified in the plans). Cabinet shall have a 16 channel back panel. The cabinet must be fiber ready and video ready and Ethernet ready with 1 Comtrol Rocketlinx ES 8510 Ethernet switch with 3 100 meg GIBX's included.

a.

i. Construction Material. The cabinet shall be constructed of sheet or cast aluminum.

ii. Door. A hinged door shall be provided permitting complete access to the interior of cabinet. When closed, the door shall fit closely to gasketing material, making the cabinet weather and dust resistant. The door shall be provided with a strong lock and key.

The door shall be designed to be opened only with the standard controller cabinet key currently used by the City of Iowa City. A sample key will be made available to the successful bidder.

iii. Auxiliary Door. A small, hinged and gasketed "door-in-door" shall be included on the outside of the main controller door. The auxiliary door shall not allow access to the controller, its associated equipment, or exposed electrical terminals but shall allow access to a small switch panel and compartment containing a signal shutdown switch, a flash control switch, and other specified functions.

The auxiliary door lock shall be equipped with a strong lock utilizing keys of a different design from those provided for the main cabinet door.

The auxiliary door lock shall be designed to be opened only with the standard auxiliary door key used by the City of Iowa City. A sample key will be made available to the successful bidder.

iv. Door Stop. The controller cabinet door shall be provided with a stop and catch arrangement to hold the door open at angles of both 90 degrees and 180 degrees, ± 10 degrees.

v. Mounting Shelves. The cabinet shall contain strong mounting table(s) or sliding way(s) to accommodate the mounting of the controller and all included auxiliary equipment. The mounting facilities shall permit the controller and/or auxiliary equipment to be withdrawn from the cabinet for inspection or maintenance without breaking any electrical connections or interrupting operation of the controller.

vi. Mounting Screws. Screws used for mounting shelves or other mounting purposes shall not protrude beyond the outside wall of the cabinet.

vii. Outlet and Lighting. An electrical outlet shall be furnished and located in an accessible place near the front of the cabinet and each cabinet shall be provided with LED cabinet lighting mounted in the cabinet in a manner which will provide adequate light to service all parts of the cabinet interior during nighttime hours Size, Type and Mounting.

i. Size. The cabinet shall be of such size to adequately house the controller, all associated electrical devices and hardware, and other auxiliary equipment herein specified.

ii. Mounting. The cabinet shall be arranged and equipped for concrete base mounting. Base should be flush with the ground and a riser installed. Sufficient galvanized anchor bolts, clamps, nuts, hardware, etc., as required for the specified mounting type shall be furnished with each cabinet.

iii. Cabinet shall have a Comtrol Rocketlinx ES8510 Ethernet switch for communication with City's Ethernet system with 3 100 meg sfp devices.

b. Ventilation.

Two thermostatically controlled duct fan units with a minimum rating of 100 CFM in free air shall be installed in the cabinet to provide forced air ventilation through the cabinet. The fan unit shall be mounted to the inside top of the cabinet and shall be easily removed and replaced without having to dismantle any part of the cabinet or exhaust duct system. The thermostat controlling the fans shall be manually adjustable to turn on between 90 degrees F and 150 degrees F with a differential of not more than 10 degrees F between automatic turn-on and turn-off. The fans shall intake air through filtered vents located near the bottom of the cabinet or cabinet door and exhaust it through a weather-proof, screened duct located near the top of the cabinet. Fiberglass type dry filters shall be used to cover the air intakes into the cabinet. These filters shall be easily removed and replaced and be of standard dimensions commercially available. The filters shall be provided with positive retainment on all sides to prevent warpage and entry of foreign matter around the edges.

c. Connecting Cables, Wiring and Panels.

i. Connecting cables. Electrical connections from the controller (and auxiliary devices when included) to outgoing and incoming circuits shall be made in such a manner that the controller (or auxiliary device) can be replaced with a similar unit, without the necessity of disconnecting and reconnecting the individual wires leading therefrom. This can be accomplished by means of a multiple plug, a spring-connected mounting or approved equivalent arrangement. Correlation shall be made with connecting cable plug and controller jack as described in Subsection 2.2., Section A of this specification.

In addition to the above, a mating plug/cable assembly shall be provided for all connectors on the controller (or auxiliary device).

ii. Panels and Wiring. Each cabinet shall be furnished with suitable, easily accessible wiring panel(s). All panel wiring shall be neatly arranged and firm.

a) Wiring Terminals. Terminals shall be provided, as a minimum, for the following:

Terminal with N.E.C. cartridge fuse receptacle, fuse, power line switch or magnetic circuit breaker, with integral power line switch, for the incoming power line.
Terminal, unfused, for the neutral side of the incoming power line.
Terminals and bases for signal load switches, and outgoing signal field circuits.
Terminals and bases for signal flasher and outgoing signal field circuits.
Terminals for detector cables.
Terminals for all required auxiliary equipment.
Terminals for all conflict monitor inputs and outputs.
Terminals for all NEMA defined inputs and outputs
Terminals for all inputs and outputs defined by the controller manufacturer which may be in addition to the NEMA defined inputs and outputs.

b) Clearance Between Terminals. Adequate electrical clearance shall be provided between terminals. The controller, auxiliary equipment, panel(s), terminals and other accessories shall be so arranged within the cabinet that they will facilitate the entrance and connection of incoming conductors.

c) Signal Circuit Polarity. The outgoing signal circuits shall be of the same polarity as the line side of the power service; the common return of the same polarity as the grounded side of the power service.

d) Grounding Conductor Bus. An equipment grounding conductor bus shall be provided in each cabinet. The bus shall be grounded to the cabinet in an approved manner.

d. Fusing and Surge Protection.

i) Incoming AC Line. Suitable overcurrent protection, utilizing one of the methods described in Subsection A.13.4.2.1, shall be provided with led indicator.

ii) Branch AC Circuits. Suitable overcurrent protection devices shall be provided for each of the following AC power line input circuits:

1. Controller mechanism
2. Cabinet fan
3. Conflict monitor
4. Detector amplifiers
5. Flash transfer

iii) Light & Outlet Fuse. A 15 ampere fuse and indicating type of fuse holder, wired in advance of the main circuit breaker for protection of the AC power input circuits to the cabinet light and the convenience duplex receptacle shall be provided.The Cabinet lighting shall be a LED type.

iv) Surge Protection. High energy transient surge protection shall be provided on the incoming AC power lines in order to minimize potential controller damage. This shall be a gas discharge lightning arrestor - 200-400 volts. A second such device shall be provided on the AC power line to the controller unit. Must have LED indicator.

e. Painting. The cabinet shall be natural, unfinished aluminum. All mounting attachments shall be natural, unfinished aluminum or finished with two coats of high grade aluminum colored paint.

f. Plastic Envelope. A heavy-duty clear plastic envelope shall be securely attached to the inside wall of the cabinet door. Minimum dimensions shall be 11 inches wide x 14 inches deep.

g. Cabinet shall have a battery back system with an automatic transfer switch. The unit shall run or flash the signals. Batteries and UPS shall be mounted in a small side exterior mount cabinet.UPS shall be Ethernet ready.

14. Guarantee. The equipment furnished shall be new, of the latest model fabricated in a first-class workmanlike manner from good quality material. The manufacturer shall replace free of charge to the purchaser any part that fails in any manner by reason of defective material or workmanship within a period of 18 months from date of shipment from the supplier's factory, but not to exceed one year from the date that the equipment was placed in operation after installation.

15. Wiring Diagrams and Documentation

One documentation package shall be supplied in each controller cabinet and three additional copies will be supplied for office use. Each package will consist of the following list of items for the cabinet and load facility and for each model of controller, conflict monitor, load switch, and flasher.

a) Complete schematic diagram, accurate and current for unit supplied.
b) Complete physical description of unit.
c) Complete installation procedure for unit.
d) Specifications and assembly procedure for any attached or associated equipment required for operation.
e) Complete maintenance and troubleshooting procedures.
f) Warranty and guarantee on unit, if any.

g) Complete performance specifications (both electrical and mechanical) on unit.
h) Complete parts list - listing full names of vendors and parts not identified by universal part numbers such as JEDEC, RETMA, or EIA.
i) Pictorial of components layout on chassis or circuit boards.
j) Complete stage-by-stage explanation of circuit theory and operation.

B. Multi-Phase Traffic Actuated Controllers(SEPAC M52 with 3.51a firmware)

1. Purpose. It is the purpose of this section of the specifications to set forth minimum design and operating requirements for multi-phase (two through eight phase) traffic actuated traffic signal controllers.

2. General Design Requirements. The General Design Requirements in Section A of this specification shall apply in addition to certain design, operational and functional requirements hereinafter described.

   a. NEMA Design Requirements. The controller shall be designed in accordance with the applicable requirements, included in NEMA Traffic Control System Standard TS1-1983.

   b. Controller Interchangeability. Interchangeability of controllers furnished under this specification shall be achieved by connector plug interchangeability as designated in Part 3, NEMA Traffic Control Systems Standard TS1-1983.

   c. Maximum Controller Dimensions. The controller shall be no more than 19 inches wide, 13 inches high and 11 inches deep.

3. Operational Requirements.

   a. Mode of Operation. The controller shall provide the multi-phase operation described in Subsections 1 and 2 of this section of the specification and shall be fully actuated with means of receiving actuations on all phases. The traffic signal controller shall be capable of Volume Density operation. The controller shall have variable initial and time waiting gap reduction features. The controller shall also have dual maximum extension capability. Controller shall be fiber ready and Ethernet ready

   b. The controller shall also permit a non-actuated mode of operation on any of its phases by assertion of the vehicle recall function (or pedestrian recall function when such function is present) on the desired phase.

   c. Call to Non-Actuated Mode. The controller shall feature an input which, when asserted, shall permit the selection of non-actuated mode of operation on any of its phases.

   d. Operation With Auxiliary Functions/Devices. The controller shall be capable of having its basic operation expanded or augmented by the addition of auxiliary functions or devices.

   e. Minimum Green

      i. Actuated Phase. The minimum green shall consist of an initial portion Only, or a separately set Minimum Green function.

         If pedestrian functions are provided and a pedestrian actuation is received, the Minimum Green shall consist of a WALK interval plus a Pedestrian Clearance interval.

      ii. Non-Actuated Phase. In the non-actuated mode of operation, the Minimum Green on the non- actuated phase shall be equal to the values described for Actuated Phases in the preceding paragraphs or shall be equal to a separately set Minimum Green function.

f. Unit Extension. The actuation of a vehicle detector during the extendible portion of an actuated traffic phase having the right-of-way shall cause the retention of right-of-way by that traffic phase for one Unit Extension portion from the end of the actuation but subject to the Maximum (extension limit).

g. Maximum (Extension Limit). The Maximum or extension limit shall determine the maximum duration of time the right-of-way can be extended for a phase having successive detector actuations spaced less than a Unit Extension portion apart.

h. Initiation of Maximum (Extension Limit). The timing of the Maximum or extension limit shall commence (1) with the first actuation or other demand for right-of-way on a traffic phase not having the right-of-way or (2) at the beginning of the Green interval if an actuation or other demand for right-of-way has been previously registered on a traffic phase not having the right-of-way or, alternatively, the Maximum may commence at the end of the initial portion of the Green interval if an actuation or other demand has been previously registered on a traffic phase not having the right-of-way.

i. Transfer of Right-of-Way. The actuation of any detector on a traffic phase not having the right-of-way shall cause the transfer of the right-of-way to that traffic phase at the next opportunity in the normal phase sequence provided that there has been an expiration of a Unit Extension portion with no continuing actuation or an expiration of the Maximum (extension limit) timing on the preceding phase having the right-of- way.

j. Change Clearance Interval(s) Prior to Transfer. The transfer of right-of-way to any conflicting phase shall occur only after the display of the appropriate change clearance interval(s).

k. Rest in Absence of Actuation.

   i. Minimum Rest. In the absence of detector actuation or assertion of recall switch(s), the right-of-way indication shall remain (rest) on the traffic phase on which the last actuation occurred.

   ii. Rest in All-Red. In the absence of detector actuation or assertion of recall switch(s), the controller, after display of the appropriate clearance interval(s) on the last phase having the right-of-way, shall rest in Red (and associated Pedestrian DON'T WALK indications) on all phases until detector actuations are received.

l. Memory Feature. Unless precluded by the operation of non-memory feature, the following memory retention shall be provided in the controller.

   i. Memory Change During Clearance Interval(s). An actuation received during a change clearance interval for a traffic phase shall cause the right-of-way to return to that phase at the next opportunity in the normal phase sequence.

   ii. Memory If Phase Terminated by Maximum (Extension Limit). If the right-of-way is transferred by the operation of the Maximum or extension limit, the traffic phase losing the right-of-way shall again receive it without further actuation at the next opportunity in the normal phase sequence.

m. Pedestrian Timing Operation. When pedestrian timing functions are specified in the General Design Requirements, Section A of this specification, the following pedestrian function operation shall be provided.

   i. Pedestrian Timing With Non-Actuated Phase. In the non-actuated mode of operation, a WALK interval shall be provided simultaneously with the associated Minimum Green interval of the non-actuated phase. A flashing

DON'T WALK Pedestrian Clearance Interval shall follow the WALK interval, during which the Green traffic phase continues to be displayed.

ii. Pedestrian Timing With Actuated Phase. When pedestrian actuation is received, a WALK interval shall be provided concurrently with the associated Green traffic phase interval. A flashing DON'T WALK Pedestrian Clearance interval shall follow the WALK interval during which the Green traffic phase continues to be displayed.

iii. Condition in Absence of Pedestrian Call. In absence of pedestrian actuation or assertion of pedestrian recall function, pedestrian signals shall remain in a DON'T WALK condition.

iv. Recycle of Pedestrian Functions. In the absence of opposing phase demand, it shall be possible to recycle the pedestrian interval functions to succeeding pedestrian actuations without change in vehicle indications.

v. Pedestrian Actuation Memory. Pedestrian actuations received by a phase during steady or flashing DON'T WALK indications of that phase shall be remembered and shall cause the controller to provide pedestrian timing functions for that phase at the next opportunity in the normal phase sequence.

vi. Non-extension of Pedestrian Intervals. Successive pedestrian actuations shall not cause extension of the pedestrian intervals.

n. Advanced Operational Features. When certain advanced operational features are specified in the General Design Requirements, Section A of this specification, the controller shall provide the following operation.

i. Volume Density Operation.

a) Variable Initial. Utilizing the specified mode selected to provide this function, the controller shall enable an increase in timing of the Initial portion of the Green interval of a phase based upon the number of traffic actuations stored on that phase during its YELLOW and RED interval.

b) Time Waiting Gap Reduction. Utilizing the functions specified, the controller shall enable a reduction in the Extension portion of the Green interval of the phase having the right-of-way in proportion to the time elapsed from the registration of an actuation on an opposing phase or from the beginning of the Green interval, whichever occurs later.

ii. Dual Maximum (Extension Limit) Operation. Assertion by external command for the operation of a Maximum II function for a phase shall cause the controller to provide the timing value for that function in lieu of the normal maximum value.

o. NEMA Operational Requirements. In addition to the basic operational requirements specified above, the controller shall provide the operational features for the applicable configuration included in the NEMA Traffic Control Systems Standard TS1- 1983.

4. Functional Requirements.

a. Basic Functional Requirements. Functional requirements for the multi-phase traffic actuated controller shall be as specified in the General Design Requirements in Section A of these specifications.

b. NEMA Functional Requirements. In addition to the basic functional requirements specified above, the controller shall provide the functional features for the applicable configuration, included in the NEMA Traffic Control Systems Standard TS1-1983.

c. Overlaps. When required by the interval sequence chart in the General Design Requirements section of these specifications, overlap(s) shall be provided by the controller and may be implemented via internal or external logic.

5. Enhanced operation.

a. Preemption. A minimum of two preemption inputs shall be provided. These shall be designed for railroad or emergency vehicle preemption and shall provide the ability to set the delay before start of preempt sequence and the duration of the preempt sequence. It shall also be possible to define the status of each phase as red, green, flashing yellow, or flashing red during the preemption period and to provide an orderly transition into and out of the preemption period.

b. Coordination. The controller shall be capable of emulating a 3 dial/3 split/3 offset pretimed controller coordinated with a 9 wire interconnect system.

c. Time Base Functions. The controller shall have the capability to provide internal time based coordination. In addition it must provide a minimum of two auxiliary outputs controlled by the time base coordination which can be fully programmed on a time basis to control external devices on a cycle by cycle, time of day, day of week, and/or holiday schedule on an annual basis.

6. Remote Flash. A remote flash input is required which will provide for the remote implementation of flashing operation consistent with the requirements of the MUTCD. This shall include a means of programming a "Flash Entry Phase" and a "Flash Exit Phase."

2.07 - Inductive Loop Vehicle Detector. Not normally used.

A. Design Requirements

1. Operation

a. General

Shall be card rack style.

The detectors shall be designed to operate with loop and lead-in wire combinations having a wide variation in electrical characteristics. The electrical characteristics are a function of the length and width of the loop, the length and type of lead-in wires, and other factors. The detector shall operate with the usual configurations of loops and lead-in wires, standard with the Department, which have a 40 to 700 microhenry total inductance.

The detector shall provide reliable detection and maintain an output indication for a period of not less than three (3) minutes for a vehicle that causes a 0.02% change in the total inductance of the loop and lead-in system as measured at the detector loop input terminals. The detector shall provide operation as above with a loop system having any or all of the following characteristics:

1) A shunting resistance of 10,000 ohms or greater to a common or circuit ground bus.
2) A loop system quality factor (Q) of not less than 5.0, when connected to the detector being tested. Q is defined as the ratio of the resonant operating frequency over the half-power bandwidth.
3) A total or equivalent inductance within the range of 40 to 700 microhenries at the detector loop input terminals.

A sensitivity adjustment or selector shall be provided to allow selection of a high, medium or low sensitivity adjustment.

b. Loop Energizing and Detector Sensing Circuits. The detector shall provide reliable detection of licensed motor vehicles. The detector shall provide an input (switch

closure) only when vehicles are passing or stopped over the loop and shall detect all vehicles passing over the loop at speeds up to 80 miles per hour.

i) Turn on. When first turned on, while tuning or being tuned, the detector shall provide a continuous output pulse (switch closure), plus a visual indication, in both the presence and pulse modes of operation. On power failure, or loop failure that would cause the inductance to exceed the tuning range, the detector must place a continuous call.

ii) Frequency. To prevent mutual interference "crosstalk", the detectors shall be provided with a three position frequency mode switch on the front panel.

iii) Automatic Tuning. The detector shall be designed to be initially tuned to the loop and provide for automatic drift compensation.

iv) Weather. The operation of the detector shall not be affected by changes in the inductance of the loop caused by environmental changes, such as rain, hail, snow, temperature humidity, nor shall the sensitivity be markedly affected.

c. Accuracy. The detector shall be able to detect all licensed vehicles, including motorcycles, accurately.

2. Detector Output. The detector output (switch closure) to the associated traffic control equipment shall be provided by means of a relay. The relay shall have a mechanical life of at least 1,000,000 operations. The contacts shall have a rating of at least 1.0 ampere at 120 volts AC or DC.

3. Power Supply. The detector shall be designed to operate on a 110 commercial 60-hertz power line over a voltage range of 100-125 volts. The primary of the power supply transformer shall be fused with a 1/4 inch diameter, 1 1/4 inches long, 250 volt fuse of suitable current rating. An extractor-post fuse- holder shall be provided. The fuse rating shall be marked by the fuse-holder.

4. Visual Indicator. A long life light emitting diode shall be used to provide a visual indication of each vehicle detection. Lamps shall be easily replaceable without the use of tools. The indication must be readily visible in the indirect sunlight.

   All indicator lights shall have a minimum design life of 20,000 hours at rated voltage unless an ON-OFF switch is provided to control the lights. If an ON-OFF switch is provided, the design of the lights need be only 1,000 hours at rated voltage.

5. Dielectric Strength. The detector shall withstand a dielectric strength test of 1,250 volts, 60 hertz per second, AC applied between the 120 VAC line-supply circuit and the terminals for the external loop for a period of one minute

6. Interchangeability and Design Life. All modules and components of the same type shall be interchangeable. The design life of all components, under conditions of normal operation, shall not be less than five years.

7. Delay Call. The detector, when specified on the bid form, to have a "Delayed Call" feature, shall be capable of ignoring a vehicle actuation unless it persists for more than a predetermined period of time. The predetermined time shall be adjustable from 0 to 25 second minimum on the front panel. The "Delayed Call" feature shall be inoperative during the green interval for the phase related to the amplifier.

B. Enclosure

1. General. A dustproof, metal enclosure shall be provided to enclose all electrical parts of the detector. The enclosure shall be designed for placement on a shelf in a weatherproof field cabinet. The detector shall not be position sensitive.

2. Detector Units. Detector units shall be designed for use with loop combinations (two to four loops) in series or parallel or series-parallel). The detector model shall have a

visual indication of a call and will not require external equipment for tuning or adjustment.

3. Size. A small size enclosure and the ability to stack the enclosures, one on top of another, is desirable. Single detector units shall not be larger than 6 inches by 3 inches by 8 inches deep.
4. Marking. Each detector shall be marked with the manufacturer's name, model, catalog, or type number, and serial number. The electrical input rating (voltage, frequency, and wattage) shall be included in the marking.

C. Input/Output Receptacle

1. Function Assignment. Input and output connections for the detector shall be made to a type MS-3102-A18-1P box receptacle with 10 male contacts. A plastic cover shall be provided on the receptacle. The pin positions of the input/output connector shall be assigned as follows:

Pin No.	Function
A	120 VAC (-)
B	Output Relay Common
C	120 VAC (+)
D	Input from Loop
E	Input from Loop
F	Output Relay N.O.
G	Output Relay N.C.
H	Chassis Ground
I	Spare
J	Spare

2. Plug and Cable. A plug, type MS-3108-B with type 18-1S insert, with 10 female contacts shall be furnished, wired, leads of leads of #18 AWG stranded, color-coded wire with 300 volt insulation. A type MS-3057-10 cable clamp and boot shall be provided for strain relief. The leads shall be 5'0" in length, the first 16 inches of leads, from the plug, shall be enclosed in cotton braiding. No terminals are required on the leads.

D. Components

1. Inductors and Transformers. All inductors and transformers shall have their windings insulated and shall be impregnated to exclude moisture. All wire leads shall be color coded.
2. Resistors and Capacitors. All resistors and capacitors shall be insulated and shall be marked with their resistance or capacitance value. Resistance and capacitance values may be indicated by the Radio Electronics Television Manufacturer's Association (RETMA) color codes. All electrolytic capacitors shall be marked to indicate polarity and voltage.
3. Printed-Circuit boards. All printed-circuit boards shall be at least 1/16 inch thick and shall be made of glass-cloth silicone. National Electric Manufacturer's Association (NEMA) type G-10 glass epoxy or equivalent. The conductor material shall be copper, 0.0027 inch thick, having a weight of 2.0 ounces per square foot, with a protective solder coating. All printed-circuit board connectors (male and female) shall be gold plated over the copper base. The printed circuit-boards shall be securely mounted in such a way as to prevent flexing or bending of the boards, and shall be easily removable for servicing or replacement.

4. Wiring. All interconnecting wire shall be insulated #22 AWG or larger, suitable for 180 degrees F operation.
5. Solid State Circuitry
   a. Components. Transistors, integrated circuits, or semi- conductor diodes shall be used for all amplifying, detecting, rectifying, counting logic, and regulator circuits. No vacuum or gas tubes shall be used except for pilot lights. Transistors, integrated circuits, and diodes shall be marked with their type number and shall be types listed by the Radio Electronics Television Manufacturer's Association (RETMA). No electromechanical timers, synchronous motors, or relays shall be employed, except as specified in Section 1-B.
   b. Proprietary parts. All electronic and electrical components must be of standard manufacture and available from a source other than the manufacturer of the loop detector unit.
6. Temperature. The temperature of components shall not cause any appreciable reduction in component life when the detector is operated in an ambient temperature from 20 degrees to 180 degrees F.

E. Workmanship
   1. The enclosure and all modules shall be fabricated, assembled, and wired in a workmanlike manner.

F. Documentation
   1. Contents. A documentation package shall be supplied in each controller cabinet for the inductive loop vehicle detectors which shall consist of the following:
      a) Complete schematic diagram, accurate and current for unit supplied.
      b) Complete physical description of unit.
      c) Complete installation procedure for unit.
      d) Loop specifications and loop assembly procedure.
      e) Complete maintenance and troubleshooting procedures.
      f) Warranty and guarantee on unit, if any.
      g) Complete performance specifications (both electrical and mechanical) on unit.
      h) Complete parts list - listing full names of vendors and parts not identified by universal part numbers such as JEDEC, RETMA, or EIA.
      i) Pictorial of components layout on chassis or circuit boards.
      j) Complete stage-by-stage explanation of circuit theory and operation.
   2. Number of copies. At least three full documentation packages for each detector sensing unit model shall be supplied to the ENGINEER.

2.08 - Equipment And Materials

A. Equipment and materials shall be of new stock unless the plans provide for the use of existing equipment, or equipment furnished by others. New equipment and materials shall be the product of reputable manufacturers of electrical equipment and shall meet the approval of the ENGINEER**.**

PART 3 EXECUTION

3.01 - General

A. The CONTRACTOR shall furnish and install all equipment and materials necessary for a complete and operative signal installation as shown on the plans and described in the Contract Documents.

B. The CONTRACTOR shall be a licensed electrical contractor in accordance with City Ordinance and adherence to local Building Code shall be met.

C. CONTRACTOR Qualifications

Trained and experienced personnel shall supervise the fiber optic cable installation. Qualified technicians shall make the cable terminations and splices. The CONTRACTOR upon request of the ENGINEER shall provide documentation of qualifications and experience for fiber optic equipment installations. The ENGINEER shall determine if the CONTRACTOR is qualified to perform this work. The CONTRACTOR shall have attended a certified fiber optic training class mandated by the specifications prior to starting work.

D. The CONTRACTOR will be responsible for incidental sidewalk removal and replacement necessary to complete the signal construction. All waste material and debris shall be disposed of at a sanitary landfill at the CONTRACTOR's expense.

E. All incidental parts which are not shown on the plans or specified herein, and which are necessary to complete the traffic signal, or electrical systems, shall be furnished and installed as though such parts were shown on the plans or specified herein. All systems shall be complete and in operation to the satisfaction of the OWNER at the time of completion of the work.

F. The CONTRACTOR shall perform all work required and furnish all labor, materials, equipment, tools, transportation and supplies necessary to complete the work in accordance with the Contract Documents. The ENGINEER or his representative shall have full freedom to observe all phases of the work performed by the CONTRACTOR and to discuss all matters dealing with the quality and progress of the work.

G. The Standard Specifications for Highway and Bridge Construction, current Series, Iowa Department of Transportation, as modified by these contract documents shall apply to this Special Provision.

The above specifications are referred to as the Standard Specifications. Part 1 of the Standard Specifications shall not apply to this section.

1. The following Iowa Department of Transportation Supplemental Specifications shall also be considered a part of these Special Provisions.
   a) Specification 5025
   b) Supplemental Specification for Traffic Controls for Street and Highway Construction and Maintenance Operations, March 26, 1991.
   c) Specification 5040
   d) General Supplemental Specification for Construction Projects, January 7, 1992.

H. The installation of the signals and signs shall be in conformance with the "Manual Of Uniform Traffic Control Devices for Streets and Highways", 1988 edition, latest revision.

I. The video detection system shall be installed as recommended by the supplier and as documented in installation materials provided by the supplier.

J. Miscellaneous Equipment

The CONTRACTOR shall furnish and install all necessary miscellaneous connectors and equipment to make a complete and operating installation in accordance with the plans, standard sheets, standard specifications, special provisions, and accepted good practice of the industry.

3.02 - Qualifications, Service Calls, And Warranty

A. CONTRACTOR's personnel are required to be knowledgeable of the traffic signal controller operation and wiring. Controller manuals and wiring schematics will be provided to the CONTRACTOR for his use on the project. These documents must be returned undamaged at the end of the project.

B. The Traffic Engineering Department will provide part-time observation of the CONTRACTOR's work. The Department's representative will be available during normal

working hours (7:00 A.M.-3:30 P.M.) to review the CONTRACTOR's work. CONTRACTOR shall provide four hours advance notice to the Department for review of the work. Any service calls or review of the CONTRACTOR's work outside of the Department's normal working hours will be billed to the CONTRACTOR.

C. The Traffic Engineering Department will continue to provide service call maintenance during the project. If it is determined that the malfunction was caused by the CONTRACTOR's work, then the CONTRACTOR will be billed for the materials, labor, and equipment required to correct the malfunction and/or damage.

D. The CONTRACTOR shall guarantee all his work against defects due to poor workmanship or materials as specified in the Contract Documents.

3.03 - Concrete Bases For Poles And Controller

A. Concrete bases for poles and controllers shall conform to the plans and Section 2403 of the Iowa DOT Standard Specifications.

B. Excavations for bases shall be made in a neat and workmanlike manner. Whenever the excavation is irregular, forms shall be used to provide the proper dimensions of the foundations below grade. Construction of the bases may require hand excavation to verify location of utilities.

C. The material for the forms shall be of sufficient thickness to prevent warping or other deflections from the specified pattern. The forms shall be set level and means shall be provided for holding them rigidly in place while the concrete is being placed. When located in a continuous sidewalk area, the top of the pole bases shall be set flush with the sidewalk or pavement surface.

D. All reinforcing bars, conduits, ground rods, and anchor bolts shall be installed rigidly in place before concrete is placed in the forms. Cap and protect conduit ends before placing concrete.

E. Anchor bolts for the signal poles or the controller shall be set in place by means of a template constructed to space the anchor rods in accordance with the manufacturer's requirements. The top of the bolts shall not vary more than 1/4 inch. The center of the template and the center of the concrete base shall coincide unless the ENGINEER directs otherwise.

F. The top of the base shall be finished level and the top edges shall be rounded with an edger having a radius of 1/2 inch. The exposed surface of the base shall have a wood floated surface finish. Exposed concrete surfaces shall be cured using white-pigmented curing compound or plastic film meeting the requirements of Article 4106.02 of the Iowa DOT Standard Specifications.

G. The bottom of the foundations and bases shall rest securely on firm undisturbed ground. Where the foundation or base cannot be constructed as shown on the plans because of an obstruction, the CONTRACTOR shall use other effective methods of supporting the pole as may be designated by the ENGINEER.

H. After the concrete is placed in the form, it shall be vibrated with a high-frequency vibrator to eliminate all voids.

I. After the foundation or base has been poured, absolutely no modification of any sort may be made. If the anchor bolts, conduit, or any part of the foundation or base is installed in an incorrect manner as determined by the ENGINEER, the entire foundation or base shall be removed and a new foundation or base installed. The CONTRACTOR shall bear all costs of replacing work deemed unsatisfactory by the ENGINEER.

J. Unless otherwise specified, anchor bolts for poles where arms are to be perpendicular to the centerline of the street shall be installed so that a line through the center of one anchor bolt farthest from the curb and extended through the center of the adjacent anchor bolt closest to

the curb will be perpendicular to the centerline of the street to within two degrees of arc unless otherwise specified.

K. Prior to setting poles, the anchor bolts shall be covered in such a manner as to protect them against damage and to protect the public from possible injury.

L. Each base location shall be approved by the ENGINEER prior to construction. Base dimensions shown on the plans are minimum dimensions and based on stable soil conditions. Should extremely loose or sandy soil be encountered, the CONTRACTOR shall contact the ENGINEER for necessary base alterations.

M. Where shown on the plans, the CONTRACTOR shall remove the top of existing mast arm footings, anchor bolts, and conduits to 36" below the existing top of curb or edge of pavement elevation. Waste materials shall be removed from the site and disposed in accordance with local regulations. Backfilling for the removal shall be performed with mechanical compaction equipment meeting the requirements for backfilling conduit. The upper 6" of the removal area, if outside the proposed pavement, shall be backfilled with black dirt.

3.04 - Handholes

A. Handholes shall be either built in place in an excavation made in a neat workmanlike manner or shall be a precast unit conforming to the requirements of the plans.

B. When the use of forms is required, they shall be set level and of sufficient thickness to prevent warping or other deflections from the specified pattern. A means shall be provided for holding them rigidly in place while the concrete is being placed.

C. The ends of all conduit leading into the handhole shall fit approximately 2 inches beyond the inside wall. A drain conforming to the dimensions shown on the plans shall be constructed in the bottom of the handhole unless otherwise specified.

D. Frames and covers for handholes shall be set flush with the sidewalk or pavement surface. When installed in an earth shoulder away from the pavement edge, the top surface of the handhole shall be approximately one inch above the surface of ground. When constructed in unpaved driveways, the top surface of the handhole shall be level with the surface of the driveway.

E. All conduit openings in the handholes shall be sealed with an approved sealing compound after the cables are in place. This compound shall be a readily workable soft plastic. It shall be workable at temperatures as low as 30 degrees F, and shall not melt or run at temperatures as high as 300 degrees Plastic loop handhole construction shall meet the requirements for the precast handhole detail in the plans except that cable hooks will not be required. Openings for conduit access shall be drilled to match the outside diameter of the conduit.

F. Grout conduit access after installing conduit.

G. Install galvanized cable hooks if not precast with the handhole.

3.05 - Conduit

A. Conduit shall be placed as shown on the plans.

B. Unless approved by the ENGINEER, conduit shall be installed without change in direction directly from one structure to another. Change in direction may be allowed for physical restrictions such as right-of-way restrictions, utilities, location of roadway slopes, retrofitting existing conduit stubs, and certain short sections of conduits.

C. Nipples shall be used to eliminate cutting and threading where short lengths of conduit are required. Where it is necessary to cut and thread steel conduit, exposed threads will be field galvanized.

D. All conduit and fittings shall be free from burrs and rough places. Standard manufactured elbows, nipples, tees, reducers, bends, couplings, union, etc. of the same materials and treatment as the straight conduit pipe shall be tightly connected to the conduit.

E. All conduit ends shall be provided with a bushing to protect the cable from abrasion, except for open ends of conduit being placed for future use. Bushings shall have grounding fittings which shall be connected to the grounding system by a #6 ground wire as contained in these specifications.

F. All conduit placed for future use shall be threaded and capped with threaded metal pipe caps.

G. All conduits shall drain, except for specific locations approved by the ENGINEER. CONTRACTOR will not be allowed to bend conduits upward to accomplish the conduit clearances shown on the handhole details.

3.06 - Trenching And Backfilling For Traffic Signals

A. Secure written approval of the City prior to any trenching or excavation within the drip line of any tree.

B. Trenches shall be excavated to such depth as necessary to provide 12 inch to 18 inch cover over the conduit. All cinders, broken concrete or other hard abrasive materials shall be removed and shall not be used for backfill. The trench shall be free of such materials before the conduit is placed. No conduit shall be placed prior to inspection of the trench by the ENGINEER.

C. All trenches shall be backfilled as soon as possible after installation of conduit. Backfill material shall be deposited in the trench in layers not to exceed 6 inches in depth and each layer shall be thoroughly compacted before the next layer is placed. Hard materials shall not be placed within 6 inches of the conduit.

D. Whenever excavation is made across parkways, gravel driveways, or sodded areas, the sod, topsoil, crushed stone and gravel shall be replaced or restored as nearly as possible to its original condition and the whole area involved shall be left in a neat and presentable condition. Concrete sidewalk pavements, and base courses and bituminous surfaces shall be replaced with new materials and the cost shall be incidental to the work.

3.07 - Pushed Conduit

A. It is intended that all conduit be placed without disturbing the existing pavement, and the term "pushed" is used. "Pushed" conduit shall be placed by jacking, pushing, boring or any other means necessary to place the conduit without cutting or removing pavement.

B. Removal of pavement will require prior approval of the ENGINEER. Replacement of removed pavement will be done according to plan details and no additional payment will be made.

C. Plan quantities for pushed conduit include at least two feet of pushed conduit behind each curb.

D. The maximum conduit depth at handholes for all conduits, including pushed conduit, is as shown on the plans. CONTRACTOR must push a mole (without conduit) at least four (4) times before consideration will be given to allowing an upward bend in the conduit.

3.08 - Electrical

A. All conductor cable combinations shall be shown on the plans. No substitutions will be permitted. Each signal head shall be wired separately from the handhole compartment in the pole base to the signal head.

B. The signal cable color codes shall be as follows:

Iowa City Color Codes

1 tape = Left turn signal; 2 tape = Through signals; 3 tape = Right turn signal.

Tapes shall be color coded as follows:
Blue = NE Corner;
Orange = Southeast Corner;
Yellow = Southwest Corner;
Green = Northwest Corner.
Video cable tapes shall be similarly color coded.

4 conductor cable

Green Ball -	Green
Yellow Ball -	Black
Red Ball -	Red
Sig. Common -	White

7 conductor cable

Green Ball -	Green
Yellow Ball -	Orange
Red Ball -	Red
Green Arrow -	Blue
Yellow Arrow -	Black
Sig. Common -	White & W/BK
FY arrow -	Black when used

9 Conductor Cables

Pedestrian Signals

Walk – main st	Green
Don't Walk – main st	Red
Walk - side st	Green\Blk
Don't walk - side st	Red\Blk
Sig. Common -	White
Pushbutton - main st	Orange
Pushbutton – side st	Black
PB Common -	W/BK

C. One electrical splice in the handhole compartment of the pole base will be allowed for the signal circuit wiring. All signal circuit cable runs shall be one continuous length of cable from the connections made in the handhole compartment of the signal pole bases to the terminal compartment in the controller base. Street lights will be fused with a 5 amp fuse in each pole base using a Type HEB-AA Fuseholder.

D. Conductor groupings and splicings may be made in the terminal compartment in the controller cabinet.

E. The loop detector lead-in cable shall be one continuous length of cable from the terminal compartment of the controller cabinet to a splice made with the loop detector wires in the first handhole or pole base handhole compartment provided adjacent to the loop detector. Details of the loop detector splices are shown on the plans.

F. Cables shall be pulled through conduit by means of a cable grip designed to provide a firm hold upon the exterior covering of the cable or cables, with a minimum of dragging on the ground or pavement. This shall be accomplished by means of reels mounted on jacks or other suitable devices. Frame-mounted pulleys, or other suitable devices shall be used for pulling the cable out of conduits into handholes. Only vegetable lubricants may be used to facilitate the pulling of cable. Contractor shall leave a pull string in each conduit.

Each signal cable shall be identified with the City's taping spec in the controller cabinet,handholes, pole base handhole, pedestal handhole and at any splice or junction location. Identification ties shall be provided both on the cable from the controller and the cables leading to the heads for a splice in a pole base handhole.
In addition, the cables shall be identified in each handhole and at the pole bases using colored tape as follows:

1 tape = Left turn signal; 2 tape = Through signals; 3 tape = Right turn signal. Tapes shall be color coded as follows: Blue = NE Corner; Orange = Southeast Corner; Yellow = Southwest Corner; Green = Northwest Corner. Video cable tapes shall be similarly color coded.

G. Cable slack shall be as follows:

four feet in handholes

two feet in signal bases

two feet in the terminal compartment of the controller base

No slack will be allowed in the loop detector lead-in cable after the initial splice.

H. Connectors shall be of the proper size for the number and size of the wires being connected.

I. Wire ends must be thoroughly cleaned after the insulation is stripped off to insure complete contact with another wire, or the connector. If strands are damaged when the insulation is removed, the section of the cable must be discarded. Nicked or damaged conductor strands will not be permitted inside of connectors. Loose wire ends shall not be used as "shims" to make a connection.

J. Electrical tape shall not be applied to the finished connections. Signal cable insulation shall extend beneath the insulated portion of the connector. Any connection with exposed bare wire shall be redone by the CONTRACTOR.

K. Covered connections must be arranged so that they will not be in contact with the metal poles. Connections in the poles shall be pointed up to prevent accumulation of moisture in the connection.

L. Loop detector splices shall be capable of satisfactory operations under continuous immersion in water.

M. Cable connections in signal heads and controller cabinets shall be made at the terminal blocks provided for this purpose. All stranded wires inserted under a binder head screw shall be equipped with a solderless pressure type spade connector with a pre-insulated shank. All solid wire shall have an eye and shall not have a terminal connector.

N. Service cable shall be continuous from the disconnect switch located on the service pole to the terminal compartment of the controller cabinet.

O. Interconnect cable or fiber shall be continuous from controller to controller.A tracer wire shall be installed in all conduits with signal cables, detector lead-in cables, or communication cables. The tracer wire shall be identified in the controller cabinet, handholes, and poles by

means of identification tags. The tracer wire shall be spliced in the handholes to form a continuous network. The tracer wire shall have an orange jacket.

3.09 - Pole Erection

A. All poles are to be erected vertically and securely bolted to the cast-in-place concrete foundations at the locations shown on the plans.

B. Leveling shall be accomplished by the use of nuts on each anchor bolt. One nut shall be turned on each anchor bolt and the pole placed in position on these nuts. The top nuts shall then be placed loosely and the pole adjusted to the vertical position by adjusting both the upper and lower nuts.

C. After the pole is securely fastened, install metal strips in the area between the pole and the base. The metal strips and the method of attachment shall be approved by the ENGINEER.

D. Each pole shall be grounded from the pole to the foundation ground rod by a No. 6 AWG bare copper ground wire.

E. Poles shall be placed so that modifications and/or attachments are correctly oriented, as indicated on the plans.

F. The foundations must be given seven days to cure before poles are erected. The center of the poles are to be set back from the curb, a distance shown on the plans. Poles shall be erected so that they are plumb with traffic signals installed, in line, and all the same relative height above the centerline of the street and with the mast arms correctly oriented as shown on the plans.

G. Poles must be erected so that they are plumb with traffic signal heads. The manufacturer recommendation for raking should be observed when setting the pole to assure that it is plumb when the load is applied.

H. Mast arm assemblies shall be furnished and installed by the CONTRACTOR. When pre-used painted mast arm assemblies are specified, the CONTRACTOR shall prime and paint the mast arm assemblies with the following method:

1. Remove all rust, scale, and loose paint from the surface by sanding or power tool cleaning (SSPC-SP-3). CONTRACTOR to use care when power tool cleaning to avoid burning, polishing, or grinding surface dirt into the existing paint surface. Hand tool cleaning (SSPC-SP-2) will be allowed only in areas accessible to power tool cleaning.
2. Remove all chalking, dirt, and other foreign material from the entire surface by application of petroleum solvent (i.e. paint thinner, mineral spirits, etc.) and wiping the entire surface with clean rags.
3. All bare metal surfaces exposed by the cleaning operation shall be spot primed the same day to avoid flash rusting.
4. After the primed areas have dried, apply one coat of finish paint.
5. Primer and paint must be approved by the ENGINEER.

3.10 - Loop Detectors

A. Loop detectors shall be installed in accordance with the plans. Adjustments in the locations shall be made to minimize the location of the loop wire across construction joints. Locations of the loops shall be subject to the approval of the ENGINEER. The cabinet end of the cable shall be clearly tagged identifying the loop.

B. The slot for the loop shall be constructed as per plan. The slot shall be completely clean of all loose debris and have a smooth bottom.

C. New PCC pavement shall not be sawed until seven days after pour unless approved by ENGINEER.

D. Loop detectors shall be connected to the controller with shielded cable. No splices will be allowed in this cable.

E. Upon completing the loop installation in the field cabinet and prior to sealing the loop in the pavement, the CONTRACTOR shall notify the ENGINEER who may meter the loops by test instruments capable of measuring electrical values of installed loop wires and lead-ins to measure induced AC voltage, inductance in microhenries, high-low "Q" indication, leakage resistance in megaohms, and the resistance of the conductors in ohms.

1. An acceptable load installation shall be defined as follows:

   a) Induced voltage test:

      No deflection on the pointer of a volt meter

   b) Inductance:

      The inductance reading on the loop tester is approximately the calculated value or with approval of the ENGINEER is between 100 mh and 200 mh.

   c) Loop Q:

      Deflection of the pointer to the upper side of the scale.

   d) Leakage to Ground:

      Deflection of the pointer to above 100 megaohms.

   e) Loop Resistance:

      The resistance reading on an ohm meter is approximately the calculated value.

2. An unacceptable loop installation shall be defined as follows:

   a) Inductance:

      The inductance reading is below 90 mh or above 250 mh.

   b) Leakage to Ground:

      Deflection of the pointer to below 100 megaohms.

   c) Loop Resistance:

      The resistance reading is 50% more than calculated.

3.11 - Signals

A. All signal faces and indicators shall be furnished by the CONTRACTOR and installed as shown on the plans. Pole mounted signal heads and pedestrian push buttons are shown on the plans and schematic drawings in schematic form only. Pole mounted signal heads are generally intended to be mounted on the face of pole with respect to oncoming traffic. (See Signal Head Mounting Details.) Modifications to this are required when the view of the pole mounted signal indication is blocked. (See Paragraph 3.11E). Pedestrian push buttons shall be installed on the face of the pole in 90° increments with respect to the mast arm. The push button shall be located on the pole face so the arrow on the R10-4 sign directs pedestrians to the appropriate crosswalk.

B. All optically limited signal heads shall be properly masked to limit their field of view as directed by the ENGINEER.

C. Backplates shall be installed and properly secured for the traffic signal heads.

D. All signal heads shall be kept securely covered until such time as the signals are put into operation.

E. The location of signal heads in which the view of the indications is blocked or partially blocked by utility poles, trees or other physical obstructions shall be adjusted to a location approved by the ENGINEER. Standard heights and locations shown on the plans are typical for unobstructed locations. Signal heads installed without approval of the ENGINEER, which in the opinion of the ENGINEER are obstructed, shall be relocated at the

CONTRACTOR's expense. Holes in the poles due to this signal relocation shall be plugged in a manner acceptable to the ENGINEER.

3.12 - Controller

A. The controller cabinet shall be mounted with the back of the cabinet toward the intersection such that the signal heads can be viewed while facing the controller.

B. All field wiring must be directly attached to the wiring lugs. Attachment of wiring shall be in a neat and workmanlike manner. All connections at the controller shall be done by City Traffic Engineering personnel.

C. All conduit openings in the controller cabinet shall be sealed with an approved sealing compound. This compound shall be a readily workable at temperatures as low as 30 degrees F and shall not melt or run at temperatures as high as 300 degrees F.

D. All wiring diagrams, service manuals, instructions for installing and maintaining the equipment and advice as to timing and operation shall be delivered to the ENGINEER in good condition.

E. The ENGINEER or his representative shall inspect the installation before activation and shall be present at the time the controller is activated to assure that the controller is installed in accordance with the manufacturer's recommendations.

3.13 - Ground Rods

A. Ground wires shall be connected to ground rods with one piece nonferrous clamps which employ set screws as tightening devices. They shall be outside the controller base with a # 6 wire, and use a conduit as an enter point into the cabinet. Connections to ground rods need not be taped.

B. Each steel pole or pedestal shall be firmly connected to the ground rod provided, by means of the grounding terminal specified in these special provisions. Placing the ground wire under an anchor bolt nut, anchor bolt cover, or similar device will not be permitted.

3.14 - Equipment Testing

A. The result of all testing shall be recorded along with date of test, name of person performing test, brand name, model number, serial number of equipment used during test, and any other pertinent information and data.

B. When the CONTRACTOR's work is complete and the project is open to normal traffic, the CONTRACTOR shall notify the ENGINEER in writing the date the signal will be ready for testing.

C. Initial traffic signal timings and timing adjustments will be performed by the ENGINEER.

D. Upon concurrence of the ENGINEER, the CONTRACTOR shall place any signal in operation for a consecutive 30-day test period. Any failure or malfunction of the equipment supplied or installation performed by the CONTRACTOR shall be corrected at the CONTRACTOR's expense and the signal tested for an additional 30 consecutive day period. This procedure shall be repeated until the signal equipment has operated satisfactorily for 30 consecutive days.

E. If the signal is to operate independently of other signals or signal systems, it shall be tested as a single installation.

F. If the signal is part of a system, the test period shall not be started until all signals in the system are ready to be tested. The system shall be tested as a unit.

G. The CONTRACTOR shall initiate correction of any failure malfunction of the signal installation within 24 hours of notification by the ENGINEER. The ENGINEER will correct any failure or malfunction of the signal installation not investigated by the CONTRACTOR within the above time period, and will deduct its expenses from the CONTRACTOR's final payment.

H. Ground testing shall conform to Section 2523.21 of the Iowa DOT Standard Specifications for Highway and Bridge Construction.

3.15 - Clean-Up

A. Upon completion of the work in this Section, remove from the site all rubbish, trash debris resulting from operations. Leave the site in a neat and orderly condition.

PART 4 – METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.01 – Method of Measurement

Payment for Traffic Signalization and for Advance Detection System will be as follows:

A. This item will be the lump sum for Traffic Signalization.

B. Advance Loop Detection System. This item will be lump sum for the advance detection system.

4.02 – Basis of Payment

A. Payment for Traffic Signalization shall be full compensation for supplying all equipment, labor, and materials necessary to install, erect, and operate a complete, fully functional traffic signal system, including but not limited to traffic signal poles, mast arms, bases, signal lights, luminaires on combination street light/signal poles, wiring, conduits, handholes, controllers, cabinets, coordination with utilities, video detection system, testing, and all other miscellaneous hardware, software or any other items necessary to complete the traffic signal system in place. This item specifically excludes the Advance Loop Detection system described in the following item.

B. Payment for Advance Loop Detection System shall be full compensation for supplying all equipment, labor, and materials necessary to install all conduit and handholes required for the advance loop detectors shown in the plans. This system includes inductive loops installed in the pavement, loop wiring, loop conduit, PVC handholes, loop sealant, loop detector units in the traffic signal cabinet, system testing, and all other materials and hardware necessary for a fully functional Advance Loop Detection system in place.

END OF SPECIAL PROVISION

RESOLUTION NO. 16-17

RESOLUTION ACCEPTING QUIT CLAIM DEED AND RIGHT-OF-WAY DEDICATION – ONE UNIVERSITY PLACE – PUBLIC IMPROVEMENTS PROJECT

WHEREAS, the City Council of University Heights, Iowa, entered into a PUD Development Agreement ("Agreement") with Jeff Maxwell ("the Developer") and approved a PUD Development Plan Application June 9, 2015, concerning development of property northwest of the intersection of Melrose Avenue and Sunset Street, the One University Place project ("OUP"); and

WHEREAS, the Agreement contemplates and requires the Developer to convey and dedicate such portions of the OUP property as are necessary to accommodate the OUP development, including construction of a left-turn lane into the OUP development from Melrose Avenue and realignment of the Melrose Avenue and Sunset Street intersection; and

WHEREAS, Maxwell's assignee, One University Place, LLC, has caused a Plat of Survey (attached as Exhibit "A") to be recorded defining and describing real property to be conveyed and dedicated to the City; and

WHEREAS, Maxwell's assignee, One University Place, LLC, has executed and tendered a Quit Claim Deed (attached as Exhibit "B") to the City conveying and dedicating the property described in the Plat of Survey; and

WHEREAS, acceptance of the Quit Claim Deed and dedication are consistent with the PUD Development Agreement and PUD Plan Application previously approved,

NOW, THEREFORE, BE IT RESOLVED by the City Council of University Heights, Iowa, that the Plat of Survey and Quit Claim Deed (attached as Exhibit "A" and Exhibit "B", respectively) are accepted and approved by the City. The City Attorney is directed to file the Quit Claim Deed with the Johnson County Recorder.

Upon motion by _____, and seconded by _____, the vote was as follows:

	AYES:	NAYS	ABSENT
Haverkamp	_____	_____	_____
Lane	_____	_____	_____
Maher	_____	_____	_____
Quezada	_____	_____	_____
Zimmermann	_____	_____	_____

Upon Roll Call thus recorded, the Resolution is declared adopted this 29th day of March, 2016.

_____
Jerry Zimmermann, Mayor Pro Tempore
City of University Heights

ATTEST:

_____
Christine M. Anderson, City Clerk

UH - Resolution 16-17 accepting quit claim deed and ROW dedication 03 29 16

62454

Doc ID: 026221730001 Type: PLA
Kind: SURVEY
Recorded: 02/17/2016 at 10:47:29 AM
Fee Amt: $7.00 Page 1 of 1
Johnson County Iowa
Kim Painter County Recorder
BK 60 PG 78

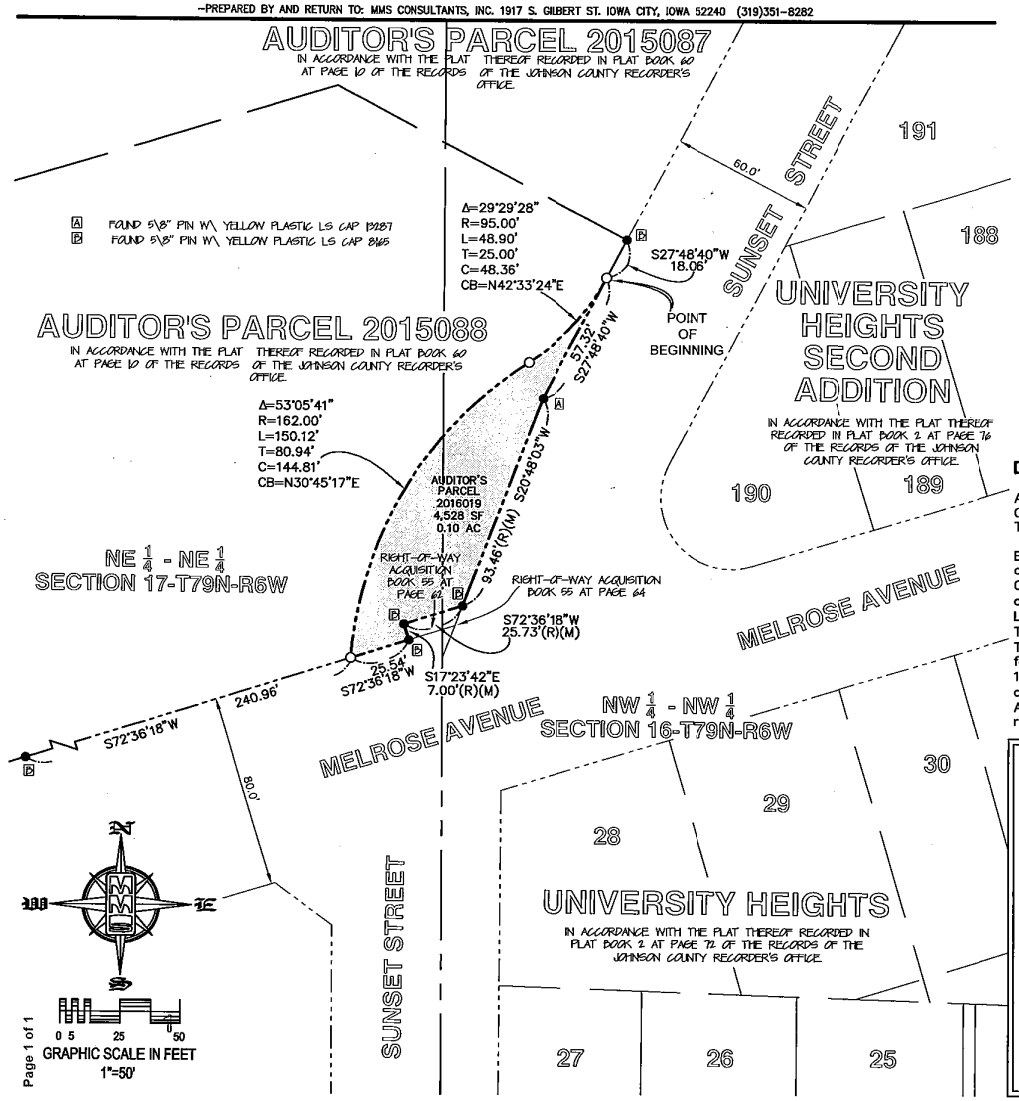
--PREPARED BY AND RETURN TO: MMS CONSULTANTS, INC. 1917 S. GILBERT ST. IOWA CITY, IOWA 52240 (319)351-8282

PLAT OF SURVEY

RIGHT-OF WAY ACQUISITION -AUDITOR'S PARCEL 2016019

A PORTION OF AUDITOR'S PARCEL 2015088 IN THE NE $\frac{1}{4}$ OF THE NE $\frac{1}{4}$ OF SECTION 17, AND THE NW $\frac{1}{4}$ OF THE NW $\frac{1}{4}$ OF SECTION 16 ALL OF TOWNSHIP 79 NORTH, RANGE 6 WEST, OF THE FIFTH P.M.

UNIVERSITY HEIGHTS, JOHNSON COUNTY, IOWA



Page 1 of 1

AREA SUMMARY TABLE	
1/4 – 1/4	AREA
NE–NE SEC 17	1,996 sf
NW–NW SEC 16	2,532 sf
TOTAL	4,528 sf

PROPRIETOR:	ONE UNIVERSITY PLACE
SURVEY REQUESTED BY:	ONE UNIVERSITY PLACE
DATE OF SURVEY:	11-13-2015

LEGEND AND NOTES

- ● – PROPERTY CORNER(S), FOUND (as noted)
- ○ – PROPERTY CORNERS SET (5/8" Iron Pin w/ yellow, plastic LS Cap embossed with "MMS")
- ⊗ – CUT "X"
- PROPERTY &/or BOUNDARY LINES
- CONGRESSIONAL SECTION LINES
- RIGHT–OF–WAY LINES
- CENTER LINES
- LOT LINES, PLATTED OR BY DEED
- EASEMENT LINES, WIDTH & PURPOSE NOTED
- EXISTING EASEMENT LINES, PURPOSE NOTED
- (R) – RECORDED DIMENSIONS
- (M) – MEASURED DIMENSIONS

UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE IN FEET AND HUNDREDTHS

DESCRIPTION – AUDITOR'S PARCEL 2016019

A PORTION OF AUDITOR'S PARCEL 2015088 IN THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 17, AND THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 16, ALL OF TOWNSHIP 79 NORTH, RANGE 6 WEST, OF THE FIFTH P.M., DESCRIBED AS FOLLOWS:

Beginning at the Northeast Corner of Auditor's Parcel 2015088, to University Heights, Iowa, in accordance with the Plat thereof Recorded in Plat Book 60 at Page 10 of the Records of the Johnson County Recorder's Office; Thence S27°48'40"W, along the East Line of said Auditor's Parcel 2015088, a distance of 18.06 feet, to the POINT OF BEGINNING; Thence continuing S27°48'04"W, along said East Line, 57.32 feet; Thence S20°48'03"W, along said East Line, 93.46 feet, to the Southeast Corner thereof; Thence S72°36'18"W, along the South Line of said Auditor's Parcel 2015088, a distance of 25.73 feet; Thence S17°23'42"E, along said South Line, 7.00 feet; Thence S72°36'18"W, along said South Line, 25.54 feet; Thence Northeasterly, 150.12 feet, along a 162.00 foot radius curve, concave Southeasterly, whose 144.81 foot chord bears N30°45'17"E; Thence Northeasterly, 48.90 feet, along a 95.00 foot radius curve, concave Northwesterly, whose 48.36 foot chord bears N42°33'24"E, to the POINT OF BEGINNING. Said Auditor's Parcel 2016019 contains 0.10 Acre (4,528 square feet), and is subject to easements and restrictions of record.

LICENSED LAND SURVEYOR JAMES E. LICHTY 13287 IOWA

SEAL

I hereby certify that this land surveying document was prepared and the related survey work was performed by me or under my direct personal supervision and that I am a duly licensed Professional Land Surveyor under the laws of the State of Iowa.

2/17 20 16

JAMES E. LICHTY
L.S. Iowa Lic. No. 13287

My license renewal date is December 31, 20 16.

Pages or sheets covered by this seal:

CIVIL ENGINEERS
LAND PLANNERS
LAND SURVEYORS
LANDSCAPE ARCHITECTS
ENVIRONMENTAL SPECIALISTS

1917 S. GILBERT ST.
IOWA CITY, IOWA 52240
(319) 351-8282
www.mmsconsultants.net

Book: 60 Page: 78 Seq: 1

Date	Revision
02-16-16	PER JEL REVIEW- RLW

PLAT OF SURVEY
RIGHT-OF-WAY ACQUISITION
AUDITOR'S PARCEL 2016019

A PORTION OF AUDITOR'S PARCEL 2015088 IN THE NE $\frac{1}{4}$ OF THE NE $\frac{1}{4}$ OF SECTION 17, AND THE NW $\frac{1}{4}$ OF THE NW $\frac{1}{4}$ OF SECTION 16 ALL OF TOWNSHIP 79 NORTH, RANGE 6 WEST, OF THE FIFTH P.M.

UNIVERSITY HEIGHTS
JOHNSON COUNTY
IOWA

MMS CONSULTANTS, INC.

Date: 02-02-2016	
Designed by: RLA	Field Book No:
Drawn by: RLW	Scale: 1"=50'
Checked by: JEL	Sheet No: 1
Project No: IC 5136012	of: 1

©THE IOWA STATE BAR ASSOCIATION
Official Form No. 106 - August 2013

FOR THE LEGAL EFFECT OF THE USE OF THIS FORM, CONSULT YOUR LAWYER

Return To: Steve Ballard, City Attorney, 22 S Linn St., Iowa City, Iowa 52240
Preparer: Thomas H. Gelman, P.O. Box 2150, Iowa City, IA 52244, (319) 354-1104
Taxpayer: City of University Heights, City Hall 1004 Melrose Ave. University Heights (Iowa City) 52246

QUIT CLAIM DEED

For the consideration of One Dollar(s) and other valuable consideration, One University Place, LLC does ~~do~~ hereby Quit Claim to the City of University Heights, Iowa, all of Grantor's ~~all your~~ right, title, interest, estate, claim and demand in the following real estate in Johnson County, Iowa:

Auditor's Parcel 2016019, University Heights, Johnson County, Iowa, according to the Survey Plat thereof recorded in Plat Book 60, Page 78, of the Records of Johnson County, Iowa, said Auditor's Parcel hereby dedicated to the City of University Heights for realignment of road right-of-way purposes. This deed is without consideration and is exempt from Declaration of Value/Groundwater Hazard Statement filing according to Iowa Code 428A.2(6).

Each of the undersigned hereby relinquishes all rights of dower, homestead and distributive share in and to the real estate. Words and phrases herein, including acknowledgment hereof, shall be construed as in the singular or plural number, and as masculine or feminine gender, according to the context.

Dated: _____, 2016

One University Place, LLC

By: _____ (Grantor) _____ (Grantor)
Jeffrey L. Maxwell, President

By: _____ (Grantor) _____ (Grantor)
Justin C. Doyle, Secretary/Treasurer

_____ (Grantor) _____ (Grantor)

STATE OF IOWA, COUNTY OF JOHNSON

This record was acknowledged before me this _____ day of _____, 2016, by Jeffrey L. Maxwell as President of One University Place, LLC.

_____
Signature of Notary Public

(This form of acknowledgment for individual grantor(s) only)

ACKNOWLEDGMENTS FOR INDIVIDUALS

STATE OF_____Iowa_____, COUNTY OF_____
This record was acknowledged before me this ____ day of _____, _2016_, by Justin C. Doyle as Secretary and Treasurer of One University Place, LLC. _____.

_____
Signature of Notary Public

STATE OF_____, COUNTY OF_____
This record was acknowledged before me this ____ day of _____, _____, by_____
_____.

_____
Signature of Notary Public

STATE OF_____, COUNTY OF_____
This record was acknowledged before me this ____ day of _____, _____, by_____
_____.

_____
Signature of Notary Public

STATE OF_____, COUNTY OF_____
This record was acknowledged before me this ____ day of _____, _____, by_____
_____.

_____
Signature of Notary Public

STATE OF_____, COUNTY OF_____
This record was acknowledged before me this ____ day of _____, _____, by_____
_____.

_____
Signature of Notary Public

REPRESENTATIVE CAPACITY ACKNOWLEDGMENTS

STATE OF_____, COUNTY OF_____

This record was acknowledged before me this ____ day of _____, _____,

by _____

as _____

of _____.

_____

Signature of Notary Public

STATE OF_____, COUNTY OF_____

This record was acknowledged before me this ____ day of _____, _____,

by _____

as _____

of _____.

_____

Signature of Notary Public

STATE OF_____, COUNTY OF_____

This record was acknowledged before me this ____ day of _____, _____,

by _____

as _____

of _____.

_____

Signature of Notary Public