



VILLAGE OF TINLEY PARK

Legacy District South

Phase 1 – Detention Pond and Storm Sewer Improvements

REL Project 14-471



Carrie A. Pintar, Project Engineer
Direct Line (815) 412-2715

February 9, 2017
Project 14-471

VILLAGE OF TINLEY PARK
LEGACY DISTRICT SOUTH PHASE 1 - DETENTION POND AND STORM SEWER IMPROVEMENTS
ADDENDUM ONE

Addendum One shall consist of the following:

- Special Provision for STORM SEWERS JACKED IN PLACE, 60"
- Clarification on Special Provision for TOPSOIL FURNISH AND PLACE, 4"
- Updated Schedule of Prices - 4 (Four) Pages

The total number of pages for **Addendum One** is 5 pages. Please acknowledge the additions, clarifications, and changes to the specifications and schedule of prices by signing and faxing back the signature page as indicated. Please also include the revised Schedule of Prices in the bid package.

STORM SEWERS JACKED IN PLACE, 60"

All work shall conform to Section 552 of the Standard Specifications. Storm sewer shall be steel pipe of Grade B with a wall thickness of 0.844". This work shall be paid for at the unit price bid per FOOT of STORM SEWERS JACKED IN PLACE 60" which price to include all labor, materials and equipment to complete the work as specified.

TOPSOIL FURNISH AND PLACE, 4"

The first sentence of the specification has been revised to remove the word "pulverized" and shall read as follows:

This work shall consist of the furnishing and placing of four inches (4") of topsoil at all areas disturbed by the construction other than the areas already specified in the Natural Area Landscape plans and/or details.

The schedule of prices has been updated and includes additional storm sewer removal, storm sewer and structure pay items as called out on the plans.

Respectfully yours,
ROBINSON ENGINEERING, LTD.

Carrie A. Pintar
Carrie A. Pintar, PE
Project Engineer

R:\2010-2014\2014\14-471.TP\Bid and Contract Documents\14-471 Addendum 1.doc

Please, print your company name, your name, and sign as noted below and fax back to us at (815) 806-0301 as proof that you have received and reviewed all pages of the addendum and acknowledge them as part of the bid documents.

Signature

Print Your Name

Company Name



Municipal Expertise. Community Commitment.

REL # 14-471

SCHEDULE OF PRICES

Local Agency Village of Tinley Park

Location

Description TP Regional Detention Pond & Storm Sewer Improvements - Phase 1 BASE BID

The undersigned submits herewith his schedule of prices covering the work to be performed under this contract; he understands that he must show in the schedule the unit prices for which he proposes to perform each item of work; that the extensions must be made by him, and if not so done, his proposal may be rejected as irregular.

Schedule for Single Bid

(For complete information covering these items, see plans and specifications)

Bidder's Proposal for making Entire Improvements					
Item No.	Items	Unit	Quantity	Unit Price	Total
1	TREE REMOVAL (6 TO 15 UNITS DIAMETER)	UNIT	204		
2	TREE REMOVAL (OVER 15 UNITS DIAMETER)	UNIT	510		
3	EARTH EXCAVATION	CU YD	95420		
4	TRENCH BACKFILL	CU YD	5900		
5	TOPSOIL FURNISH AND PLACE, 4"	SQ YD	885		
6	TOPSOIL FURNISH AND PLACE, 12"	SQ YD	34000		
7	SEEDING, CLASS 1A	ACRE	0.25		
8	STONE RIPRAP, CLASS A3	SQ YD	60		
9	STONE RIPRAP, CLASS A4	SQ YD	80		
10	STONE RIPRAP, CLASS A5	SQ YD	150		
11	AGGREGATE BASE COURSE, TYPE B 4"	SQ YD	330		
12	PORTLAND CEMENT CONCRETE DRIVEWAY PAVEMENT, 7 INCH	SQ YD	30		
13	HOT-MIX ASPHALT DRIVEWAY PAVEMENT, 6"	SQ YD	30		
14	PORTLAND CEMENT CONCRETE SIDEWALK 5 INCH	SQ FT	2700		
15	PAVEMENT REMOVAL	SQ YD	10500		
16	DRIVEWAY PAVEMENT REMOVAL	SQ YD	30		
17	SIDEWALK REMOVAL	SQ FT	20292		
18	PAVED DITCH REMOVAL	FOOT	1615		
19	CLASS D PATCHES, TYPE IV, 6 INCH	SQ YD	4500		
20	CONCRETE HEADWALL REMOVAL	EACH	3		
21	PIPE CULVERT REMOVAL	FOOT	45		
22	END SECTIONS 36"	EACH	1		
23	END SECTIONS 60"	EACH	1		

Item No.	Items	Unit	Quantity	Unit Price	Total
24	PRECAST REINFORCED CONCRETE FLARED END SECTIONS 12"	EACH	3		
25	PRECAST REINFORCED CONCRETE FLARED END SECTIONS 24"	EACH	1		
26	PRECAST REINFORCED CONCRETE FLARED END SECTIONS 36"	EACH	1		
27	GRATING FOR CONCRETE FLARED END SECTION 24"	EACH	1		
28	GRATING FOR CONCRETE FLARED END SECTION 36"	EACH	1		
29	TRAVERSABLE PIPE GRATE	FOOT	2		
30	STORM SEWERS, CLASS A, TYPE 1 12"	FOOT	58		
31	STORM SEWERS, CLASS A, TYPE 1 24"	FOOT	12		
32	STORM SEWERS, CLASS A, TYPE 1 36"	FOOT	61		
33	STORM SEWERS, CLASS A, TYPE 1 48"	FOOT	16		
34	STORM SEWERS, CLASS A, TYPE 2 12"	FOOT	90		
35	STORM SEWERS, CLASS A, TYPE 2 24"	FOOT	38		
36	STORM SEWERS, CLASS A, TYPE 2 36"	FOOT	342		
37	STORM SEWERS, CLASS A, TYPE 2 60"	FOOT	2656		
38	STORM SEWERS, CLASS A, TYPE 1 EQUIVALENT ROUND-SIZE 30"	FOOT	16		
39	STORM SEWERS, CLASS A, TYPE 2 EQUIVALENT ROUND-SIZE 24"	FOOT	16		
40	STORM SEWERS, CLASS A, TYPE 2 EQUIVALENT ROUND-SIZE 30"	FOOT	100		
41	STORM SEWER REMOVAL 8"	FOOT	182		
42	STORM SEWER REMOVAL 10"	FOOT	194		
43	STORM SEWER REMOVAL 12"	FOOT	428		
44	STORM SEWER REMOVAL 24"	FOOT	478		
45	STORM SEWER REMOVAL 30"	FOOT	88		
46	STORM SEWER REMOVAL 36"	FOOT	213		
47	STORM SEWER REMOVAL 48"	FOOT	10		
48	STORM SEWER REMOVAL 60"	FOOT	20		
49	STORM SEWER REMOVAL, EQUIVALENT ROUND-SIZE 30"	FOOT	20		
50	STORM SEWERS JACKED IN PLACE, 60"	FOOT	145		
51	MANHOLES, TYPE A, 4'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	4		
52	MANHOLES, TYPE A, 5'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	1		
53	MANHOLES, TYPE A, 6'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	1		
54	MANHOLES, TYPE A, 7'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	15		
55	MANHOLES, TYPE A, 8'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	1		
56	MANHOLES, TYPE A, 9'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	5		

Item No.	Items	Unit	Quantity	Unit Price	Total
57	MANHOLES, TYPE A, 6'-DIAMETER, WITH 2 TYPE 1 FRAME, CLOSED LIDS, RESTRICTOR PLATE	EACH	1		
58	MANHOLES, TYPE A, 9'-DIAMETER, WITH 2 TYPE 1 FRAME, CLOSED LIDS, RESTRICTOR PLATE	EACH	2		
59	REMOVING MANHOLES	EACH	6		
60	REMOVING CATCH BASINS	EACH	3		
61	REMOVING INLETS	EACH	4		
62	PROPOSED STORM SEWER CONNECTION TO EXISTING STORM SEWER	EACH	5		
63	BACKFLOW PREVENTER	EACH	1		
64	CONFLICT MANHOLES	EACH	1		
65	FENCE REMOVAL AND REPLACEMENT (SPECIAL)	FOOT	1200		
66	FENCE REMOVAL	FOOT	1200		
67	CHAIN LINK FENCE, 6'	FOOT	1200		
68	PAINT PAVEMENT MARKING - LETTERS AND SYMBOLS	SQ FT	260.8		
69	PAINT PAVEMENT MARKING - LINE 4"	FOOT	4530		
70	PAINT PAVEMENT MARKING - LINE 6"	FOOT	358		
71	PAINT PAVEMENT MARKING - LINE 12"	FOOT	120		
72	PAINT PAVEMENT MARKING - LINE 24"	FOOT	94		
73	ADJUSTING WATER MAIN 6"	FOOT	60		
74	ADJUSTING WATER MAIN 10"	FOOT	100		
75	WATER VALVES TO BE ADJUSTED	EACH	1		
76	8" LINE STOP	EACH	2		
77	10" LINE STOP	EACH	2		
78	8" CUT & CAP	EACH	2		
79	REMOVE WATER MAIN, 8"	FOOT	550		
80	FIRE HYDRANT WITH AUXILIARY VALVE, VALVE BOX AND TEE	EACH	1		
81	REMOVE FIRE HYDRANT	EACH	2		
82	WATER MAIN SERVICE ADJUSTMENT	EACH	10		
83	SANITARY SEWER SERVICE ADJUSTMENT	EACH	10		
84	DUCTILE IRON SANITARY SEWER, 8"	FOOT	100		
85	RUBBER ADJUSTING RINGS	EACH	96		
86	EXPLORATORY EXCAVATION	EACH	15		
87	16" DIAMETER STEEL SLEEVE, 0.344" WALL THICKNESS, OPEN CUT INSTALLATION	FOOT	60		
88	20" DIAMETER STEEL SLEEVE, 0.344" WALL THICKNESS, OPEN CUT INSTALLATION	FOOT	60		
89	RAILROAD PROTECTIVE LIABILITY INSURANCE	LSUM	1		

Item No.	Items	Unit	Quantity	Unit Price	Total
90	METRA ALLOWANCE	DOL	25000	\$1.00	\$25,000
91	NATURAL AREA SITE PREPARATION	L SUM	1		
92	SEEDING, INSTALLED - BUFFALO GRASS SEED MIX	SQ YD	4150		
93	SEEDING, INSTALLED - TRANSITIONAL BUFFER SEED MIX	SQ YD	1450		
94	SEEDING, INSTALLED - MESIC PRAIRIE SEED MIX	SQ YD	4200		
95	SEEDING, INSTALLED - WET-MESIC PRAIRIE SEED MIX	SQ YD	2240		
96	SEEDING, INSTALLED - WETLAND SEED MIX	SQ YD	220		
97	SEEDING, INSTALLED - EMERGENT WETLAND SEED MIX	SQ YD	21260		
98	PLUGS, INSTALLED - WETLAND PLUG MIX	EACH	1976		
99	PLUGS, INSTALLED - EMERGENT WETLAND PLUG MIX	EACH	98100		
100	PLUGS, INSTALLED - DEEP EMERGENT PLUG MIX	EACH	2890		
101	PLUGS, INSTALLED - FLOATING AQUATIC PLUG MIX	EACH	1900		
102	EROSION CONTROL BLANKET, INSTALLED - NAG S-75BN	SQ YD	13200		
103	EROSION CONTROL BLANKET, INSTALLED - NAG S-150BN	SQ YD	5480		
104	GOOSE ENLOSURE FENCING, INSTALLED	FOOT	6600		
105	INTERIM STEWARDSHIP AND WATERING	L SUM	1		
106	NATURAL AREAS STEWARDSHIP - FIRST GROWING SEASON	L SUM	1		
107	NATURAL AREA ENTRANCE CONCRETE SIDEWALK, 5"	SQ FT	190		
108	NATURAL AREA ENTRANCE CONCRETE CURB, 6"	FOOT	68		
109	UNIT PAVERS	SQ FT	212		
110	STABILIZED PATHWAY MIX	SQ FT	13810		
111	METAL PATHWAY EDGING	FOOT	4605		
112	6' BENCH, INSTALLED	EACH	2		
113	INTERPRETIVE SIGN	EACH	2		
114	NATURAL STONES	EACH	8		
115	MULCH	CU YD	30		
116	2.5" TREES	EACH	52		
117	6' - 8' TREES	EACH	33		
118	5 GAL SHRUBS	EACH	57		
119	1 GAL PERENNIALS/GRASSES	EACH	407		
120	CONTINGENCY	DOL	50000	\$1.00	\$50,000



Robinson

ENGINEERING

Carrie A. Pintar, Project Engineer
Direct Line (815) 412-2715

February 10, 2017
Project 14-471

VILLAGE OF TINLEY PARK LEGACY DISTRICT SOUTH PHASE 1 – DETENTION POND AND STORM SEWER IMPROVEMENTS ADDENDUM TWO

Addendum Two shall consist of the following:

- Revision to Special Provision COMPLETION SCHEDULE
- Clarification on limits for TOPSOIL FURNISH AND PLACE, 4"
- Clarification on limits for TOPSOIL FURNISH AND PLACE, 12"
- Revision to Special Provision TRENCH BACKFILL
- Addition of Special Provision CONSTRUCTION FENCE
- Additional information for RAILROAD PROTECTIVE LIABILITY INSURANCE – 3 (Three) Pages
- Updated Schedule of Prices – 4 (Four) Pages

The total number of pages for Addendum Two is 9 pages. Please acknowledge the additions, clarifications, and changes to the specifications and schedule of prices by signing and faxing back the signature page as indicated. Please also include the revised Schedule of Prices in the bid package.

COMPLETION SCHEDULE

It has come to our attention that some of the natural area seed mixes and plug plantings warrant revising the completion schedule accordingly for these areas to be planted within their specified windows. As such, the completion schedule shall be revised to the following:

All work associated with the excavation and grading of the regional detention pond, removal and installation of storm sewer and appurtenances, pavement and landscaping restoration and all natural area landscaping areas that meet their appropriate planting season as described in these contract documents shall be completed by November 30, 2017. All other natural area landscaping areas shall be completed by June 30, 2018. The Interim Stewardship and Watering shall end with the completion of the project or June 30, 2018, whichever comes first. The First Growing Season will be from completion of the project or June 30, 2018, whichever comes first to October 2018.

TOPSOIL FURNISH AND PLACE, 4"

The limits shall be from the normal water level (proposed contour 688) to the property line of the pond parcel as well as all other areas disturbed by the construction.

TOPSOIL FURNISH AND PLACE, 12"

The limits shall be from the normal water level (proposed contour 688) to the limits of the floating aquatic plug mix (proposed contour 686). The areas below the proposed 686 contour do not require any topsoil.

TRENCH BACKFILL

The first paragraph of the trench backfill special provision shall be revised to the following:

All materials used for trench backfill under and within three feet (3') of paved areas, including streets, curbs, sidewalks and driveways shall be per the detail drawings. FA-6 backfill is required for the trench backfill up to subgrade. The trench backfill shall be mechanically compacted in 12 inch lifts to a minimum of 95% Standard Proctor density. All trench backfill must meet the requirements of Section 1003 of the Standard Specifications.

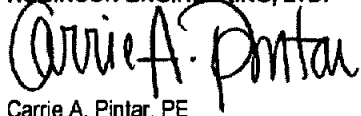
CONSTRUCTION FENCE

This item shall include all materials, labor and equipment for the installation, maintenance, repair, and removal of temporary orange construction fence at locations as indicated on the plans and/or as needed to meet the requirements as specified in STOCKPILING OF MATERIALS AND END OF DAY CLEAN UP and/or as directed by the Village and/or Authorized Representative. This will not be paid for separately, but instead shall be considered incidental to the contract.

For an e-mail version of this Addendum, please e-mail me at cpintar@reltd.com.

Respectfully yours,

ROBINSON ENGINEERING, LTD.



Carrie A. Pintar, PE

Project Engineer

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Please, print your company name, your name, and sign as noted below and fax back to us at (815) 806-0301 as proof that you have received and reviewed all pages of the addendum and acknowledge them as part of the bid documents.

Signature

Print Your Name

Company Name

EXHIBIT "C"

INSURANCE REQUIREMENTS

Prior to commencement of any work to be performed on or about the Premises under the terms of this Agreement, Indemnitor shall purchase or shall require its subcontractors to purchase the following insurance coverage. The total cost of the premium for such insurance shall be at the expense of Indemnitor or its Subcontractors:

(a) Commercial General Liability Insurance (ISO Form).

Indemnitor or Subcontractor shall furnish evidence that, with respect to the operations it performs and the operations performed by sub-subcontractors, it carries regular Commercial General Liability Insurance providing for a limit of not less than \$2,000,000 per occurrence limit, \$4,000,000 aggregate, bodily injury and/or property damage combined, for damages arising out of bodily injuries to or death of any person or destruction of property, including the loss of use thereof, in any one occurrence under the terms of which on a primary and non-contributory basis The Commuter Rail Division of the Regional Transportation Authority, a division of an Illinois municipal corporation, and its affiliated separate public corporation known as the Northeast Illinois Regional Commuter Railroad Corporation, both operating under the service mark Metra, as now exists or may hereafter be constituted or acquired, and the Regional Transportation Authority, an Illinois municipal corporation and any other railroads operating on Metra property and/or other railroads as required are named as an additional insured for ongoing operations and products/completed operations and include contractual language covering construction and/or demolition being performed on or near a railroad property and include the following endorsement: Contractual Liability ISO Form CG 24 17 10 01 (or a substitute form providing equivalent coverage) and no XCU exclusion.

(b) Railroad Protective Liability Insurance.

In addition to the above, Indemnitor shall furnish evidence, with respect to the operations it or any of its Subcontractors perform, that it has provided Railroad Protective Public Liability Insurance (AAR-AASHTO form) in the name of The Commuter Rail Division of the Regional Transportation Authority, a division of an Illinois municipal corporation, and its affiliated separate public corporation known as the Northeast Illinois Regional Commuter Railroad Corporation, both operating under the service mark Metra, as now exists or may hereafter be constituted or acquired, and the Regional Transportation Authority, an Illinois municipal corporation and any other railroads operating on Metra property and/or other railroads as required providing for a limit of not less than \$2,000,000 per occurrence limit, bodily injury and/or property damage combined, for damages arising out of bodily injuries to or death of any person in any one occurrence and for damage to or destruction of property, including the loss of use thereof, in any one occurrence. Such insurance shall be furnished with an aggregate of not less than \$6,000,000 for all damages as a result of more than one occurrence or depending on scope of work and/or location \$5,000,000 per occurrence for bodily injury and/or property damage and \$10,000,000 aggregate.

(c) **Workers' Compensation Insurance.**

Indemnitor or Subcontractor shall furnish evidence that, with respect to the operations it performs, it carries a policy complying with the statutes of the State of Illinois covering all employees of the Indemnitor or Subcontractor, as applicable. The policy shall contain employers liability coverage with limits of not less than \$1,000,000 each accident; \$1,000,000 each employee disease; and \$1,000,000 policy limit-disease.

(d) **Automobile Liability Insurance.**

Indemnitor or Subcontractor shall furnish evidence that, with respect to the operations it performs, it carries a policy issued to and covering the liability of Indemnitor or the Subcontractors, as applicable, arising out of the use of all owned, non-owned, hired, rented or leased vehicles which bear or are required to bear license plates according to the laws of the State of Illinois. Coverage under this policy shall have limits of liability of not less than \$1,000,000 per occurrence, combined single limit, for bodily injury and property damage liability under the terms of which on a primary and non-contributory basis The Commuter Rail Division of the Regional Transportation Authority, a division of an Illinois municipal corporation, and its affiliated separate public corporation known as the Northeast Illinois Regional Commuter Railroad Corporation, both operating under the service mark Metra, as now exists or may hereafter be constituted or acquired, and the Regional Transportation Authority, an Illinois municipal corporation and any other railroads operating on Metra property and/or other railroads as required are named as additional insured.

All policies listed above, (except railroad protective which is in Metra's name) shall include a waiver of subrogation, thereby waiving your rights of subrogation against Metra and any additional insured's.

All deductibles applicable to the insurance coverage shall be borne by the contractor/vendor. The certificate of insurance shall clearly state how defense costs (also known as "allocated loss adjustment expenses") shall apply in terms of the deductible and the insurance limits. (SIR programs are prohibited, unless approved by Metra's Risk Management Department.)

The insurance company or companies providing such insurance shall have a AM Best rating of A-7 or better and a minimum financial rating of XIII as published in the most recent issue of Best Key Rating Guide. The insurance hereinabove specified shall be carried until all work required to be performed under the terms of this Agreement is satisfactorily completed and formally accepted. Failure to carry or keep such insurance in force until all work is satisfactorily completed shall constitute a violation of the Agreement. Indemnitor shall furnish to Metra a current certificate of insurance for both Comprehensive General Liability and Railroad Protective Public Liability Insurance.

No work shall commence until Indemnitor has obtained and provided the required insurance to Metra and has received approval of same by Metra. All policies must be in full force at the time of submission and shall not be canceled, modified, limited or allowed to expire without having given Metra thirty (30) days prior written notice of such. Notice must be sent via certified mail to: Metra, Attention: Manager, Commercial Insurance, 15th Floor, 547 West Jackson Boulevard, Chicago, Illinois 60661.

Indemnitor's failure to obtain or to cause its Subcontractors to obtain proper insurance coverage or to insure CRD, Metra, the NIRCRC or the RTA as additional insured's shall not, at any time, operate as a waiver of each of CRD's, Metra's, NIRCRC's or RTA's right to indemnification and defense against any claims, damages or injuries covered under the terms and provisions of this Agreement. During the term, Metra may make commercially reasonable increases in the amount of insurance required by Indemnitor or its Subcontractors under the terms and provisions of this Agreement.



Municipal Expertise. Community Commitment.

REL # 14-471

SCHEDULE OF PRICES

Local Agency Village of Tinley Park

Location _____

Description TP Regional Detention Pond & Storm Sewer Improvements - Phase 1 BASE BID

The undersigned submits herewith his schedule of prices covering the work to be performed under this contract; he understands that he must show in the schedule the unit prices for which he proposes to perform each item of work; that the extensions must be made by him, and if not so done, his proposal may be rejected as irregular.

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55	MANHOLES, TYPE A, 8'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	1		
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72	PAINT PAVEMENT MARKING - LINE 24"	FOOT	94		
73	ADJUSTING WATER MAIN 6"	FOOT	60		
74	ADJUSTING WATER MAIN 10"	FOOT	100		
75	WATER VALVES TO BE ADJUSTED	EACH	1		
76	8" LINE STOP	EACH	2		
77	10" LINE STOP	EACH	2		
78	8" CUT & CAP	EACH	2		
79	REMOVE WATER MAIN, 8"	FOOT	550		
80	FIRE HYDRANT WITH AUXILIARY VALVE, VALVE BOX AND TEE	EACH	1		
81	REMOVE FIRE HYDRANT	EACH	2		
82	WATER MAIN SERVICE ADJUSTMENT	EACH	10		
83	SANITARY SEWER SERVICE ADJUSTMENT	EACH	10		
84	DUCTILE IRON SANITARY SEWER, 8"	FOOT	100		
85	RUBBER ADJUSTING RINGS	EACH	96		
86	EXPLORATORY EXCAVATION	EACH	15		
87	16" DIAMETER STEEL SLEEVE, 0.344" WALL THICKNESS, OPEN CUT INSTALLATION	FOOT	60		
88	20" DIAMETER STEEL SLEEVE, 0.344" WALL THICKNESS, OPEN CUT INSTALLATION	FOOT	60		
89	RAILROAD PROTECTIVE LIABILITY INSURANCE	LSUM	1		

Item No.	Items	Unit	Quantity	Unit Price	Total
90	METRA ALLOWANCE	DOL	25000		
91	NATURAL AREA SITE PREPARATION	L SUM	1		
92	SEEDING, INSTALLED - BUFFALO GRASS SEED MIX	SQ YD	4150		
93	SEEDING, INSTALLED - TRANSITIONAL BUFFER SEED MIX	SQ YD	1450		
94	SEEDING, INSTALLED - MESIC PRAIRIE SEED MIX	SQ YD	4200		
95	SEEDING, INSTALLED - WET-MESIC PRAIRIE SEED MIX	SQ YD	2240		
96	SEEDING, INSTALLED - WETLAND SEED MIX	SQ YD	220		
97	SEEDING, INSTALLED - EMERGENT WETLAND SEED MIX	SQ YD	21260		
98	PLUGS, INSTALLED - WETLAND PLUG MIX	EACH	1976		
99	PLUGS, INSTALLED - EMERGENT WETLAND PLUG MIX	EACH	98100		
100	PLUGS, INSTALLED - DEEP EMERGENT PLUG MIX	EACH	2890		
101	PLUGS, INSTALLED - FLOATING AQUATIC PLUG MIX	EACH	1900		
102	EROSION CONTROL BLANKET, INSTALLED - NAG S-75BN	SQ YD	13200		
103	EROSION CONTROL BLANKET, INSTALLED - NAG S-150BN	SQ YD	5480		
104	GOOSE ENLOSURE FENCING, INSTALLED	FOOT	6600		
105	INTERIM STEWARDSHIP AND WATERING	L SUM	1		
106	NATURAL AREAS STEWARDSHIP - FIRST GROWING SEASON	L SUM	1		
107	NATURAL AREA ENTRANCE CONCRETE SIDEWALK, 5"	SQ FT	190		
108	NATURAL AREA ENTRANCE CONCRETE CURB, 6"	FOOT	68		
109	UNIT PAVERS	SQ FT	212		
110	STABILIZED PATHWAY MIX	SQ FT	13810		
111	METAL PATHWAY EDGING	FOOT	4605		
112	6' BENCH, INSTALLED	EACH	2		
113	INTERPRETIVE SIGN	EACH	2		
114	NATURAL STONES	EACH	8		
115	MULCH	CU YD	30		
116	2.5" TREES	EACH	52		
117	6' - 8' TREES	EACH	33		
118	5 GAL SHRUBS	EACH	57		
119	1 GAL PERENNIALS/GRASSES	EACH	407		
120	CONTINGENCY	DOL	50000		

VILLAGE OF TINLEY PARK
COOK & WILL COUNTIES, ILLINOIS
NOTICE TO CONTRACTORS

The Village of Tinley Park will receive sealed proposals for the following improvements at the Clerk's office, 16250 South Oak Park Avenue, Tinley Park, Illinois 60477, until 10:00 AM on Tuesday, February 14, 2017.

LEGACY DISTRICT SOUTH
PHASE 1 – DETENTION POND AND STORM SEWER IMPROVEMENTS

Proposals will be publicly read aloud on Tuesday, February 14, 2017 after 10:01 AM. No bid shall be withdrawn after the opening of the proposals without the consent of the President and Board of Trustees for a period of ninety days after the scheduled time of closing bids.

All proposals shall be sealed in an envelope, addressed to the Village of Tinley Park, attention Clerk's office. The name and address of the bidder and the name of the project shall also appear on the outside of the envelope. Proposals must be submitted on the forms provided by the Engineer.

The Bid Documents, including specifications, are on file at the office of the Engineer, Robinson Engineering, Ltd., 10045 W. Lincoln Highway, Frankfort, Illinois 60423, (phone 815-806-0300), and may be obtained from the Engineer's office upon payment of One Hundred Fifty Dollars (\$150.00) for each paper copy and/or Ten Dollars (\$10.00) per CD format. The bid documents will be issued until 4:30 PM on the last business day preceding the bid. No refund will be made for documents received from the Engineer.

A certified check/bank draft drawn on a solvent bank or a bid bond, payable without condition to the Village of Tinley Park in an amount not less than ten percent (10%) of the bid shall be submitted with each proposal, as a guarantee that, if the proposal is accepted, a contract will be entered into and the performance of the contract is properly secured.

A performance bond in a sum equal to one hundred percent (100%) of the amount of the bid, with sureties to be approved by the President and Board of Trustees for the faithful performance of the contract must be furnished by the successful bidder. All bids or proposals shall contain an offer to furnish bond upon acceptance of such bid or proposal.

The right is reserved to reject any or all proposals, to waive technicalities, to postpone the bid opening, or to advertise for new proposals, if in the judgment of the President and Board of Trustees their best interests will be promoted thereby.

The contractor will be required to pay not less than the prevailing wage rates on this project as established by the United States Department of Labor. He shall also comply with all applicable Federal, State and local regulations.

The Village of Tinley Park Local Vendor Purchasing Policy provides local vendors with preferential treatment when competing for contracts with the Village. A local vendor is defined as a business that has an actual business location within the Village of Tinley Park and is licensed by the Village. As such, when considering contracts, the Village of Tinley Park reserves the right to forego the lowest and responsible bid in favor of a local vendor under the following circumstances:

<u>Contract Value</u>	<u>Range (up to a maximum of)</u>
\$0-\$250,000	5%
\$250,000-\$500,000	4%
\$500,000-\$750,000	3%
\$750,000-\$1,000,000	2%
\$1,000,000-\$2,000,000	1%

Responsible bidders are determined pursuant to the criteria set forth pursuant to the criteria set forth in the Village's Responsible Bidder Ordinance No. 2009-O-002.

Bidder qualifications and experience will also be included in the basis for determining the lowest responsible bidder.

Prequalifications will be required to be submitted to the Engineer by all potential bidders. If in the opinion of the Engineer and the President and Board of Trustees, an applicant would not be able to serve the best interest of the Village, a proposal will not be issued to the applicant.

President and Board of Trustees
Village of Tinley Park
Cook & Will Counties, Illinois

PROPOSAL
and
CONTRACT

PROPOSAL

TO THE OWNER, Village of Tinley Park, Illinois

1. Proposal of Dyer Construction Company, Inc.,
(name and address of bidder)
1716 Sheffield Avenue, Dyer, IN 46311
gfurman@dyerconstruction.com
(email address of bidder)

for the improvement described in the NOTICE TO CONTRACTORS.

2. In submitting this proposal, the undersigned declares that the only persons or parties interested in the proposal as principals are those named herein; and that proposal is made without collusion with any other person, firm or corporation.
3. The undersigned further declares that he has carefully examined the proposal, plans, specifications, form of contract and contract bond, and special provisions (if any), and that he has inspected in detail the site of the proposed work, and that he has familiarized himself with all of the local conditions affecting the contract and the detailed requirements of construction, and understands that in making this proposal he waives all right to plead any misunderstanding regarding the same.
4. The undersigned further understands and agrees that if this proposal is accepted, he is to furnish and provide all necessary machinery, tools, apparatus and other means of construction, and to do all of the work, and to furnish all of the materials specified in the contract, except such materials as are to be furnished by the Owner, in the manner and at the time therein prescribed, and in accordance with the requirements therein set forth, and is fully responsible for the construction means, methods, techniques, sequences and safety procedures and programs incident thereto.
5. The undersigned declares that he understands that the quantities mentioned are approximate only and that they are subject to increase or decrease; that he will take in full payment therefore the amount and the summation of the actual quantities, as finally determined, multiplied by the unit prices shown in the schedule of prices contained herein.
6. The undersigned further agrees that the unit prices submitted herewith are for the purpose of obtaining a gross sum, and for use in computing the value of extras and deductions; if there is a discrepancy between the gross sum bid and that resulting from the summation of the quantities multiplied by their respective unit prices, the latter shall apply.
7. The undersigned further agrees that if the Owner decides to extend or shorten the improvement, or otherwise alter it by extras or deductions, including the elimination of any one or more of the items, as provided in the specifications, he will perform the work as altered, increased or decreased at the contract unit prices.

8. The undersigned further agrees that the Owner may at any time during the progress of work covered by this contract order other work or materials incidental thereto and that all such work and materials as do not appear in the proposal or contract as a specific item accompanied by a unit price, and which are not included under the bid price for other items in this contract, shall be performed as extra work, and that he will accept as full compensation therefore the actual cost plus fifteen per cent (15%), the actual cost to be determined as provided in the specifications.
9. The undersigned further agrees to execute a contract for this work and present the same to the Owner within fifteen (15) days after the date of notice of the award of the contract to him.
10. The undersigned further agrees that he and his surety will execute and present within fifteen (15) days after the date of notice of the award of contract, a contract bond satisfactory to and in the form prescribed by the Owner, in the penal sum of the full amount of the contract, guaranteeing the faithful performance of the work in accordance with the terms of the contract.
11. The undersigned further agrees to begin work not later than ten (10) days after the execution and approval of the contract and contract bond, unless otherwise provided, and to prosecute the work in such manner and with sufficient materials, equipment, labor and safety precautions as will insure its completion within the time limit specified herein, it being understood and agreed that the completion within the time limit is an essential part of the contract. The undersigned agrees to complete the work within _____ calendar days after the date of the execution of the contract by both parties, or by 11/30/2017 if this is a completion day contract, unless additional time shall be granted by the Engineer in accordance with the provisions of the specifications. In case of failure to complete the work within the time names herein or within such extra time as may have been allowed by extensions, the undersigned agrees that the Owner shall withhold from such sums as may be due him under the terms of this contract, the costs set forth in the specifications, which cost shall be considered and treated not as a penalty, but as damages due the Owner from the undersigned by reason of inconvenience to the public, added cost of engineering and construction observation, maintenance of detours, and other items which have caused an expenditure of public funds resulting from the failure of the undersigned to complete the work within the time specified in the contract.
12. Accompanying this proposal is a bank draft, bank cashier's check, certified check or bid bond, complying with the requirements of the specifications, made payable to: Village of Tinley Park

16250 South Oak Park Avenue, Tinley Park, Illinois 60477

The amount of the bond, check or draft is Ten Percent of the Amount of Bid
(\$ (10%) of the Amount of Bid).

If the proposal and the undersigned shall fail to execute a contract and contract bond as required herein, it is hereby agreed that the amount of the check or draft substituted in lieu thereof, shall become the property of the Owner, and shall be considered as payment of damages due to delay and other causes suffered by the Owner because of the failure to execute said contract and contract bond; otherwise said check or draft substituted in lieu thereof shall be returned to the undersigned.

**ATTACH BANK DRAFT, BID BOND, BANK CASHIER'S
CHECK OR CERTIFIED CHECK HERE**

In the event that one check, bond, or draft is intended to cover two or more proposals, the amount must be equal to the sum of the proposal guarantees of the individual sections covered.

13. The undersigned submits herewith his schedule of prices covering the work to be performed under this contract; he understands that he must show in the schedule the unit prices for which he proposes to perform each item of work; that the extensions must be made by him; and that if not so done, his proposal may be rejected as irregular.
14. The undersigned firm certifies that it is not barred from bidding on this contract as a result of a conviction for the violation of State laws prohibiting bid-rigging or bid-rotating.

AIA® Document A310™ - 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

Dyer Construction Company, Inc.
1716 Sheffield Ave
Dyer, IN 46311

SURETY:

(Name, legal status and principal place of business)

Federal Insurance Company: Indiana Corporation
15 Mountain View Road
Warren, NJ 07059

OWNER:

(Name, legal status and address)

Village of Tinley Park
16250 South Oak Park Avenue
Tinley Park, IL

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

BOND AMOUNT: Ten Percent of the Amount of Bid----- (--10%--)

PROJECT:

(Name, location or address, and Project number, if any)


Legacy District South, Phase 1 - Detention Pond and Storm Sewer Improvements

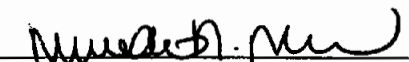
The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

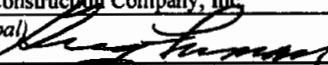
If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

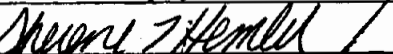
Signed and sealed this 14th day of February, 2017.


(Witness)


(Witness)

Dyer Construction Company, Inc.
(Principal)  (Seal)

(Title) VICE PRESIDENT
Federal Insurance Company

(Surety)  (Seal)

(Title) Sherene L. Hemler, Attorney In Fact

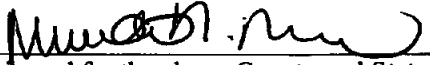
CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

Surety Company Acknowledgement

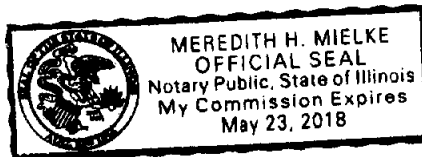
STATE OF **ILLINOIS**
COUNTY OF **COOK**

SS.:

On this 14th day of February, 2017, before me personally appeared **Sherene L. Hemler**, to me known, who, being by me duly sworn, did depose and say: that (s)he resides at **Schaumburg, Illinois**, that (s)he is the **Attorney in Fact of Federal Insurance Company**, the corporation described in and which executed the annexed instrument; that (s)he knows the corporate seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; that (s)he signed his/her name thereto by like order; and that the liabilities of said corporation do not exceed its assets as ascertained in the manner provided by law.


Notary Public in and for the above County and State

My Commission Expires: 05/23/18



CHUBB

Power of Attorney

Federal Insurance Company | Vigilant Insurance Company | Pacific Indemnity Company

Know All by These Presents. That **FEDERAL INSURANCE COMPANY**, an Indiana corporation, **VIGILANT INSURANCE COMPANY**, a New York corporation, and **PACIFIC INDEMNITY COMPANY**, a Wisconsin corporation, do each hereby constitute and appoint John E. Adams, Jessica Ancona, Carol A. Dougherty, Sherene L. Hemler, Robert E. Kappus, Kirk Liskewitz, Meredith H. Mielke, J.S. Pohl, Mike Pohl, Robert B. Schutz and James L. Sulkowski of Schaumburg, Illinois -----

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said **FEDERAL INSURANCE COMPANY**, **VIGILANT INSURANCE COMPANY**, and **PACIFIC INDEMNITY COMPANY** have each executed and attested these presents and affixed their corporate seals on this 1st day of February, 2017.

Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

Stephen M. Haney

Stephen M. Haney, Vice President



STATE OF NEW JERSEY

County of Hunterdon

SS.

On this 1st day of February, 2017 before me, a Notary Public of New Jersey, personally came Dawn M. Chloros, to me known to be Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros, being by me duly sworn, did depose and say that she is Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of said Companies; and that she signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that she is acquainted with Stephen M. Haney, and knows him to be Vice President of said Companies; and that the signature of Stephen M. Haney, subscribed to said Power of Attorney is in the genuine handwriting of Stephen M. Haney, and was thereto subscribed by authority of said Companies and in deponent's presence.

Notarial Seal



KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2318085
Commission Expires July 16, 2019

Katherine J. Adelaar

Notary Public

CERTIFICATION

Resolutions adopted by the Boards of Directors of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY on August 30, 2016:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into in the ordinary course of business (each a "Written Commitment"):

- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
- (2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such person's written appointment as such attorney-in-fact.
- (3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (4) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY (the "Companies") do hereby certify that

- (i) the foregoing Resolutions adopted by the Board of Directors of the Companies are true, correct and in full force and effect,
- (ii) the Companies are duly licensed and authorized to transact surety business in all 50 of the United States of America and the District of Columbia and are authorized by the U.S. Treasury Department; further, Federal and Vigilant are licensed in the U.S. Virgin Islands, and Federal is licensed in Guam, Puerto Rico, and each of the Provinces of Canada except Prince Edward Island; and
- (iii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Whitehouse Station, NJ, this 14th day of February, 2017.



Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO NOTIFY US OF A CLAIM, VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT:

Telephone (908) 903-3493 Fax (908) 903-3656 e-mail: surety@chubb.com

SCHEDULE OF PRICES

 Local Agency Village of Tinley Park

Location _____

 Description TP Regional Detention Pond & Storm Sewer Improvements - Phase 1 BASE BID

The undersigned submits herewith his schedule of prices covering the work to be performed under this contract; he understands that he must show in the schedule the unit prices for which he proposes to perform each item of work; that the extensions must be made by him, and if not so done, his proposal may be rejected as irregular.

Schedule for Single Bid

(For complete information covering these items, see plans and specifications)

Bidder's Proposal for making Entire Improvements					\$5,062,000.00
Item No.	Items	Unit	Quantity	Unit Price	Total
1	TREE REMOVAL (6 TO 15 UNITS DIAMETER)	UNIT	204	\$ 5.00	\$ 1,020.00
2	TREE REMOVAL (OVER 15 UNITS DIAMETER)	UNIT	510	\$ 3.00	\$ 1,530.00
3	EARTH EXCAVATION	CU YD	112120	\$ 19.45	\$ 2,180,734.00
4	TRENCH BACKFILL	CU YD	5900	\$ 26.87	\$ 158,533.00
5	TOPSOIL FURNISH AND PLACE, 4"	SQ YD	13515	\$ 5.07	\$ 68,521.05
6	TOPSOIL FURNISH AND PLACE, 12"	SQ YD	22650	\$ 1.71	\$ 38,731.50
7	SEEDING, CLASS 1A	ACRE	0.25	\$ 4,000.00	\$ 1,000.00
8	STONE RIPRAP, CLASS A3	SQ YD	60	\$ 54.38	\$ 3,262.80
9	STONE RIPRAP, CLASS A4	SQ YD	80	\$ 61.88	\$ 4,950.40
10	STONE RIPRAP, CLASS A5	SQ YD	150	\$ 61.88	\$ 9,282.00
11	AGGREGATE BASE COURSE, TYPE B 4"	SQ YD	330	\$ 10.35	\$ 3,415.50
12	PORTLAND CEMENT CONCRETE DRIVEWAY PAVEMENT, 7 INCH	SQ YD	30	\$ 72.60	\$ 2,178.00
13	HOT-MIX ASPHALT DRIVEWAY PAVEMENT, 6"	SQ YD	30	\$ 65.30	\$ 1,959.00
14	PORTLAND CEMENT CONCRETE SIDEWALK 5 INCH	SQ FT	2700	\$ 6.20	\$ 16,740.00
15	PAVEMENT REMOVAL	SQ YD	10500	\$ 4.07	\$ 42,735.00
16	DRIVEWAY PAVEMENT REMOVAL	SQ YD	30	\$ 15.29	\$ 458.70
17	SIDEWALK REMOVAL	SQ FT	20292	\$ 0.62	\$ 12,581.04
18	PAVED DITCH REMOVAL	FOOT	1615	\$ 5.58	\$ 9,011.70
19	CLASS D PATCHES, TYPE IV, 6 INCH	SQ YD	4500	\$ 48.93	\$ 220,185.00
20	CONCRETE HEADWALL REMOVAL	EACH	3	\$ 1,663.61	\$ 4,990.83
21	PIPE CULVERT REMOVAL	FOOT	45	\$ 13.11	\$ 589.95
22	END SECTIONS 36"	EACH	1	\$ 8,618.21	\$ 8,618.21
23	END SECTIONS 60"	EACH	1	\$ 15,390.80	\$ 15,390.80

Item No.	Items	Unit	Quantity	Unit Price	Total
24	PRECAST REINFORCED CONCRETE FLARED END SECTIONS 12"	EACH	3	\$ 951.30	\$ 2,853.90
25	PRECAST REINFORCED CONCRETE FLARED END SECTIONS 24"	EACH	1	\$ 1,111.31	\$ 1,111.31
26	PRECAST REINFORCED CONCRETE FLARED END SECTIONS 36"	EACH	1	\$ 1,528.71	\$ 1,528.71
27	GRATING FOR CONCRETE FLARED END SECTION 24"	EACH	1	\$ 575.17	\$ 575.17
28	GRATING FOR CONCRETE FLARED END SECTION 36"	EACH	1	\$ 810.17	\$ 810.17
29	TRAVERSABLE PIPE GRATE	FOOT	2	\$ 0.01	\$ 0.02
30	STORM SEWERS, CLASS A, TYPE 1 12"	FOOT	58	\$ 55.11	\$ 3,196.38
31	STORM SEWERS, CLASS A, TYPE 1 24"	FOOT	12	\$ 83.94	\$ 1,007.28
32	STORM SEWERS, CLASS A, TYPE 1 36"	FOOT	61	\$ 81.92	\$ 4,997.12
33	STORM SEWERS, CLASS A, TYPE 1 48"	FOOT	16	\$ 146.35	\$ 2,341.60
34	STORM SEWERS, CLASS A, TYPE 2 12"	FOOT	90	\$ 55.68	\$ 5,011.20
35	STORM SEWERS, CLASS A, TYPE 2 24"	FOOT	38	\$ 64.90	\$ 2,466.20
36	STORM SEWERS, CLASS A, TYPE 2 36"	FOOT	342	\$ 139.24	\$ 47,620.08
37	STORM SEWERS, CLASS A, TYPE 2 60"	FOOT	2656	\$ 228.27	\$ 606,285.12
38	STORM SEWERS, CLASS A, TYPE 1 EQUIVALENT ROUND-SIZE 30"	FOOT	16	\$ 247.50	\$ 3,960.00
39	STORM SEWERS, CLASS A, TYPE 2 EQUIVALENT ROUND-SIZE 24"	FOOT	16	\$ 255.38	\$ 4,086.08
40	STORM SEWERS, CLASS A, TYPE 2 EQUIVALENT ROUND-SIZE 30"	FOOT	100	\$ 192.60	\$ 19,260.00
41	STORM SEWER REMOVAL 8"	FOOT	182	\$ 10.23	\$ 1,861.86
42	STORM SEWER REMOVAL 10"	FOOT	194	\$ 11.21	\$ 2,174.74
43	STORM SEWER REMOVAL 12"	FOOT	428	\$ 11.46	\$ 4,904.88
44	STORM SEWER REMOVAL 24"	FOOT	478	\$ 10.91	\$ 5,214.98
45	STORM SEWER REMOVAL 30"	FOOT	88	\$ 15.42	\$ 1,356.96
46	STORM SEWER REMOVAL 36"	FOOT	213	\$ 54.74	\$ 11,659.62
47	STORM SEWER REMOVAL 48"	FOOT	10	\$ 58.39	\$ 583.90
48	STORM SEWER REMOVAL 60"	FOOT	20	\$ 68.39	\$ 1,367.80
49	STORM SEWER REMOVAL, EQUIVALENT ROUND-SIZE 30"	FOOT	20	\$ 19.75	\$ 395.00
50	STORM SEWERS JACKED IN PLACE, 60"	FOOT	145	\$ 1,067.85	\$ 154,838.25
51	MANHOLES, TYPE A, 4'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	4	\$ 2,555.76	\$ 10,223.04
52	MANHOLES, TYPE A, 5'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	1	\$ 2,773.75	\$ 2,773.75
53	MANHOLES, TYPE A, 6'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	1	\$ 4,524.95	\$ 4,524.95
54	MANHOLES, TYPE A, 7'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	15	\$ 6,862.78	\$ 102,941.70
55	MANHOLES, TYPE A, 8'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	1	\$ 12,628.42	\$ 12,628.42
56	MANHOLES, TYPE A, 9'-DIAMETER, TYPE 1 FRAME, CLOSED LID	EACH	5	\$ 14,363.65	\$ 71,818.25

Item No.	Items	Unit	Quantity	Unit Price	Total
57	MANHOLES, TYPE A, 6'-DIAMETER, WITH 2 TYPE 1 FRAME, CLOSED LIDS, RESTRICTOR PLATE	EACH	1	\$ 6,880.73	\$ 6,880.73
58	MANHOLES, TYPE A, 9'-DIAMETER, WITH 2 TYPE 1 FRAME, CLOSED LIDS, RESTRICTOR PLATE	EACH	2	\$ 26,951.98	\$ 53,903.96
59	REMOVING MANHOLES	EACH	6	\$ 331.93	\$ 1,991.58
60	REMOVING CATCH BASINS	EACH	3	\$ 398.85	\$ 1,196.55
61	REMOVING INLETS	EACH	4	\$ 315.26	\$ 1,261.04
62	PROPOSED STORM SEWER CONNECTION TO EXISTING STORM SEWER	EACH	5	\$ 1,167.80	\$ 5,839.00
63	BACKFLOW PREVENTER	EACH	1	\$ 43,034.78	\$ 43,034.78
64	CONFLICT MANHOLES	EACH	1	\$ 8,304.83	\$ 8,304.83
65	FENCE REMOVAL AND REPLACEMENT (SPECIAL)	FOOT	1200	\$ 22.78	\$ 27,336.00
66	FENCE REMOVAL	FOOT	1200	\$ 8.65	\$ 10,380.00
67	CHAIN LINK FENCE, 6'	FOOT	1200	\$ 19.00	\$ 22,800.00
68	PAINT PAVEMENT MARKING - LETTERS AND SYMBOLS	SQ FT	260.8	\$ 6.00	\$ 1,564.80
69	PAINT PAVEMENT MARKING - LINE 4"	FOOT	4530	\$ 0.60	\$ 2,718.00
70	PAINT PAVEMENT MARKING - LINE 6"	FOOT	358	\$ 0.90	\$ 322.20
71	PAINT PAVEMENT MARKING - LINE 12"	FOOT	120	\$ 1.80	\$ 216.00
72	PAINT PAVEMENT MARKING - LINE 24"	FOOT	94	\$ 3.60	\$ 338.40
73	ADJUSTING WATER MAIN 6"	FOOT	60	\$ 331.26	\$ 19,875.60
74	ADJUSTING WATER MAIN 10"	FOOT	100	\$ 405.53	\$ 40,553.00
75	WATER VALVES TO BE ADJUSTED	EACH	1	\$ 291.96	\$ 291.96
76	8" LINE STOP	EACH	2	\$ 3,733.89	\$ 7,467.78
77	10" LINE STOP	EACH	2	\$ 4,758.89	\$ 9,517.78
78	8" CUT & CAP	EACH	2	\$ 733.89	\$ 1,467.78
79	REMOVE WATER MAIN, 8"	FOOT	550	\$ 13.84	\$ 7,612.00
80	FIRE HYDRANT WITH AUXILIARY VALVE, VALVE BOX AND TEE	EACH	1	\$ 4,879.78	\$ 4,879.78
81	REMOVE FIRE HYDRANT	EACH	2	\$ 708.89	\$ 1,417.78
82	WATER MAIN SERVICE ADJUSTMENT	EACH	10	\$ 1,317.80	\$ 13,178.00
83	SANITARY SEWER SERVICE ADJUSTMENT	EACH	10	\$ 2,202.20	\$ 22,022.00
84	DUCTILE IRON SANITARY SEWER, 8"	FOOT	100	\$ 126.57	\$ 12,657.00
85	RUBBER ADJUSTING RINGS	EACH	96	\$ 95.00	\$ 9,120.00
86	EXPLORATORY EXCAVATION	EACH	15	\$ 986.29	\$ 14,794.35
87	16" DIAMETER STEEL SLEEVE, 0.344" WALL THICKNESS, OPEN CUT INSTALLATION	FOOT	60	\$ 154.86	\$ 9,291.60
88	20" DIAMETER STEEL SLEEVE, 0.344" WALL THICKNESS, OPEN CUT INSTALLATION	FOOT	60	\$ 166.86	\$ 10,011.60
89	RAILROAD PROTECTIVE LIABILITY INSURANCE	LSUM	1	\$ 5,000.00	\$ 5,000.00

Item No.	Items	Unit	Quantity	Unit Price	Total
90	METRA ALLOWANCE	DOL	25000	\$ 1.00	\$ 25,000.00
91	NATURAL AREA SITE PREPARATION	L SUM	1	\$ 5,000.00	\$ 5,000.00
92	SEEDING, INSTALLED - BUFFALO GRASS SEED MIX	SQ YD	4150	\$ 0.80	\$ 3,320.00
93	SEEDING, INSTALLED - TRANSITIONAL BUFFER SEED MIX	SQ YD	1450	\$ 0.75	\$ 1,087.50
94	SEEDING, INSTALLED - MESIC PRAIRIE SEED MIX	SQ YD	4200	\$ 0.80	\$ 3,360.00
95	SEEDING, INSTALLED - WET-MESIC PRAIRIE SEED MIX	SQ YD	2240	\$ 0.65	\$ 1,456.00
96	SEEDING, INSTALLED - WETLAND SEED MIX	SQ YD	220	\$ 2.75	\$ 605.00
97	SEEDING, INSTALLED - EMERGENT WETLAND SEED MIX	SQ YD	21260	\$ 0.80	\$ 17,008.00
98	PLUGS, INSTALLED - WETLAND PLUG MIX	EACH	1976	\$ 2.75	\$ 5,434.00
99	PLUGS, INSTALLED - EMERGENT WETLAND PLUG MIX	EACH	98100	\$ 2.75	\$ 269,775.00
100	PLUGS, INSTALLED - DEEP EMERGENT PLUG MIX	EACH	2890	\$ 2.75	\$ 7,947.50
101	PLUGS, INSTALLED - FLOATING AQUATIC PLUG MIX	EACH	1900	\$ 4.25	\$ 8,075.00
102	EROSION CONTROL BLANKET, INSTALLED - NAG S-75BN	SQ YD	13200	\$ 1.35	\$ 17,820.00
103	EROSION CONTROL BLANKET, INSTALLED - NAG S-150BN	SQ YD	5480	\$ 1.65	\$ 9,042.00
104	GOOSE ENCLOSURE FENCING, INSTALLED	FOOT	6600	\$ 4.25	\$ 28,050.00
105	INTERIM STEWARDSHIP AND WATERING	L SUM	1	\$ 9,000.00	\$ 9,000.00
106	NATURAL AREAS STEWARDSHIP - FIRST GROWING SEASON	L SUM	1	\$ 15,000.00	\$ 15,000.00
107	NATURAL AREA ENTRANCE CONCRETE SIDEWALK, 5"	SQ FT	190	\$ 10.10	\$ 1,919.00
108	NATURAL AREA ENTRANCE CONCRETE CURB, 6"	FOOT	68	\$ 24.20	\$ 1,645.60
109	UNIT PAVERS	SQ FT	212	\$ 25.00	\$ 5,300.00
110	STABILIZED PATHWAY MIX	SQ FT	13810	\$ 12.58	\$ 173,729.80
111	METAL PATHWAY EDGING	FOOT	4605	\$ 8.58	\$ 39,510.90
112	6' BENCH, INSTALLED	EACH	2	\$ 1,625.00	\$ 3,250.00
113	INTERPRETIVE SIGN	EACH	2	\$ 1,880.95	\$ 3,761.90
114	NATURAL STONES	EACH	8	\$ 500.00	\$ 4,000.00
115	MULCH	CU YD	30	\$ 50.00	\$ 1,500.00
116	2.5" TREES	EACH	52	\$ 750.00	\$ 39,000.00
117	6' - 8' TREES	EACH	33	\$ 600.00	\$ 19,800.00
118	5 GAL SHRUBS	EACH	57	\$ 60.00	\$ 3,420.00
119	1 GAL PERENNIALS/GRASSES	EACH	407	\$ 20.00	\$ 8,140.00
120	CONTINGENCY	DOL	50000	\$ 1.00	\$ 50,000.00

**NOT FOR BID**

REL # 14-471

SCHEDULE OF PRICESLocal Agency Village of Tinley Park

Location _____

Description TP Regional Detention Pond & Storm Sewer Improvements - Phase 1 UNIT PRICES FOR PLANTINGS

The undersigned submits herewith his schedule of prices covering the work to be performed under this contract; he understands that he must show in the schedule the unit prices for which he proposes to perform each item of work; that the extensions must be made by him, and if not so done, his proposal may be rejected as irregular.

Schedule for Unit Prices - NOT FOR BID

(For complete information covering these items, see plans and specifications)

				Bidder's Unit Prices for Plantings		Per Unit Prices
Item No.	Items	Unit	Quantity	Unit Price	Total	
1	ACER SACCHARUM - SUGAR MAPLE 2.5" CAL	EACH	1.	\$577.50	\$577.50	
2	AESULUS GLABRA - OHIO BUCKEYE 2.5" CAL	EACH	1.	\$577.50	\$577.50	
3	CARPINUS CAROLINIANA - AMERICAN HORNBEAM 2.5" CAL	EACH	1.	\$577.50	\$577.50	
4	GYMNOCLADUS DIOICUS - KENTUCKY COFFEETREE 2.5" CAL	EACH	1.	\$603.75	\$603.75	
5	LIRIODENDRON TULIPIFERA - TULIP TREE 2.5" CAL	EACH	1.	\$551.25	\$551.25	
6	NYSSA SYLVATICA - BLACKGUM 2.5" CAL	EACH	1.	\$682.50	\$682.50	
7	OSTRYA VIRGINIANA - IRONWOOD 2.5" CAL	EACH	1.	\$603.75	\$603.75	
8	QUERCUS ALBA - WHITE OAK 2.5" CAL	EACH	1.	\$603.75	\$603.75	
9	QUERCUS BICOLOR - SWAMP WHITE OAK 2.5" CAL	EACH	1.	\$603.75	\$603.75	
10	QUERCUS MACROCARPA - BURR OAK 2.5"	EACH	1.	\$603.75	\$603.75	
11	TILIA AMERICANA - AMERICAN LINDEN 2.5"	EACH	1.	\$525.00	\$525.00	
12	AMELANCHIER CANADENSIS - SHADBLow SERVICEBERRY 6'-8'	EACH	1.	\$525.00	\$525.00	
13	CERCIS CANADENSIS - EASTERN REDBUD 6'-8'	EACH	1.	\$603.75	\$603.75	
14	CRATAEGUS VIRIDIS - WINTER KIND HAWTHORN 2.5" CAL	EACH	1.	\$446.25	\$446.25	
15	HAMAMELIS VIRGINIANA - WITCH HAZEL 6'-8'	EACH	1.	\$367.50	\$367.50	
16	AMORPHA FRUTICOSA - INDIGO BUSH 5 GAL	EACH	1.	\$68.25	\$68.25	
17	LINDERA BENZOIN - SPICEBUSH 5 GAL	EACH	1.	\$68.25	\$68.25	
18	PHYSOCARPUS OPULIFOLIUS - NINEBARK 5 GAL	EACH	1.	\$68.25	\$68.25	
19	ROSA SETIGERA - ILLIANA'S ROSE 5 GAL	EACH	1.	\$68.25	\$68.25	
20	SYMPHORICARPOS ALBUS - WHITE SNOWBERRY 5 GAL	EACH	1.	\$68.25	\$68.25	
21	VIBURNUM DENTATUM - ARROWWOOD VIBURNUM 5 GAL	EACH	1.	\$84.00	\$84.00	
22	ALLIUM CERNUUM - NODDING ONION #1	EACH	1.	\$21.00	\$21.00	
23	DALEA CANDIDA - WHITE PRAIRIE CLOVER #1	EACH	1.	\$21.00	\$21.00	
24	DALEA PURPUREA - PURPLE PRAIRIE CLOVER #1	EACH	1.	\$21.00	\$21.00	
25	LIATRIS ASPERA - ROUGH BLAZING STAR #1	EACH	1.	\$15.75	\$15.75	
26	PENSTEMON DIGITALIS - BEARDTONGUE #1	EACH	1.	\$21.00	\$21.00	
27	RUELIA HUMILIS - PRAIRIE PETUNIA #1	EACH	1.	\$15.75	\$15.75	
28	SPOROBOLUS HETEROLEPIS - PRAIRIE DROPSEED #1	EACH	1.	\$21.00	\$21.00	



REL # 14-471

SCHEDULE OF PRICESLocal Agency Village of Tinley Park

Location _____

Description TP Regional Pond & Storm Sewer Improvements - Phase 1 ALTERNATE BID

The undersigned submits herewith his schedule of prices covering the work to be performed under this contract; he understands that he must show in the schedule the unit prices for which he proposes to perform each item of work; that the extensions must be made by him, and if not so done, his proposal may be rejected as irregular.

Schedule for Single Bid

(For complete information covering these items, see plans and specifications)

Bidder's Proposal for making Entire Improvements					Per Unit Prices
Item No.	Items	Unit	Quantity	Unit Price	Total
1	NATURAL AREAS STEWARDSHIP - SECOND GROWING SEASON	L SUM	1	\$12,600.00	\$12,600.00
2	NATURAL AREAS STEWARDSHIP - THIRD GROWING SEASON	L SUM	1	\$12,600.00	\$12,600.00
3	PRESCRIBED BURN	EACH	1	\$9,450.00	\$9,450.00
4	ANNUAL NATURAL AREAS VEGETATION MONITORING & REPORTING	EACH	3	\$6,300.00	\$18,900.00
5	UNIT COST FOR AS-NEEDED WATERING OF SEEDED & PLUGGED AREAS	EACH	1	\$15,750.00	\$15,750.00

SIGNATURES

(If an individual)

Signature of Bidder

Business Address

(If a co-partnership)

Firm Name (SEAL)

Signed by (SEAL)

Business Address

Insert
Names and
Addresses of
All Members
of the Firm
.....
.....
.....
.....

(If a corporation)

Corporate Name Dyer Construction Company, Inc.,

Signed By 

Vice- President

Business Address 1716 Sheffield Avenue, Dyer, IN 46311

(Corporate Seal)

Insert
Names of
Officers

President Janet Furman

Secretary Greg Furman

Treasurer Susan Thompson

Attest: 

~~Secretary~~ Treasurer

Phone Number (219) 865-2961

BIDDER'S CERTIFICATE

The undersigned, having executed the attached bid for the construction of:

Legacy District South Phase 1 - Detention Pond and Storm Sewer Improvements

Name of Project

for the Village/City/Town of Tinley Park, County of Cook & Will

State of Illinois hereby certifies that he has read all of the Contract

Documents, including the Notice to Bidders, Instructions to Bidders, Proposal Forms,
General conditions of the contract, Detail Specifications, Forms of contract, Form of
Performance Bond and Form of Maintenance Bond, and that he has examined the plans
and that his proposal for the work is based on the conditions and requirements therein;
and should the contract be awarded to him, he agrees to execute the work in strict
accordance therewith, including compliance with the Insurance Requirements of the
General Conditions.

Name of Bidder: Greg Furman

By: 

Company Name : Dyer Construction Company, Inc.,

Date: 2/14/2017



Carrie A. Pinter, Project Engineer
Direct Line (815) 412-2715

February 9, 2017
Project 14-471

**VILLAGE OF TINLEY PARK
LEGACY DISTRICT SOUTH PHASE 1 - DETENTION POND AND STORM SEWER IMPROVEMENTS
ADDENDUM ONE**

Addendum One shall consist of the following:

- Special Provision for STORM SEWERS JACKED IN PLACE, 60"
- Clarification on Special Provision for TOPSOIL FURNISH AND PLACE, 4"
- Updated Schedule of Prices - 4 (Four) Pages

The total number of pages for Addendum One is 5 pages. Please acknowledge the additions, clarifications, and changes to the specifications and schedule of prices by signing and faxing back the signature page as indicated. Please also include the revised Schedule of Prices in the bid package.

STORM SEWERS JACKED IN PLACE, 60"

All work shall conform to Section 552 of the Standard Specifications. Storm sewer shall be steel pipe of Grade B with a wall thickness of 0.844". This work shall be paid for at the unit price bid per FOOT of STORM SEWERS JACKED IN PLACE 60" which price to include all labor, materials and equipment to complete the work as specified.

TOPSOIL FURNISH AND PLACE, 4"

The first sentence of the specification has been revised to remove the word "pulverized" and shall read as follows:

This work shall consist of the furnishing and placing of four inches (4") of topsoil at all areas disturbed by the construction other than the areas already specified in the Natural Area Landscape plans and/or details.

The schedule of prices has been updated and includes additional storm sewer removal, storm sewer and structure pay items as called out on the plans.

Respectfully yours,
ROBINSON ENGINEERING, LTD.


Carrie A. Pinter, PE
Project Engineer

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Please, print your company name, your name, and sign as noted below and fax back to us at (815) 806-0301 as proof that you have received and reviewed all pages of the addendum and acknowledge them as part of the bid documents.


Signature

Greg Furman

Print Your Name

Dyer Construction Company, Inc.,

Company Name



Carrie A. Pintar, Project Engineer
Direct Line (815) 412-2715

February 10, 2017
Project 14-471

**VILLAGE OF TINLEY PARK
LEGACY DISTRICT SOUTH PHASE 1 – DETENTION POND AND STORM SEWER IMPROVEMENTS
ADDENDUM TWO**

Addendum Two shall consist of the following:

- Revision to Special Provision COMPLETION SCHEDULE
- Clarification on limits for TOPSOIL FURNISH AND PLACE, 4"
- Clarification on limits for TOPSOIL FURNISH AND PLACE, 12"
- Revision to Special Provision TRENCH BACKFILL
- Addition of Special Provision CONSTRUCTION FENCE
- Additional Information for RAILROAD PROTECTIVE LIABILITY INSURANCE – 3 (Three) Pages
- Updated Schedule of Prices – 4 (Four) Pages

The total number of pages for Addendum Two is 9 pages. Please acknowledge the additions, clarifications, and changes to the specifications and schedule of prices by signing and faxing back the signature page as indicated. Please also include the revised Schedule of Prices in the bid package.

COMPLETION SCHEDULE

It has come to our attention that some of the natural area seed mixes and plug plantings warrant revising the completion schedule accordingly for these areas to be planted within their specified windows. As such, the completion schedule shall be revised to the following:

All work associated with the excavation and grading of the regional detention pond, removal and installation of storm sewer and appurtenances, pavement and landscaping restoration and all natural area landscaping areas that meet their appropriate planting season as described in these contract documents shall be completed by November 30, 2017. All other natural area landscaping areas shall be completed by June 30, 2018. The Interim Stewardship and Watering shall end with the completion of the project or June 30, 2018, whichever comes first. The First Growing Season will be from completion of the project or June 30, 2018, whichever comes first to October 2018.

TOPSOIL FURNISH AND PLACE, 4"

The limits shall be from the normal water level (proposed contour 688) to the property line of the pond parcel as well as all other areas disturbed by the construction.

TOPSOIL FURNISH AND PLACE, 12"

The limits shall be from the normal water level (proposed contour 688) to the limits of the floating aquatic plug mix (proposed contour 686). The areas below the proposed 686 contour do not require any topsoil.

TRENCH BACKFILL

The first paragraph of the trench backfill special provision shall be revised to the following:

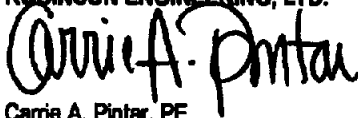
All materials used for trench backfill under and within three feet (3') of paved areas, including streets, curbs, sidewalks and driveways shall be per the detail drawings. FA-6 backfill is required for the trench backfill up to subgrade. The trench backfill shall be mechanically compacted in 12 inch lifts to a minimum of 95% Standard Proctor density. All trench backfill must meet the requirements of Section 1003 of the Standard Specifications.

CONSTRUCTION FENCE

This item shall include all materials, labor and equipment for the installation, maintenance, repair, and removal of temporary orange construction fence at locations as indicated on the plans and/or as needed to meet the requirements as specified in STOCKPILING OF MATERIALS AND END OF DAY CLEAN UP and/or as directed by the Village and/or Authorized Representative. This will not be paid for separately, but instead shall be considered incidental to the contract.

For an e-mail version of this Addendum, please e-mail me at cpintar@reitd.com.

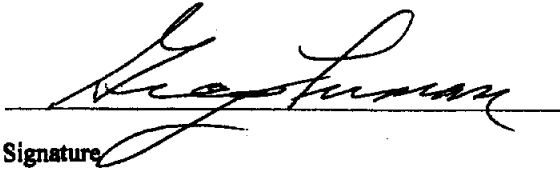
Respectfully yours,
ROBINSON ENGINEERING, LTD.



Carrie A. Pinter, PE
Project Engineer

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Please, print your company name, your name, and sign as noted below and fax back to us at (815) 806-0301 as proof that you have received and reviewed all pages of the addendum and acknowledge them as part of the bid documents.



Signature

Greg Furman

Print Your Name

Dyer Construction Company, Inc.,

Company Name

CONTRACTOR'S STATEMENT

1. Do you have sufficient knowledge of Drawings and Specifications of the work covered by this Contract to warrant submitting a Proposal for this work?
Yes.
2. (a) Have you done work of this nature? Yes.
(b) To what extent? (Dollar value) \$40,000,000.000 (CSO Basins)
(c) For whom? Hammond Sanitary District (Rick Sutton, Plant Manager)
5143 Columbia Avenue, Hammond, IN 46327
3. Do you have sufficient equipment to perform this work? Yes.
If so, list major items: Please see our attached equipment list.
4. Give Bank reference: BMO Harris, Merrillville, IN Branch
Address: 7701 Broadway, Merrillville, IN 46410 PH: (219) 738-6502
5. List names and addresses of major suppliers:
Welch Brothers Inc., 1050 Saint Charles Street, Elgin, IL 60120
Neenah Foundry Company, 2121 Brooks Avenue, Neenah, WI 54956
Hanson Material Services 322 S. William St., Thornton, IL 60476
6. Have you ever had, or do you now have, funds withheld for non-completion of work to the satisfaction of any municipality? No.
(a) If so where? _____
(b) For what reason? _____
7. Have you ever been disqualified by a Governmental Agency for failure to satisfactorily complete a public improvement? No.

CONTRACTOR'S STATEMENT (cont.)

8. Have you ever been cited for failing to withhold or report payroll deductions for Federal Income Tax? No.
9. Have you ever been cited by the Federal Government for any violation of the Copeland Act (Anti-kick-back Law)? No.
10. If awarded contract, work will begin in 10 calendar days.

EM Equipment List - Summary

Equipment and Components

Equipment/Component	Vin Number	Date Last Used	Status	Attach To Equip	Comp of Equip
Department: 1 DC Equipment					
Category: 01 Dozers and Loaders					
01-02	1994 CAT 950F WHEEL LOADER	8TK01278	10/14/16	Active	
01-03	2015 CAT D6N LGP DOZER	PBA03060	12/09/16	Active	
01-10	2012 CAT D6T DOZER	KSBO1245	12/02/16	Active	
01-11	2014 CAT D6T LGP DOZER	KSB01771	11/22/16	Active	
01-15	2006 CAT D6N LGP DOZER	ALY02455	12/21/16	Active	
01-17	2008 CAT D4K LGP DOZER	RRR00205	11/09/16	Active	
01-18	2008 CAT D3K DOZER	LLL00330	12/07/16	Active	
01-19	2007 CAT D6N LGP DOZER	DJY00167	12/23/16	Active	
01-20	2007 CAT D6N LGP DOZER	DJY00397	11/30/16	Active	
01-21	2009 CAT D6N LGP DOZER	DJY1549	12/09/16	Active	
01-22	2008 CAT D6N LGP DOZER	DJY01364	12/01/16	Active	
01-23	2015 CAT D6N LVTARO DOZER	PBA02302	12/22/16	Active	
01-24	2001 CAT D8R DOZER	6Y200407	12/13/16	Active	
01-25	1997 CAT D8R DOZER	7XM02303	10/20/16	Active	
01-26	2000 CAT D8R DOZER	7XM03923	11/22/16	Active	
01-51	2006 JD 644J WHEEL LOADER	DW644JX608285	12/30/16	Active	
01-52	2007 JD 644J WHEEL LOADER	DW644JX612100	12/29/16	Active	
01-53	2008 JD 644K WHEEL LOADER	DW644KZ623774	12/30/16	Active	
01-54	2009 JD 644K WHEEL LOADER	DW644KZ627552	12/27/16	Active	
01-55	2008 JD 844J FOUR WHEEL DR LO.	DW844JX617944	06/15/16	Active	
01-56	2013 JD 644K FT4 4WD LOADER	1DW644KZVDE651862	11/18/16	Active	
01-60	2009 MUSTANG MTL20 TRACK LO/	21406276	12/22/16	Active	
Category: 02 Scrapers					
02-01	1995 CAT 627F SCRAPER	1DL-00332	11/22/16	Active	
02-02	1995 CAT 627F SCRAPER	1DL-00212	09/07/16	Active	
02-03	1997 CAT 627F SCRAPER	1DL-00371	11/22/16	Active	
02-04	1997 CAT 627F SCRAPER	1DL-00388	11/22/16	Active	
02-05	1997 CAT 627F SCRAPER	1DL-00440	09/12/16	Active	
02-06	1997 CAT 627F SCRAPER	1DL-00441	09/13/16	Active	
02-07	2000 CAT 627F SCRAPER	1DL00856	11/17/16	Active	
02-08	2001 CAT 627G SCRAPER	AXF00569	11/22/16	Active	
02-09	2001 CAT 627G SCRAPER	AXF00570	11/22/16	Active	
Category: 04 Articulated Dump Trucks					
04-01	2011 CAT 740 ARTICULATED DUMI	B1P06157	07/28/16	Active	
04-02	2011 CAT 740 ARTICULATED DUMI	B1P06172	07/23/16	Active	
04-03	2011 CAT 740 ARTICULATED DUMI	B1P05405	10/14/16	Active	
04-04	2005 CAT 740 6X6 ARTICULATED C	CAT00740LB1P00334	12/05/16	Active	
04-05	2005 CAT 740 6X6 ARTICULATED C	CAT00740CAXM01975	12/29/16	Active	
04-06	2005 CAT 740 6X6 ARTICULATED C	CAT00740LB1P00365	08/11/16	Active	
04-07	2005 CAT 740 ARTICULATED DUMI	CAT740TAXM02125	10/21/16	Active	
04-08	2011 CAT ARTICULATED DUMP	CAT00740CB1P06159	10/17/16	Active	
Category: 07 Excavators					
07-01	2006 JD 450DLC HYDRAULIC EXCA	FF450DX913023	06/10/16	Active	
07-02	2012 JD 470G-LC HYDRAULIC EXC.	1FF470GXTCE470420	12/22/16	Active	
07-03	2013 JD 470G-LC HYDRAULIC EXC.	1FF470GXVBE470195	11/04/16	Active	
07-04	2014 JD 470G-LC IT4 EXCAVATOR	1FF470GXLEE470897	10/25/16	Active	
07-21	2006 GRADALL XL-4300II EXCAVAT	4300000029	12/01/16	Active	
07-23	2005 JD 180C-W WHEELED EXCAV	FF180CX30013	12/02/16	Active	
07-24	2013 JD 50G MINI EXCAVATOR	1FF050GXLDH280258	12/21/16	Active	
07-25	2015 JD 60G MINI EXCAVATOR	1FF060GXPFJ286402		Active	
07-30	2013 JD 250G LC IT4 EXCAVATOR	1FF250GXLEE609133	12/30/16	Active	
07-31	2014 JD 245G-LC HYDRAULIC EXC.	1FF245GXLEE600335		Active	

EM Equipment List - Summary

Equipment and Components

Equipment/Component	Vin Number	Date Last Used	Status	Attach To Equip	Comp of Equip
Department: 1 DC Equipment					- Continued
Category: 07 Excavators					- Continued
07-37	2010 JD 410J BACKHOE	1T0410JXCA0189035	12/30/16	Active	
07-39	2003 JD 330C LC HYDRAULIC EXC.	FF330CX082437	12/09/16	Active	
07-40	2011 JD 350G-LC EXCAVATOR	1FF350GXTBE808236	12/30/16	Active	
07-41	2015 JD 350G LC FT4 EXCAVATOR	1FF350GXTFF810679	12/22/16	Active	
07-42	2014 JD 350G-LC EXCAVATOR	1FF350GXLEF810206	12/30/16	Active	
07-43	2007 JD 350D-LC EXCAVATOR	FF350DX805326	12/21/16	Active	
07-47	2007 JD 200DLC EXCAVATOR	FF200DX510296	12/09/16	Active	
07-48	2006 JD 200CLC EXCAVATOR	FF200CX506101	12/22/16	Active	
07-73	1992 CAT V80F FORK LIFT	2GJ01798		Active	
07-74	1997 CAT TH83 FORK LIFT	3RN00891		Active	
Category: 08 Graders					
08-01	1974 CAT 140G GRADER	72V08564	11/07/16	Active	
08-02	2007 JD 872D MOTOR GRADER	DW872DX612050	12/07/16	Active	
08-03	1973 CAT 16G MOTOR GRADER	93U01300		Active	
Category: 09 Pick-up Trucks					
09-02	2015 GMC 2500 PICK UP TRUCK	1GT12ZE89FF125246	06/04/16	Active	
09-06	2006 CHEVROLET SILVERADO PIC	3GCEC14Z86G246715		Active	
09-07	2001 CHEVROLET PICK UP TRUCI	1GCHK24U71E172696		Active	
09-08	2011 CHEVROLET SILVERADO EX	1GC5K0C85BZ437847	12/22/16	Active	
09-09	2004 GMC 1500 PICK UP TRUCK	1GTEC14X24Z262405	12/09/16	Active	
09-10	2015 GMC 2500 PICKUP TRUCK	1GD22XEG3FZ126998	12/30/16	Active	
09-11	2006 CHEVROLET SILVERADO PIC	1GCHK24U36E218726	07/06/16	Active	
09-12	2013 GMC SIERRA 2500	1GD22ZC89DZ335795	12/30/16	Active	
09-14	2004 GMC C1500 PICK UP TRUCK	1GTEC14V44E106520	07/11/16	Active	
09-15	2016 GMC SIERRA 2500	1GD22REG0GZ184130	12/22/16	Active	
09-16	2016 GMC SIERRA 2500	1GD22REG5GZ184270	12/30/16	Active	
09-17	2014 GMC SAVANA 2500 CARGO V	1GTW7FBA6E1191326	12/31/16	Active	
09-19	2005 CHEVROLET SILVERADO PIC	1GCEC14X95Z169513	10/28/16	Active	
09-20	2001 KENWORTH/PBT SEMI TRAC	1XKWDB9X01J876948	12/22/16	Active	
09-23	2007 CHEVROLET SILVERADO PIC	1GCHK29K67E563693	12/30/16	Active	
09-24	2008 CHEVROLET SILVERADO PIC	1GBHK29K38E127860	03/01/16	Active	
09-25	2013 CHEVROLET 1 TON TRUCK	1GB3CZC81DF160132	06/23/16	Active	
09-26	2007 CHEVROLET SILVERADO PIC	1GCHC24K07E597343	12/20/16	Active	
09-27	2007 CHEVROLET SILVERADO PIC	1GCHC24K47E599399	12/30/16	Active	
09-28	2009 CHEVROLET SILVERADO PIC	1GCHK44K69E103553	12/30/16	Active	
09-29	2005 GMC C-14 PICK UP TRUCK	1GTEC14X25Z166582		Active	
09-30	2003 PETERBILT 378 SEMI TRACT	1XPFD9X03D808712	12/22/16	Active	
09-31	2015 GMC SIERRA 250	1GD22XEGXFZ127047	12/30/16	Active	
09-32	2003 CHEVROLET SILVERADO PIC	1GCHK24UX3E350037	11/06/15	Active	
09-33	2010 CHEVROLET SILVERADO PIC	1GC5KXBG3AZ202461	12/30/16	Active	
09-34	2011 CHEVROLET SILVERADO PIC	1GCOKVCG3BZ368655	12/23/16	Active	
09-35	2009 GMC SIERRA 3500 PICK UP T	1GDJC74K69E109736	07/16/16	Active	
09-36	Additional to 9-30			Active	
09-45	1998 GMC WATER TRUCK	1GDT7H4C8WJ514561	10/05/15	Active	
09-46	2003 ELGIN BROOM STREET SWEI	1FVABTAK93HK53523	09/16/16	Active	
09-47	2005 PETERBILT WATER TRUCK	2NPLLD0XX5M864713	07/21/16	Active	
09-54	1978 FORD LUBE TRUCK	W81DVBFB1109		Active	
09-71	2009 PETERBILT SEMI TRACTOR	1XPTD49X59D787850	01/01/17	Active	
09-72	2017 PETERBILT SEMI TRACTOR	1XPTP4EX4HD434639	12/21/16	Active	
09-73	1997 PETERBILT SEMI TRACTOR	1XPFDT9X0VN442124	09/15/16	Active	
09-74	1998 PETERBILT SEMI TRACTOR	1XPFDT9X4WN442130	11/16/16	Active	
09-75	1998 PETERBILT SEMI TRACTOR	1XPFDT9X4WN442127	12/02/16	Active	

EM Equipment List - Summary

Equipment and Components

Equipment/Component	Vin Number	Date Last Used	Status	Attach To Equip	Comp of Equip
Department: 1 DC Equipment					- Continued
Category: 09 Pick-up Trucks					- Continued
09-78	1998 PETERBILT SEMI TRACTOR	1XPFDT9XXWN442133			Active
09-80	2011 PETERBILT MECHANIC TK	2NP2HN7X4BM111845	05/24/16		Active
Category: 10 Trailers					
10-01	2007 KRUIZ 22' SEMI-DUMP	1K9SD22267K226430			Active
10-02	2007 KTUZ 22' SEMI-DUMP	1K9SD22287K226431			Active
10-07	2008 HIBILT SEMI-DUMP	1H9A3E3C981015044			Active
10-08	2008 HIBILT SEMI-DUMP	1H9A3E3C081015045			Active
10-10	2010 RANCO 22' SEMI-DUMP	1D9SD2223AR661104	07/19/16		Active
10-11	2010 RANCO 22' SEMI-DUMP	1D9SD2225AR661105			Active
10-12	2010 RANCO 22' SEMI-DUMP	1D9SD2227AR661106			Active
10-20	1985 FLORING T/A WRECKING TRI	1F9D2N345FC001033			Active
10-34	2002 TRANSCRAFT FLATBED	1TTF4820X21068883			Active
10-38	1961 ROGERS TRAILER.	8843			Active
10-40	2015 TALBERT LOWBOY TRAILER	40FSK5336F1033994			Active
10-42	2003 TALBERT 55SA HTE#12590 T	40FSK664931022445			Active
10-46	1964 FRUEHAUF TRAILER 35 TON	FWD828104			Active
10-52	1972 DEMOLITION - TUB TRAILER	786S972			Active
Category: 11 Rollers					
11-02	1999 CAT 825G SHEEPSFOOT	6RN00344	11/21/16		Active
11-05	2005 CAT 815F SHEEPSFOOT	BKL00798	12/02/16		Active
11-06	1975 CAT 815 SHEEPSFOOT	91P982			Active
11-07	2015 CAT 815F2 SHEEPSFOOT	BYN01159			Active
11-10	2001 BOMAG BW213D-3 ROLLER	10580291155	11/11/16		Active
11-11	2004 BOMAG BW211D-3 ROLLER	901580861099	12/23/16		Active
11-12	2005 BOMAG BW211D-40 ROLLER	901583251114	11/01/16		Active
11-14	2008 BOMAG BW211D-40 SM ROLL	901583251167	11/22/16		Active
11-15	2005 CAT CS533E SMOOTH ROLLE	ASL01567	11/18/16		Active
11-16	2013 PADFOOT ROLLER 84" CP56E	LHC00251			Active
11-39	2005 REMCO AW20S 10' DISC	AW05722			Active
11-46	1984 ROME TAH20-28" TANDEM DI	10TAH 1762			Active
11-50	2006 MODEL HP8000 DEMO HAM'R	1559	01/15/16		Active
Category: 13 Broom Truck					
13-06	2000 ROSCO RB48 STREET SWEE	36670			Active
Category: 14 Pavers					
14-01	1999 BLAW KNOX PAVER PF-5510	551028-18	07/11/16		Active
Category: 20 Miscellaneous					
20-06	2008 VEERMEER BC1800XL BRUS	1VRY131Z381002281			Active
20-20	TRENCH BOXES	5BMP816-259			Active
20-21	TRENCH BOXES 6HC-820	05-338 & 05-339	05/17/16		Active
20-94	1980 FINN HYDRO SEEDER	1199			Active
Category: 25 Vehicles					
25-02	2011 CHEVROLET TRAVERSE - Jar	1GNKVLED8BJ217419			Active
25-08	2013 GMC TERRAIN-BLACK - Kevin	2GKALSEK4D6394900			Active
25-09	2013 GMC TERRAIN-SILVER - John	2GKALSEK8D6394124			Active
25-10	2014 GMC TERRAIN-WHITE - Keith	2GKALREKXE6302098			Active
25-11	2013 CHEVY TAHOE	1GNSKCE01DR208846			Active
Category: 50 Office Equipment					
50-01	OFFICE EQUIPMENT				Active
50-02	COMPUTER EQUIPMENT				Active
50-03	OFFICE FUNITURE				Active
Category: G GPS					

EM Equipment List - Summary

Equipment and Components

Equipment/Component	Vin Number	Date Last Used	Status	Attach To Equip	Comp of Equip
Department: 1 DC Equipment					- Continued
Category: G GPS					- Continued
GPB1A	GPS Base Station SPS855 69855-91	5428R02506	Active		
GPB1B	GPS Base Station Head PN77970-0C	5412118293	Active		
GPB2A	GPS Base Station SPS852 69852-91	5130K77318	Active		
GPB2B	GPS Base Station Head P/N57971-0	1441130001	Active		
GPB3A	GPS Base Station SPS855 69855-91	5428R02521	Active		
GPB3B	GPS Base Station Rover Zethr Model	77970-00	Active		
GPB4A	GPS Base Station SPS855	5218K84758	Active		
GPB4B	GPS Base Station Rover TSC3	TCS3362RD	Active		
GPB5A	GPS Base Station	5307KS1292	Active		
GPB6A	GPS Base Station SPS985 PN 8250C	5412F60170	Active		
GPB7A	GPS Base Station SPS985 Trimble S	5309F27387	Active		
GPB7B	GPS Base Station Trimble Geodimeter	60840112	Active		
GPS1A	GPS 1-22 Screen CD460 P/N90460-I	1374J033SW	Active		
GPS1B	GPS 1-22 Receiver MS980 MFR 479	2516J282SA	Active		
GPS1C	GPS 1-22 Receiver MS 980 MFR 479	2516J280SA	Active		
GPS2A	GPS 1-20 Screen CD700 P/N244-17	1037J022SM	Active		
GPS2B	GPS 1-20 Receiver MS990 CAT MFF	0767J043SP	Active		
GPS2C	GPS 1-20 Receiver MS990 CAT MFF	1067J002SP	Active		
GPS3A	GPS 1-03 Screen CB460 P/N90460-I	1284J004SW	Active		
GPS3B	GPS 1-03 Receiver MS992 P/N7199	2515J807SP	Active		
GPS3C	GPS 1-03 Receiver MS992 P/N1992	2515J796SP	Active		
GPS4A	GPS 1-11 Screen CB460 P/N90460-C	1464J045SW	Active		
GPS4B	GPS 1-11 Receiver MS992 P/N7199	0924J088SP	Active		
GPS4C	GPS 1-11 Receiver MS992 P/N7199	0924J095SP	Active		
GPS5A	GPS 1-10 Screen CB460 PN90460-5	2412J120SW	Active		
GPS5B	GPS 1-10 Receiver MS992 PN71992	2582J543SP	Active		
GPS5C	GPS 1-10 Receiver MS992 PN71992	1962J536SP	Active		
GPS6A	GPS 1-21 Screen CD700 PN244-171	0577J014SM	Active		
GPS6B	GPS 1-21 Receiver MS990 PN55760	2677J023SP	Active		
GPS6C	GPS 1-21 Receiver MS990 PN55760	1067J003SP	Active		
GPS7A	GPS 1-19 Screen CB430 CAT PN29	2216J008SM	Active		
GPS7B	GPS 1-19 Receiver MS980 47950-00	1395J010SA	Active		
GPS7C	GPS 1-19 Receiver MS980 47950-00	1395J065SA	Active		
GPS8A	GPS 1-23 Screen CB460	2314J002SW	Active		
GPS8B	GPS 1-23 Receiver Antenna MS992	2834J7535P	Active		
GPS8C	GPS 1-23 Receiver Antenna MS992	2754J809SP	Active		
GT-01	Laser Trimble DG711	27232	Active		
GT-02	Laser Trimble DG711	26429	Active		
GT-03	David White Line Transfer Unit LT8-3	503503	Active		
GT-04	Laser Trimble Receiver (Grade Eye)	6774	Active		
GT-05	Rotation Laser Rugby 100LR Leica	89362	Active		
GT-06	Spectra LL500	62498	Active		
GT-07	Spectra LL500	101553	Active		
GT-08	GL412	11375174	Active		
GT-09	Rotating Laser Rugby	93708	Active		
GT-10	Spectra LL500	101556	Active		
Category: T Non-Asset					
T-1	1992 Great Dane (Zander's Trailer)	1GRAA9621NB175602	Active		
T-10	2006 Hauling (Pressure washer trailer)	5NHUHA2176W044666	Active		
T-108	1990 D-8 CATERPILLAR DOZER	46A-27107	Active		
T-109	1990 D-8 CATERPILLAR DOZER	46A-27109	Active		
T-11	2003 Fontainer Drop Deck Trailer	13N24830035917658	Active		
T-12	2009 GTM Skid Steer Trailer	4ZIH18219S005502	Active		

EM Equipment List - Summary

Equipment and Components

Equipment/Component	Vin Number	Date Last Used	Status	Attach To Equip	Comp of Equip
Department: 1 DC Equipment					- Continued
Category: T Non-Asset					- Continued
T1202	Wacker Diesel pate compactor DPU6	0732407119418	Active		
T-13	2016 Atlas Trailer	5HCKU1428GE035277	Active		
T-14	1987 Fontaine Entenable Flatbed	13N4482C6H1542152	Active		
T-15	1998 Trailmobile (empty)	1PTO1BAR5W9013188	Active		
T-159	1960 CAT D8H DOZER	46A16465	Active		
T-16	1998 Trailmobile (concrete blankets)	1PTO1BAR8W9013184	Active		
T-17	Jet Vac Hydro-Excavation Unit	1R9J518273P303057	Active		
T1711	10" Pump Deutz Eng	1009035	Active		
T1712	4" Gorman Rupp Pump	1336865N	Active		
T1720	Ingersoll-Rand 185 Air Compressor	274671UCH221	Active		
T-18	12' Rome TWR24-28 Tandem Disc		Active		
T1808	Arrow Pavement Breaker	HJ1250507	Active		
T-19	1997 GMC Fuel Truck	1GDM7D1Y4JV515544	Active		
T-2	1999 International (small black flat tra	1ZFUF1621XB000920	Active		
T-20	Landpride Pulverizer SP3072	521939	Active		
T-21	6" Thompson Dewatering Pump	Serial # 0000081	Active		
T-212	1974 S24 Terex Scraper 24 CYD (2-	58839	Active		
T-22	D.M.I. Ripper Disk		Active		
T-23	2005 7000 GUW Utility Trailer	4YSWS16235S016570	Active		
T-24	Landpride Treker 4410	490153	Active		
T-25	FFC Autorake	1314228	Active		
T-27	4" D&D Hyd Submer Pump	D948	Active		
T-28	Modular Lifting Beam-12 ton- MOD24	S4\009	Active		
T-29		4YZ00855	Active		
T-3	1973 Fruehauf (suction hose & burlap	HPR449083	Active		
T-30	2012 Atlas Copco Air Compressor XA	HOP040370	Active		
T-31	24-48" PIPE PLUG	62972//63002	Active		
T-32	1961 CAT 933 HIGHLIFT	42A2069	Active		
T-33	2016 Big Tex Utility Trailer	16VPX1820G2068145	Active		
T-4	1978 Fruehauf	MAZ575336	Active		
T-5	1986 HIB (Kevin Pullins)	1H9A3C3A4G1015132	Active		
T-6	40' Fruehauf (white box in yard)	MEC574309	Active		
T-7	2005 Royal Cargo Trailer (saw trailer)	5LABE12275M037423	Active		
T7570	Vermeer Trencher	IVRS072P611001788	Active		
T7572	2007 Husquarna FS3500G Concrete		Active		
T-8	1998 Wabash Drop Frame FRP Van	1JJV532WOWL456797	Active		
T-9	1999 Wabash Drop Frame FRP Van	1JJV532W1WL456789	Active		

CERTIFICATE OF ELIGIBILITY TO BID

I, Dyer Construction Company, Inc., / Greg Furman (contractor), pursuant to section 33E-11 of the Illinois Criminal Code of 1961 as amended, hereby certifies that neither (he, she, it) nor any of (his, her, its) partners, officers, or owners of (his, her, its) business has been convicted in the past five (5) years of the offense of bid-rigging under section 33E-3 of the Illinois Criminal Code of 1961 as amended and that neither (he, she, it) nor any of (his, her, its) business has ever been convicted of the offense of bid-rigging under section 33E-4 of the Illinois Criminal Code of 1961 as amended.

Date: 2/14/2017

By: 

(Name of Contractor) Greg Furman

Vice-President

(Title)

Dyer Construction Company Inc.,

CONTRACT

1. THIS AGREEMENT, made and concluded this 21 day of February, 2017 between the
Village of Tinley Park, acting by and through its Mayor and Board of Trustees
(city/village/town of) (President-Board of Trustees/Mayor-City Council)
known as the party of the first part, and Dyer Construction Company, Inc., his/their
(Contractor)
executors, administrators, successors or assigns, known as the party of the second part.

2. WITNESSETH: That for and in consideration of the payment and agreements mentioned in the Proposal hereto attached, to be made and performed by the party of the first part, and according to the terms expressed in the Bond referring to these presents, the party of the second part agrees with said party of the first part at his/their own proper cost and expense to do all the work, furnish all materials and all labor necessary to complete the work in accordance with the plans and specifications hereinafter described, and in full compliance with all of the plans of this agreement and the requirements of the Engineer under it.

3. And it is also understood and agreed that the Notice to Contractors, proposals, contract bond, General Requirements and Covenants (Division I), Technical Specifications (Division II), Special Provisions (Division III) and Standard drawings (Division IV), in addition to any specific plans and specifications upon which the contractor's proposal is based, are all incorporated by reference into this contract and are therefore made a part hereof.

4. IN WITNESS WHEREOF, the said parties have executed these presents on the date above mentioned.

FOR THE VILLAGE OF TINLEY PARK
(Party of the First Part)

By: [Signature]
Title: David G. Seaman, Mayor
Attest: [Signature]
Title: Patrick E. Rea, Clerk

MUNICIPAL SEAL

FOR THE CONTRACTOR
(Party of the Second Part)

By: [Signature]
Title: President
Attest: [Signature]
Title: Treasurer

CORPORATE SEAL

Executed by Municipality

Executed by Contractor

CONTRACT BOND

Bond# 8244-24-96

KNOWN ALL MEN BY THESE PRESENTS, that we, Dyer Construction Company, Inc.

_____, a corporation organized under the laws of the State of
Indiana _____, and licensed to do business in the State of Illinois, as principal, and
Federal Insurance Company _____, a corporation organized and existing under the laws of the State
of Indiana _____, with authority to do business in the State of Illinois, as Surety, are held
and firmly bound unto the _____ Village of Tinley Park _____, State of Illinois, in the penal sum of
Five Million Sixty Two Thousand and 00/100 _____ Dollars
(\$ 5,062,000.00 _____), lawful money of the United States, well and truly to be paid unto
said _____ Village of Tinley Park _____, for the payment of which we bind ourselves, our successors and
assigns, jointly, severally, and firmly by these presents.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH that whereas, the said Principal has entered into a written contract with an Owner which is the Village of Tinley Park and acts through its Mayor and Board of Trustees or the construction of the work designated 14-471 Legacy District South Phase 1 – Detention Pond and Storm Sewer Improvements, which contract hereby is referred to and made a part hereof, as if written herein in length, and whereby the said Principal has promised and agreed to perform said work in accordance with the terms of said Contract, and has promised to pay all sums of money due for any labor, materials, apparatus, fixtures or machinery furnished to such Principal for the purpose of performing such work and has further agreed to pay all direct and indirect damages to any person, firm, company, or corporation suffered or sustained on account of the performance of such work, for any reason whatsoever, during the time thereof and until such work is completed and accepted; and has further agreed that this bond shall inure to the benefit of any person, firm, company or corporation, to whom any money may be due from the Principal, subcontractor or otherwise, for any such labor, materials, apparatus, fixtures or machinery so furnished, and that suit may be maintained on such bond by any such person, firm, company or corporation, for the recovery of any such money.

NOW, THEREFORE, if the said Principal shall well and truly perform said work in accordance with the terms of said contract, and shall pay all sums of money due or to become due for any labor, materials, apparatus, fixtures or machinery furnished to him for the purpose of constructing such work, and shall commence and complete the work within the time prescribed in said contract, and shall pay and discharge all damages, direct and indirect, that may be suffered or sustained on account of

such work, for any reason whatsoever, during the time of the performance thereof and until the said work shall have been accepted, and shall hold the aforesaid Owner and its or his agents harmless on account of any such damages, and shall in all respects fully and faithfully comply with all the provisions, conditions and requirements of said contract, then this obligation to be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, we have duly executed the foregoing obligation this 28th day of February A.D. 2017

Contractor's corporate name: Dyer Construction Company, Inc.

By: Janet Furman
President

CORPORATE SEAL

Attest: Laura Thompson
Attestor's Title: Treasurer

Executed by Contractor

Surety's corporate name: Federal Insurance Company

By: [Signature]
Attorney-in-fact Mike Pohl

CORPORATE SEAL

By: N/A
Attorney-in-fact

Executed by Surety for Contractor

APPROVED THIS 21 DAY OF February A.D. 20 17

VILLAGE OF TINLEY PARK, IL

By: [Signature]
Title: David G. Seaman, Mayor

ATTEST FOR VILLAGE OF TINLEY PARK, IL

By: [Signature]
Title: Patrick E. Rea, Clerk

MUNICIPAL SEAL

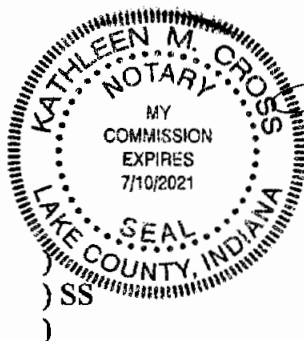
Executed by Municipality

STATE OF)
) SS
COUNTY OF)

I, KATHLEEN CROSS, a Notary Public in and for said County in the State aforesaid,
(Notary) do hereby certify that Carol Furman and Susan Thompson, to me
(President) (Attestor)
personally known to be president and secretary, respectively, of Dyer Construction Company, Inc.,
(Contractor)
a corporation, and also known to me to be the persons whose names are subscribed to the foregoing instrument,
appeared before me this day in person and acknowledged that as such president and secretary respectively they
signed, sealed and delivered the said instrument as the free and voluntary act of said Corporation, for the uses and
purposes therein set forth, and that they were duly authorized to execute the same by the Board of Directors of
said Corporation.

GIVEN UNDER MY HAND AND NOTARIAL SEAL THIS 28th DAY OF February A.D.
20 17

SEAL



Kathleen Cross
Notary Public

STATE OF Illinois
)
) SS
COUNTY OF Cook
)

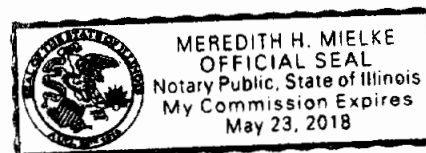
I, Meredith H. Mielke, a Notary Public in and for said County in the State aforesaid, do hereby
(Notary) certify that Mike Pohl who is personally known to me to be the same person who signed
(Attorney-in-Fact) the above and foregoing instrument as the Attorney in Fact for Federal Insurance Company appeared
(Surety) before me this day in person and acknowledged that he signed the name of Federal Insurance Company
~~XXXXXX~~ (Surety) thereto, as his Principal, and his own name as Attorney in Fact, as the free and voluntary act of his said Principal
for the uses and purposes therein set forth, and that he executed the said instrument under authority given him by
said Principal.

GIVEN UNDER MY HAND AND NOTARIAL SEAL THIS 28th DAY OF February A.D.
20 17

SEAL

Meredith H. Mielke
Notary Public

CB-3



Executed by Contractor

Executed by Surety

CHUBB

Power of Attorney

Federal Insurance Company | Vigilant Insurance Company | Pacific Indemnity Company

Know All by These Presents, That **FEDERAL INSURANCE COMPANY**, an Indiana corporation, **VIGILANT INSURANCE COMPANY**, a New York corporation, and **PACIFIC INDEMNITY COMPANY**, a Wisconsin corporation, do each hereby constitute and appoint John E. Adams, Jessica Ancona, Carol A. Dougherty, Sherene L. Hemler, Robert E. Kappus, Kirk Liskewitz, Meredith H. Mielke, J.S. Pohl, Mike Pohl, Robert B. Schutz and James L. Sulkowski of Schaumburg, Illinois -----

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said **FEDERAL INSURANCE COMPANY**, **VIGILANT INSURANCE COMPANY**, and **PACIFIC INDEMNITY COMPANY** have each executed and attested these presents and affixed their corporate seals on this 1st day of February, 2017.

Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

Stephen M. Haney

Stephen M. Haney, Vice President



STATE OF NEW JERSEY

County of Hunterdon

SS.

On this 1st day of February, 2017 before me, a Notary Public of New Jersey, personally came Dawn M. Chloros, to me known to be Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros, being by me duly sworn, did depose and say that she is Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of said Companies; and that she signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that she is acquainted with Stephen M. Haney, and knows him to be Vice President of said Companies; and that the signature of Stephen M. Haney, subscribed to said Power of Attorney is in the genuine handwriting of Stephen M. Haney, and was thereto subscribed by authority of said Companies and in deponent's presence.

Notarial Seal



KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2318965
Commission Expires July 16, 2019

Katherine J. Adelaar

Notary Public

CERTIFICATION

Resolutions adopted by the Boards of Directors of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY on August 30, 2016:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into in the ordinary course of business (each a "Written Commitment"):

- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
- (2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such person's written appointment as such attorney-in-fact.
- (3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (4) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY (the "Companies") do hereby certify that

- (i) the foregoing Resolutions adopted by the Board of Directors of the Companies are true, correct and in full force and effect,
- (ii) the Companies are duly licensed and authorized to transact surety business in all 50 of the United States of America and the District of Columbia and are authorized by the U.S. Treasury Department; further, Federal and Vigilant are licensed in the U.S. Virgin Islands, and Federal is licensed in Guam, Puerto Rico, and each of the Provinces of Canada except Prince Edward Island; and
- (iii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Whitehouse Station, NJ, this 28th day of February, 2017.



Dawn M. Chloros

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO NOTIFY US OF A CLAIM, VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT:
Telephone (908) 903-3493 Fax (908) 903-3656 e-mail: surety@chubb.com

DIVISION I

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SECTION 1. DEFINITION OF TERMS

1-1 DESCRIPTION

When a standard specification number is used in the Specifications it shall be taken to mean the latest revision of that Standard Specification at the time of the Bid.

Whenever in the specifications and Contract the following terms, or pronouns in place of them, are used, the intent and meaning shall be interpreted as follows:

1-2 ABBREVIATIONS

The following organizations are referred to in this specification by abbreviations of the titles. Additional information noted but not detailed can be obtained from these organizations by writing to them.

ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, Pennsylvania 19103
ASSHTO	The American Association of State Highway and Transportation Officials 917 National Press Building Washington, D.C. 20004
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, Colorado 80235
NSF	National Sanitation Test Laboratory Foundation Box 1478 Ann Arbor, Michigan
ANSI	American National Standards Institute 1430 Broadway New York, New York 10018
IDOT	Illinois Department of Transportation 2300 South Dirksen Parkway Springfield, Illinois 62764
FHWA	Federal Highway Administration DOT Building, 400 Seventh St., S.W. Washington, D.C. 20590
OSHA	Occupational Safety and Health Act
MWRDGC	The Metropolitan Water Reclamation District of Greater Chicago 100 East Erie Street Chicago, Illinois 60611

REL Robinson Engineering, Ltd

ISO Insurance Services Office

1-3 ADDENDA

Written or graphic instruments issued prior to the execution of the Agreement, which modify or interpret the Contract Documents, Drawings, and Specifications by additions, deletions, clarifications or corrections.

1-4 AWARD

The decision of the Owner to accept the proposal of the lowest responsive, responsible bidder for the work, subject to the execution of and approval of a satisfactory Contract therefore, and bond to secure the performance thereof, and to such other conditions as may be specified or otherwise required by law.

1-5 BASE COURSE

The layer or layers of specified or selected material of designed thickness placed on a sub-base or a subgrade to support the surface course.

1-6 BITUMINOUS PAVEMENT

A pavement structure which maintains intimate contact and distributes loads to the subgrade and depends upon aggregate interlock particle friction and cohesion for stability, and a pavement structure which includes a bituminous concrete surface course over a bituminous concrete base course or a portland cement concrete base course.

1-7 BIDDER

Any individual, firm, partnership or corporation submitting a proposal for the Work contemplated, acting directly or through a duly authorized representative.

1-8 CONTRACT

The written agreement between the Owner and the Contractor setting forth the obligations of the parties thereunder, including, but not limited to, the performance of the Work (the furnishing of labor and materials, and the basis of payment).

The Contract includes such of the following document parts as may be utilized. These document parts so utilized will be as fully part of the Contract as if therein set out verbatim, or, if not attached, as if attached thereto. The controlling order of priority for these documents on the project is as follows (e.g., A is controlling over B-N, etc.):

- A. Supplemental Agreements (Change Order)
- B. Addenda
- C. Special Conditions of Contract
- D. General Conditions of Contract
- E. Special Provisions to the Specifications
- F. Detailed Specifications
- G. Complete Project Plans or Drawings
- H. General Specifications
- I. Contract
- J. Contractor's Contract Bond
- K. Contractor's Proposal
- L. Notice to Proceed
- M. Notice of Award
- N. Notice to Bidders

1-9 CONTRACTOR

The Bidder awarded the Contract for the Work.

1-10 CONTRACT BOND

The approved form of security furnished by the Contractor and his surety as a guaranty that he will execute the Work in accordance with the terms of the Contract.

1-11 CORPORATION

With respect to the execution and performance of the Contract, a corporate body authorized or licensed to do business in the State of Illinois for projects in Illinois and in the State of Indiana for projects in Indiana.

1-12 CULVERT

A drainage structure extending across and beneath a traveled way and having a tubular or box-type cross-section open on both ends.

1-13 ENGINEER

ROBINSON ENGINEERING, LTD. or an engineer of a municipality, including such assistants as are authorized to represent them, who represents the Owner during the construction phase activities of the Work.

1-14 FORCE MAIN

A pipe constructed or used to carry sewage under pressure.

1-15 ENGINEERING OBSERVER

The authorized representative of the Owner or of the Engineer assigned to observe the progress of the Work to determine only if the Work is proceeding in accordance with the technical plans and specifications.

1-16 LABORATORY

An established testing laboratory approved by the Engineer.

1-17 MANHOLE

A vertical enclosed structure providing access to a pipe line or other structure.

1-18 NOTICE TO BIDDERS

The official notice, included in the proposal form, inviting bids for the proposed improvement, including a brief description of the Work.

1-19 OWNER

The Village, City, Town, Sanitary District, or other governmental body, corporation, partnership or individual initiating the project, acting through its legally constituted officials, officers or employees. The Department as referenced in the State Specifications.

1-20 PAVEMENT STRUCTURE

The combination of sub-base, base course and surface course placed on a sub-grade to support the traffic load and distribute it to the roadbed.

1-21 PLANS

All official drawings or reproductions of drawings pertaining to the Work provided for in the contract.

1-22 PLUMBING

Plumbing shall be as defined in the latest adopted Illinois State Plumbing Code, copies of which are available from the Illinois Department of Public Health, Division of Engineering and Sanitation, 535 West Jefferson Street, Springfield, Illinois 62706.

1-23 PROPOSAL (BID)

The written offer of the Bidder to perform the proposed Work.

1-24 PROPOSAL GUARANTY

The security designated in the proposal to be furnished by the Bidder as a guaranty that said Bidder will enter into a Contract with the Owner for the acceptable performance of the Work and will furnish the required Contract Bond, if the Work is awarded to him.

1-25 RAILROAD

The Railroad or Railway Company whose property is involved in the Work.

1-26 RIGHT-OF-WAY AND EASEMENTS

The areas owned, or acquired by permanent easement; also, the areas acquired by temporary easement during the time the easement is in effect.

1-27 SEWER, COMBINED

Any sewer constructed or used for the purpose of carrying both storm water and waterborne wastes to a treatment facility.

1-28 SEWER, SANITARY

Any sewer constructed or used for the purpose of carrying waterborne wastes to a treatment facility.

1-29 SEWER, SERVICE

A branch sanitary sewer line constructed from the main sanitary sewer line to a point described in the Special Provisions or Plans or to a point established by the Engineer.

1-30 SEWER, STORM

A sewer constructed or used for carrying storm water or sub-surface water to a storm water outlet.

1-31 SPECIAL PROVISIONS

Specific directions, provisions, requirements and revisions of the Specifications peculiar to the Work under consideration which are not satisfactorily provided for in the Specifications. The Special Provisions set forth the final contractual intent as to the matter involved. The Special Provisions included in the Contract shall not operate to annul those portions of the Specifications with which they are not in conflict.

1-32 SPECIFICATIONS

The body of directions, provisions and requirements contained herein, or in any supplement to this document referred to in the Special Provisions, together with written agreements and all documents of any description made or to be made pertaining to the method or manner of performing the Work, the quantities or the quality of materials to be furnished under the contract.

1-33 STATE SPECIFICATIONS

IDOT, Standard Specifications for Road and Bridge Construction, latest edition at the time of Bid. This book outlines the general requirements and covenants to all improvements, as well as provisions relating to materials, equipment and construction requirements for individual items of work.

1-34 SUBCONTRACTOR

The individual, firm, partnership or corporation to whom the Contractor, with the written consent of the Engineer, sublets, assigns, or otherwise disposes of any part of the Work covered by the contract.

1-35 SUB-BASE

The layer or layers of specified or selected material of designed thickness placed on a sub-grade to support a base course.

1-36 SUB-GRADE

The top of surface of a roadbed upon which the pavement structure and shoulders are constructed.

1-37 SUPPLEMENTAL AGREEMENT

The written agreement executed by the Owner and the Contractor, with the assent of the Contractor's surety, covering modifications or alterations of the terms of the original Contract.

1-38 SUPPLIER

Any person or organization who supplies materials or equipment for the Work including that fabricated to a special design.

1-39 SURETY

The corporate body, individual or individuals which engage to be responsible for the Bidder's acts in the execution of the Contract in the event of its being awarded to him; or, which are bound with and for the Contractor to insure his acceptable performance of the Contract, his payment of all obligations pertaining to the Work, and his fulfillment of such other conditions as may be specified or otherwise required by law.

1-40 SURFACE COURSE

One or more layers of a pavement structure designed to accommodate the traffic load, the top layer of which resists skidding, traffic abrasion, and the disintegrating effects of climate. The top layer is sometimes called "wearing course".

1-41 WATER MAIN

A pipe constructed or used to carry potable water under pressure.

1-42 WATER SERVICE LINE

That line connected to the water main, which delivers potable water to the user's facilities.

1-43 THE WORK

The improvement advertised for bids, described in the Proposal form, indicated on the Plans and covered in the Specifications, Special Provisions, Contract, authorized alterations, extensions and deductions, and supplementary agreements, or any part or parts thereof.

SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS

2-1 CONTENTS OF THE PROPOSAL FORM

Bidders will be furnished with forms stating the location and description of the Work contemplated, the approximate quantities of Work to be performed, the amount of the Proposal Guarantee, requirements pertaining to labor, and the date, time and place of filing and opening Proposals. All documents bound with or attached to the proposal shall be considered a part thereof, and shall not be detached or altered.

2-2 INTERPRETATION OF ESTIMATE OF QUANTITIES

An estimate of quantities of Work to be done and materials to be furnished under the Specifications is given in the Proposal. It is given as a basis for comparison of Proposals and the award of the Contract. The Owner and Engineer do not expressly or by implication agree that the actual quantities involved will correspond therewith; nor shall the Bidder plead misunderstanding or deception because of such estimate of quantities pertaining to the Work.

Payment will be based on the actual quantities of Work performed in accordance with Contract, at the Contract unit prices specified. No allowance will be made for any change in anticipated profits due to an increase or decrease in the original estimate of quantities. The Owner reserves the right to omit any item entirely, or to increase or decrease any or all items as provided in Section 4-3.

2-3 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND SITE OF WORK

The bidder shall, before submitting his bid, carefully examine the Proposal, Plans, Specifications, Special Provisions, and form of Contract and bond. He shall inspect in detail the site of the proposed Work and familiarize himself with all the local conditions affecting the Contract and the detailed requirements of construction. If his Bid is accepted, he will be responsible for all errors in his Proposal resulting from his failure or neglect to comply with these instructions. The Owner or Engineer will, in no case, be responsible for any change in anticipated profits resulting from such failure or neglect.

When the Plans or Special Provisions include information pertaining to sub-surface exploration, borings, test pits, and other preliminary investigations, such information is included only for the convenience of the Bidder. The Owner or Engineer assumes no responsibility whatever in respect to the sufficiency of the information, and there is no guaranty, either expressed or implied, that the conditions indicated are representative of those existing throughout the Work, or that unanticipated developments may not occur.

When the Plans or Special Provisions include information pertaining to the location of underground utility facilities, such information is only included for the convenience of the Bidder. The Owner or Engineer assumes no responsibility whatever in respect to the sufficiency or accuracy of the information, or lack of information, shown on the Plans relative to the location of underground utility

facilities. It shall be the Contractor's responsibility to obtain from the respective utility companies detailed information relative to the location of their facilities and the work schedules of the utility companies for removing or adjusting them.

2-4 ENGINEER'S ESTIMATE

The Engineer's "Estimate of Cost" as prepared for the Owner for the work to be completed under this contract may or may not be available to the Bidders at the discretion of the Owner or the Engineer. If the "Estimate of Cost" is available, it shall be given to all prospective bidders upon request.

2-5 PREPARATION OF THE PROPOSAL

The Bidder shall submit his Proposal on the form furnished by the Owner. The Proposal shall be executed properly, and Bids shall be made for all items indicated in the proposal form, except that when alternate bids are asked, a Bid on more than one alternate for each item is not required, unless the Special Provisions provide otherwise. The Bidder shall indicate, in figures, a unit price or lump sum for each of the separate items called for in the Proposal; he shall show the products of respective quantities and unit prices in the column provided for that purpose, and the gross sum shown in the place indicated in the Proposal shall be the summation of said products. All writing shall be with ink or typewriter, except the signature of the bidder, which shall be written with ink.

If the Proposal is made by an individual, his name and post office address shall be shown. If made by a firm, joint venture, or partnership, the name and post office address of each member of the firm, joint venture, or partnership shall be shown. If made by a corporation, the Proposal shall show the names, titles, and business addresses of the president, secretary, and treasurer, certified to by the secretary.

2-6 MULTIPLE BIDS

If multiple Bids are to be received, bidding shall be in accordance with the instructions in the Special Provisions.

2-7 REJECTION OF PROPOSALS

Proposals that contain omissions, erasures, alterations, additions not called for, conditional or alternate bids unless called for, irregularities of any kind, or proposals otherwise regular which are not accompanied by the proper proposal guaranty shall be rejected as informal or insufficient. However, the Owners reserve the right to reject any or all Proposals and to waive such technical error as may be deemed best for the interest of the Owner.

2-8 PROPOSAL GUARANTY

Each proposal shall be accompanied by a bid bond, bank draft, bank cashier's check, or properly certified check for not less than ten per cent (10%) of the amount Bid unless otherwise specified in the Special Provisions.

If a multiple Bid is submitted, the bid bond, bank draft, bank cashier's check, or certified checks, which accompany the individual Proposals making up the combination, will be considered as also covering the multiple Bid.

See Paragraph 3-3 regarding return of Proposal Guaranty.

The bid bond, bank draft, cashier's checks, or certified checks accompanying Proposals shall be made payable to the Owner.

2-9 DELIVERY OF PROPOSALS

Proposals shall be delivered prior to the time and at the place indicated in the notice to bidders. Each Proposal shall be placed in an envelope sealed and plainly marked to indicate its contents. Only sealed Proposals will be accepted.

Proposals will not be opened unless received at the place of letting and prior to the time stated in the Notice to Bidders.

2-10 WITHDRAWAL OF PROPOSALS

Permission will be given a Bidder to withdraw a Proposal if he makes his request in writing before the time for opening Proposals. If a Proposal is withdrawn, the Bidder will not be permitted to submit another Proposal for the same Work at the same letting.

2-11 WITHDRAWAL OF PROPOSAL GUARANTY

See Paragraphs 3-2 and 3-3 on award of Contract and return of Proposal Guaranty.

2-12 PUBLIC OPENING OF PROPOSALS

Unless otherwise specified, Proposals will be opened and read publicly at the time and place specified in the Notice to Bidders. Bidders, their authorized agents, and other interested parties are invited to be present.

2-13 DISQUALIFICATION OF BIDDERS

Any one or more of the following causes may be considered as sufficient for the disqualification of a Bidder and rejection of his Proposal.

- A. More than one Proposal for the same Work from an individual, firm, partnership, or corporation under the same or different names.
- B. Evidence of collusion among bidders.
- C. Unbalanced Proposals in which the prices for some items are substantially out of proportion to the prices for other items.
- D. Failure to submit a unit price for each item of Work listed in the Proposal.
- E. If the Proposal form is other than that furnished by the Engineer or if the form is altered or any part thereof is detached.
- F. If there are omissions, erasures, alterations, unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the Proposal incomplete, indefinite or ambiguous as to its meaning.
- G. If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
- H. If the Proposal is not accompanied by the proper proposal guaranty.
- I. If the Proposal is prepared with other than ink or typewriter.
- J. Lack of competency as revealed by financial statement or experience questionnaire.
- K. Unsatisfactory performance record as shown by past work judged from the standpoint of workmanship and progress.
- L. Uncompleted work, which, in the judgment of the Owner, might hinder or prevent the prompt completion of additional work.
- M. False information provided on a Bidder's "Contractor's Statement."
- N. Failure to comply with any prequalification regulations of the Owner.
- O. Default under previous contracts.

2-14 COMPETENCY OF BIDDERS

The Bidder, if a corporation, shall show the name of the State in which the corporation is chartered. Each Bidder shall furnish the Owner within two (2) weeks after request, with satisfactory evidence of his competency to perform the Work contemplated. When requested, he shall submit to the Owner a

financial statement prepared by a Certified Public Accountant showing his financial condition at the end of his past fiscal year. The accountant who prepares the statement shall certify that he holds a valid and unrevoked certificate as a Certified Public Accountant, issued in accordance with the laws of the State in which he is licensed. The Bidder, if requested, shall also answer and submit questionnaires relating to his experience and available equipment for performing construction work similar to that for which he is offering a proposal, and shall do so within the same two weeks from the time of request.

Before an award is made, the Bidder may, at the option of the Owner be required to furnish a statement showing the value of all uncompleted work for which he has entered into contracts.

2-15 MATERIAL SUBSTITUTIONS

If restrictions of any governmental authority prohibit the use of certain items that are required by the Plans and Specifications, substitution for such items will be determined by the Owner.

Each Bidder shall base his bid on the furnishing of all items exactly as shown on the Plans and as described in the Specifications. The successful Bidder will not be authorized to make any substitutions on his own volition, but in each and every case must obtain a properly authorized change order from the Owner on his Contract before installing any work in variance with the Contract requirements.

2-16 CONTRACTOR'S UNDERSTANDING

It is understood and agreed that the Contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, the general and local conditions, and all other matters which can in any way affect the Work under this Contract. No verbal agreement or conversation with any officer, agent, or employee of the Owner and Engineer, either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

2-17 STATUS OF RIGHT-OF-WAY, EASEMENT AND CONSTRUCTION EASEMENT ACQUISITION

Each bidder is instructed to fully acquaint himself with the status of the right-of-way, easement and construction easement acquisition at the time of submission of his proposal and the possibility of the acquisition of the parcels remaining to be acquired, if any, in time so as not to interfere with the progress of his work under this contract, and the owner shall not be liable to any damage that may occur to him for any and all delay through delay of the owner in securing the necessary right-of-way, easement and construction easement.

The owner agrees that it will make every effort to acquire any right-of-way, easement and construction easement with all speed and diligence possible.

SECTION 3. AWARD AND EXECUTION OF CONTRACT

3-1 CONSIDERATION OF PROPOSALS

The proposals received will be compared on the basis of the summation of the products of the items of Work listed and the unit prices offered. In case of discrepancy between the gross sum shown in the Proposal prices, the unit prices shall govern, and any errors found in said products shall be corrected. In awarding Contracts, the Owner will, in addition to considering the amounts stated in the Proposals, take into consideration the responsibility of the various Bidders as determined from a study of the data required under the previous article and from other investigations, which the Owner may elect to make.

3-2 AWARD OF CONTRACT

Except in cases where the Owner exercises the right reserved to reject any or all Proposals, the Contract will be awarded by the Owner, as soon as practicable after the opening of Proposals.

Unless otherwise specified, if a Contract is not awarded within forty- five (45) days after the opening of Proposals, a Bidder may file a written request with the Owner for the withdrawal of his bid or award date may be extended by mutual consent of the Owner and Bidder. The Owner will have a maximum of ten (10) days after the receipt of such request to award the Contract or release the Bidder from further obligation by return of the Bidder's Proposal Guaranty.

3-3 RETURN OF PROPOSAL GUARANTY

The Proposal Guaranties of all except the two lowest Bidders will be returned promptly after the Proposals have been checked. Proposal Guaranties of the two lowest Bidders will be returned as soon as the Contract and Bond of the successful bidder have been properly executed and approved.

If Contracts cannot be awarded promptly, the Owner shall permit the two (2) lowest Bidders to substitute for the bank cashier's checks, or certified checks which they may have submitted with their Proposals as Proposal Guaranties, a bid bond executed by a corporate surety company satisfactory to the Owner, but such substitutions shall not be made until a period of three (3) days has elapsed after the date of opening Proposals.

3-4 REQUIREMENT OF CONTRACT BOND

The successful Bidder, at the time of the execution of the Contract, shall deposit with the Owner a surety bond for the full amount of the Contract. The form of bond shall be that furnished by the Owner, and the surety shall be acceptable to the Owner.

3-5 EXECUTION OF THE CONTRACT

The contract shall be executed by the successful Bidder. The bond, when required, shall be executed by the principal and the sureties, and executed Contract and Contract Bond shall be presented to the Owner within fifteen (15) days after the date of notice of the award of the Contract.

Each Contract must be executed in three (3) original counterparts, and there shall be executed original counterparts of the Contract Bond in equal number to the executed original counterparts of the Contract. One (1) copy each of such executed documents will be retained by the Owner and the Engineer, the third will be delivered to the Contractor.

3-6 FAILURE TO EXECUTE CONTRACT

Failure on the part of the successful Bidder to execute a Contract and an acceptable Contract Bond and acceptable insurance certificates as provided herein, within fifteen (15) days from the date of receipt of Contract documents from the Owner will be considered as just cause for the annulment of the award and the forfeiture of the proposal guaranty to the Owner, not as a penalty but in payment of liquidated damages sustained as a result of such failure.

SECTION 4. SCOPE OF WORK

4-1 INTENT OF THE PLANS AND SPECIFICATIONS

The intent of the contract is to prescribe a complete outline of work which the Contractor undertakes to do in full compliance with the contract, plans and specifications. The Contractor shall furnish all required materials, equipment, tools, labor, and incidentals, unless otherwise provided in the contract, and shall include the cost of these items in the unit prices bid for the several units of work. Contractor shall be solely responsible for all safety procedures and safety violations. The quantities appearing in the bid schedule of prices are estimates prepared for the establishment of pay item prices and the comparison of bids. Payment to the Contractor will be made for the actual measured quantities performed and accepted or material furnished and accepted according to the contract, and the scheduled quantities may be increased, decreased, or omitted as herein provided.

Under no circumstances shall the Contractor exceed any established pay item quantity without notification to the Engineer and receipt of written authorization as provided herein.

The latest edition of the State Specifications and Standard Specifications for Water and Sewer Construction in Illinois shall be the basis and govern this contract unless otherwise provided by special provision or exception.

4-2 SPECIAL WORK

Should any construction or requirement not covered by the Specifications be anticipated on any proposed Work, Special Provisions for the same will be prepared and included in the Proposal form, which Special Provisions shall be considered as a part of the Specifications the same as though contained fully herein.

4-3 CHANGES

The Owner reserves the right to make, in writing, at any time during work, changes in quantities, alterations in work, and the performance of extra work to satisfactorily complete the project. Such changes in quantities, alterations, and extra work shall not invalidate the contract nor release the surety, and the Contractor agrees to perform the work as altered.

If the alterations or changes in quantities significantly change the character of the work under the contract, whether or not changed by any such different quantities or alterations, an adjustment, excluding loss of anticipated profits, will be made to the contract. The basis for the adjustment shall be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, then an adjustment will be made either for or against the Contractor in such amount as the Owner may determine to be fair and equitable.

If alterations or changes in quantities do not significantly change the character of the work to be performed under contract, the altered work will be paid for as provided elsewhere in the contract.

The term "significant change" shall be construed to apply only when the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction or when a major item, defined as an item whose total original contract costs exceeds ten percent of the total original contract amount, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity.

All alterations, cancellations, extensions, and deductions shall be authorized in writing by the Owner before work is started. Such authorizations shall set up the items of work involved and the method of payment for each item.

The Contractor shall accept payment for alterations which result in an increase or decrease in the quantities of work to be performed according to the following:

- A. All increases in work of the type which appear in the contract as pay items accompanied by unit prices will, except as provided under paragraph (C) herein, be paid for at the contract unit prices. Decreases in quantities included in the contract will be deducted from the contract at the unit bid prices. No allowance will be made for delays or anticipated profits.
- B. Major items of work for which the quantities are increased by not more than 125 percent or reduced to not less than 75 percent of the original contract quantities will be paid for as specified in paragraph (a) above. Any adjustments for increased quantities for major items of work increased more than 125 percent shall only apply to that portion in excess of 125 percent of original contract quantities. Any adjustments made for major items of work which are decreased to less than 75 percent of the original contract quantities shall apply to the actual amount of work performed.
- C. Extra work which is not included in the contract as pay items at unit prices and is not included in other items of the contract will be paid for according to Section 9-4.

4-4 PERIODIC AND FINAL CLEANUP

From time to time or as may be ordered by the Owner and immediately after completion of the Work, the Contractor shall at his own expense clean up and remove all refuse and unused materials of any kind resulting from the Work. Upon failure to do so within five (5) working days after receipt of written request from the Owner, the Work may be done by the Owner and the cost thereof be charged to the Contractor and be deducted from his Contract price. Upon completion of the Work, the Contractor shall remove all his equipment and put the area of the Work in a neat and clean condition and do all other cleaning required to complete the Work in a workmanlike manner, ready for use and satisfactory to the Owner.

All Cleanup shall be performed as specified in the various sections of these Specifications or in the Special Provisions.

4-5 LUMP SUM CONTRACTS

On lump sum Contract, when specified in Special Provisions, or Contracts containing lump sum items, the lump sum contract price shall include the furnishing and installation of all Work described in the Specifications and/or shown on the Plans.

4-6 LOCAL ORDINANCES AND REGULATIONS

The Contractor shall keep himself fully informed of all existing laws, ordinances, and regulations of the municipality affecting the work and/or material of this Contract. If any inconsistency is discovered between the Plans, Specifications and those covered by local municipal laws, ordinances, or regulations, it shall be reported to the Owner and Engineer.

4-7 PREFERENCE TO VETERANS

Attention is called to assure compliance with Illinois Revised State Chapter 126 Section 23. Preference to veterans upon public works: "In the employment and appointment to fill positions in the construction, addition to, or alteration of all public works undertaken or contracted for by the state, or by any political subdivision thereof, preference shall be given to persons who were engaged in the military or naval service of the United States in time of war".

SECTION 5. CONTROL OF THE WORK

5-1 PLANS AND WORKING DRAWINGS

The Contractor shall submit to the Engineer such shop, working, or layout drawings pertaining to the construction of the Work, as may be required. These drawings shall be reviewed by Engineer for general conformance with the design concept only. This review by the Engineer does not relieve the Contractor and/or fabricator/vendor of responsibility for conformance with the Contract documents (see 1-8) and applicable codes, all of which have priority over these shop, working and layout drawings. Corrections or comments made on the shop drawings by the Engineer during this review process do not relieve the Contractor from compliance with the requirements of the Contract documents (1-8) and applicable codes.

When the Contract includes Work adjacent to a railroad and false work, cofferdams, or sheeting is required, the Contractor shall submit to the Engineer for his approval and the Railroad Engineer's approval, plans for the false work, cofferdams, or sheeting by a Registered Structural Engineer. It shall be the responsibility of the Contractor to contact the railroad to determine how to meet their requirements. The cost of meeting those requirements shall be borne by the Contractor. The plans shall be submitted sufficiently in advance of the time the Contractor intends to start work to permit checking. No such work shall be started prior to receipt by the Contractor of approval of the Plans for the false work, cofferdams, or sheeting.

The cost of furnishing such Drawings shall be incidental to the contract and no additional compensation will be allowed the Contractor for any delays resulting therefrom.

5-2 CONFORMITY WITH PLANS AND SPECIFICATIONS

It is the intent of the Specifications that all Work performed and all materials furnished shall be in conformity with the lines, grades, cross section, dimensions and material requirements shown on the Plans or indicated in the Specifications.

In the event the Engineer finds the materials or the finished product in which the materials are used or the Work performed are not in conformity with the Engineering Plans and technical Specifications including tolerances and have resulted in an inferior or unsatisfactory product, the Work or material shall be removed and replaced or otherwise corrected by and at the expense of the Contractor.

5-3 COORDINATION OF COMPONENT PARTS OF THE CONTRACT

The Specifications, the accompanying Plans, the Proposal, the Special Provisions, and all other contract documents are intended to describe a complete Work and are essential parts of the Contract. A requirement occurring in any of them is binding. In case of discrepancy, figured dimensions shall govern over scaled dimensions, Plans shall govern over Specifications, Special Provisions shall govern over both Specifications and Plans, and quantities shown on the plans shall govern over those shown in the

Proposal. Neither the Owner, Engineer, nor the Contractor shall take advantage of any apparent error or omission in the Plans or Specifications, and the Owner shall be permitted to make such minor changes or alterations as may be deemed necessary for the fulfillment of the intent of the Plans and Specifications. Any corrections or alterations so made shall be subject to the provisions of Section 4-3.

5-4 COOPERATION BY CONTRACTOR

The Contractor will be furnished necessary copies of the Plans and Special Provisions, and he shall have one copy of each available on the work at all times during its prosecution. He shall give the work his constant attention to facilitate the progress thereof, and shall cooperate with the Owner and Engineer in every way possible. He shall have on the Work site at all times a competent, English-speaking representative authorized to receive orders and act for him and shall not replace him without prior written notification to the Owner.

5-5 UTILITIES

Not all of the gas, power, telephone or cable television lines, whether above or below ground, have been shown on the drawings. The location of existing underground utilities, such as water mains, sewers gas mains, etc., as shown on the drawings, have been determined from the best available information and are given for the convenience of the Contractor. The Contractor must assume responsibility for location and protection of all utilities, whether shown or not, and must realize that the actual locations of the utilities shown on the drawings may be different from the location indicated.

It is the responsibility of the Contractor to phone the Joint Utility Locating Information for Excavators (J.U.L.I.E.) at least 48 hours before excavation starts (except Saturday, Sunday and Holidays) phone toll free 1-800-892-0123. The Contractor shall also be responsible for having the "Dig Number" assigned as a result of the phone request available at the construction site and at his office.

It is understood and agreed that the Contractor has considered in his Proposal all of the permanent and temporary utility appurtenances shown or otherwise indicated on the Plans in their present positions and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by him due to any interference from the said utility appurtenances of the operation of moving them either by the utilities company or by the Contractor; or on account of any special construction methods required in prosecuting his work due to the existence of said appurtenances.

5-6 COOPERATION BETWEEN CONTRACTORS

If separate contracts are let for Work comprising an entire improvement, each Contractor shall conduct his Work so as not to interfere with or hinder the progress or completion of the Work being performed by other Contractors.

The Contractor shall as far as possible arrange his Work, and place and dispose of the materials being used so as not to interfere with the operations of the other contractors within the limits of the same improvement. He shall join his work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others. In case of dispute, the latest approved progress schedule shall govern.

5-7 CONSTRUCTION STAKES

Construction stakes and/or paint will be furnished and set by the Engineer to mark the general location, alignment, elevation and grade of the Work. The Contractor shall exercise proper care in the preservation of stakes set for his use or the use of the Engineer. The Contractor shall pay for the cost of replacing stakes damaged by his operation or those stolen by others.

5-8 AUTHORITY AND DUTIES OF OBSERVERS

Observers employed by the Owner or by the Engineer shall be authorized to observe the progress of the Work to determine if the Work is proceeding in accordance with the technical Plans and Specifications, and to perform such other duties as may be designated by the Engineer. However, the Engineer shall not be responsible for the construction means, methods, techniques, sequences or safety procedures and precautions in connection with the work by the contractors.

5-9 ENGINEER'S FIELD OFFICE AND/OR LABORATORY

When required by the Special Provisions, the Contractor shall furnish a field office and laboratory. The field office and/or laboratory shall be a weatherproof building for the exclusive use of the Engineer. It shall be independent of any building used by the Contractor. All keys to the building shall be turned over to the Engineer. The Engineer shall designate the location of the building and it shall remain on the site until released by the Engineer.

The building shall conform to the following requirements:

Floor space, not less than	120 square feet
Height of ceiling, not less than.....	8 feet
Windows, not less than	3
Door, with lock approved by the Engineer	1
Instrument locker, 2 feet x 3 feet x 4 feet, with adjustable shelves	
Hinged wall table	3 feet x 6 feet

The Contractor shall provide lights, heat, and when electric power is available, summer air conditioning for the building. The conditions shall be acceptable to the Engineer.

When shown on the plans or specified in the Special Provisions, the Contractor shall furnish two (2) buildings conforming to the above requirements, one to be used as a field laboratory, and each to be located where designated by the Engineer.

With the approval of the Engineer, a mobile building or buildings of approximately the same dimensions and having similar facilities may be substituted for the above described building or buildings.

The cost of furnishing the building or buildings, light, heat, and air conditioning shall be paid for at the contract lump sum price for "FIELD OFFICE AND/OR LABORATORY". The office and/or laboratory shall remain the property of the Contractor when the Work is completed.

5-10 CONSTRUCTION OBSERVATION

All materials and each part or detail of the Work may be subject at all times to observation by the Engineer and the Owner, or their authorized representatives, and the Contractor will be held strictly to the true intent of the Contract documents in regard to quality of materials, workmanship and the diligent execution of the Contract. Observations may be made at the site or at the source of material supply whether mill, plant or shop. The Engineer, or his representatives, shall be allowed access to all parts of the Work and shall be furnished with such information and assistance by the Contractor as is required to make his observations and construction review. The duty of the Engineer to conduct observations and construction review of the Contractor's performance shall not include review of the adequacy of the Contractor's safety measures in, on, or near the construction site.

Engineer shall not at any time supervise, direct, or have control over any contractors' work, nor shall Engineer have authority over or responsibility for the means, methods, techniques, sequences, or procedures of construction selected or used by any contractor, nor for safety precautions and programs in connection with the contractors' work, nor for any failure of any Contractor to comply with laws and regulations applicable to contractors' work. Engineer neither guarantees the performance of any contractor nor assumes responsibility for any contractor's failure to furnish and perform its work. Engineer shall have no authority to stop the work of any contractor on the Project. The Engineer's efforts will be directed toward providing assurance for the Owner that the completed project will conform to the Plans and Specifications as prepared by the Engineer, to safeguard the Owner against variances and deviations from the Plans and Specifications, and to assist in a correct interpretation of the Plans and Specifications.

The Engineer shall not have control of the construction and does not have a right, duty or responsibility to stop work for any reason including any contractor's failure to follow proper safety precautions or any acts or omissions. The Engineer shall not be responsible for the acts, errors or omissions of any contractor or any of their agents or employees or any other person performing any of the Work under the Contract.

The Contractor shall, upon written notice from the Owner, remove or uncover such portions of the finished Work as he may direct, before the final acceptance of the same. After examination, the Contractor shall restore said portion of the Work to the standard required by the Contract documents. If the Work thus exposed or examined proves acceptable, the expenses of uncovering or removing and the replacing of the parts removed shall be paid for as Extra work, unless otherwise provided in the Contract documents, but if the Work so exposed or examined is unacceptable, the expense of uncovering or removing and the replacing of the same in accordance with the Contract documents shall be borne by the Contractor.

The Contractor shall supervise and direct the Work. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction.

Any reference to "supervision" by the Engineer in the Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction or any other referenced documents shall be changed to "observation."

When the State and/or Federal Government is to pay a portion of the cost of the Work covered by the Contract, the Work shall be subject to the observation of the representatives of those Governments, but such observation shall in no sense make those Governments a part of the Contract.

5-11 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK

Work done without lines and grades being given, or beyond the lines shown on the Plans or as given, except as herein provided, or any extra work done without authority will be considered as unauthorized and at the expense of the Contractor, and will not be measured or paid for. Work so done may be ordered by the Owner to be removed or replaced at the Contractor's expense.

All work, which has been rejected, shall be remedied or removed and replaced so as to comply with the Plans and Specifications by the Contractor at his own expense. Upon failure on the part of the Contractor to comply promptly with any order of the Owner made under the provisions of this article, the Owner shall, after giving written notice to the Contractor, have the authority to cause defective work to be remedied, or removed and replaced, or to cause unauthorized work to be removed, and to deduct the cost thereof from the contract price due or become due to the Contractor.

5-12 FINAL ACCEPTANCE

The Engineer shall make final acceptance of all Work included in the Contract, as soon as practicable after notification by the Contractor that the Work is completed. If the Work is not acceptable to the Engineer, he shall inform the Contractor in writing as to the particular defects to be remedied before final acceptance can be made.

The Contractor shall be relieved of normal maintenance responsibilities for any sections of the work, which are completed and accepted by the Owner prior to project completion. For the remainder of the Work, the guarantee period shall be as stated in Section 7-16.

When the Contract includes work for which the County, State and/or Federal Government is to pay a portion of the cost thereof, such work shall also be subject to the inspection and approval of the representatives of those governments.

5-13 PUBLIC CONSTRUCTION BID ACT, 30 ILCS 557/1

It is agreed that the Public Construction Bid Act, 30 ILCS 557/1, shall not be applicable to this contract pursuant to the home rule powers of the community.

SECTION 6. CONTROL OF MATERIAL

6-1 QUALITY OF MATERIALS

It is the intent of the Specifications that first-class materials shall be used throughout the Work, and that they shall be incorporated as to produce completed construction, which is workmanlike and acceptable in every detail. The cost of collecting and furnishing of samples of all test material shall be borne by the Contractor. The cost of all testing shall be borne by the Owner. Only materials, which conform to the requirements of these Specifications, shall be incorporated in the Work.

6-2 DEFECTIVE MATERIALS

All materials not conforming to the requirements of the Specifications shall be considered as defective and shall be removed from the Work; if in place, they shall be removed by the Contractor at his expense and replaced with acceptable materials. No defective materials, the defects of which have been subsequently corrected, shall be used until approval has been given. Upon failure of the Contractor to comply forthwith with any written order of the Owner pursuant to the provisions of this article, the Owner shall have authority to remove and replace defective materials and to deduct the cost of removal and replacement from any monies due to become due the Contractor.

6-3 TESTING MATERIALS

All materials should be tested and approved by the Engineer before incorporation in the Work. The Contractor shall give sufficient advance notice of placing orders to permit tests to be completed before the materials are incorporated in the Work and the Contractor shall afford such facilities as the Engineer may require for collecting and forwarding samples and making observations.

6-4 SAND, GRAVEL AND CRUSHED STONE

The source of sand, gravel and crushed stone construction shall be approved by the Engineer prior to usage. The approval shall be based upon testing of samples furnished by the Contractor and tested by the Engineer for conformance with Specifications. Approval shall be contingent upon the Contractor using materials on the job, which conform with the samples satisfactorily tested.

6-5 CONCRETE

Samples of concrete used in construction shall be taken by the Contractor and made into test cylinders in conformance with ASTM C31. The Owner shall provide the services of an independent testing laboratory to collect and test the cylinders in conformance with ASTM C39, and furnish a copy of test results to the Engineer. Any concrete, which tests indicate failed to conform to the Specifications, shall be removed and replaced at Contractor's expense. At the option of the Owner, the concrete may be accepted and agreed upon adjustment in payment.

6-6 MISCELLANEOUS MATERIALS

Fittings, valves, castings, hydrants, house service pipes, masonry blocks, bricks, manhole sections or other miscellaneous manufactured materials used in water and sewer construction shall be furnished with the implied guarantee that such materials conform with the requirements of the Specifications. The Engineer reserves the right to require a certified statement from the manufacturer of such materials that the specific materials have been inspected and tested and conform with the Specifications.

6-7 JOB SITE OBSERVATION

Regardless of any tests of materials made at the source, the Contractor shall carefully inspect all materials before installation and reject any materials, which have been damaged or have visible flaws. The Engineer also reserves the right to make such observation, but failure to detect irregularities does not relieve the Contractor of responsibility to remove and replace materials, which are found to be defective after installation.

6-8 STORED MATERIALS

If it is necessary to store materials, they shall be protected in such a manner as to insure the preservation of their quality and fitness for the Work. All stored materials shall be inspected at the time of use in the Work, even though they may have been inspected and approved before being placed in storage. The Contractor may use the right-of-way for storage of materials. If stockpiling is done outside the right-of-way, the additional space required shall be provided by the Contractor at his expense.

6-9 "OR EQUAL" CLAUSE

Whenever, in any of the Contract Documents, an article, material or equipment is defined by describing a proprietary product, or by using the name of a manufacturer, or vendor, the term "or equal", if not inserted shall be implied except where the Proposal provides for alternate bids. The specific article, materials, or equipment mentioned shall be understood as indication of the type function, minimum standard or design, efficiency and quality desired and shall not be construed in such a manner as to exclude manufacturer's products of comparable quality, design and efficiency. The Contractor shall comply with the requirements of the Contract Documents relative to an Owner's approval of materials and equipment before they are incorporated in the project.

SECTION 7. LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

7-1 LAWS TO BE OBSERVED

The Contractor shall at all times observe and comply with all Federal laws, State laws, County laws, local laws, ordinances, and regulations which in any manner affect the conduct of the Work, and all such orders or decrees as exist at the time Bids are advertised, of legislative bodies or tribunals having legal jurisdiction or authority over the work and no plea of misunderstanding or ignorance thereof will be considered. The Engineer shall not be responsible for determining whether the Contractor is in compliance with these laws, ordinances and regulations.

The Contractor shall indemnify and save harmless the Owner, the Engineer, and all of their officers, agents, employees and servants against any claim or liability, including legal fees, arising from or based on the violation of such law, ordinance, regulation, order or decree, whether by themselves or their employees.

7-1.01 INDEMNIFICATION

To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless Owner and REL and their respective officers, agents and employees, from and against all claims, damages, losses, costs, expenses, judgments and liabilities, including but not limited to attorney's fees, costs and expenses, arising out of or in connection with Contractor's performance of or failure to perform this Agreement, provided that any such claim, damage, loss, costs, expenses, judgments or liabilities are attributable to bodily injury, sickness, disease or death, or to injury or destruction of tangible personal property, including the loss of use resulting therefrom, that is caused in whole or in part by any act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by any party indemnified hereunder.

Contractor shall defend, indemnify and hold harmless Owner, REL, and their respective officers, agents and employees from and against all claims, damages, losses, costs and expenses arising out of, relating to, or incurred in connection with the use by Contractor, its officers, agents, subcontractors and employees of any equipment, materials, tools, construction equipment, machinery, and/or motor vehicles owned or leased by Owner. The indemnification provided by this Section shall apply regardless of whether Owner consents to the use of equipment by Contractor.

In the event such indemnity as described above is prohibited by law, then said indemnity shall only be to the extent caused by the negligent acts or omissions of the Contractor, subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, or to the extent allowed by applicable law.

The indemnification obligation under this paragraph shall not be limited in any way by any limitations on the amount or type of damages, compensation or benefits payable by or for the benefit of Contractor or any indemnities under any Worker's Compensation Act, Occupational Disease Act, Disability Benefits Act, or any other employee benefits act. The Contractor further agrees to waive any and all liability limitations based upon the Worker's Compensation Act court interpretations or otherwise.

Contractor agrees that a similar waiver of liability limitation will be incorporated in its agreements with subcontractors or anyone directly or indirectly employed by them. Contractor agrees that in the event it fails to incorporate such a waiver of liability limitation in its agreements with said subcontractors and others, then it will be responsible for any additional liability arising out of said failure. The defense and indemnification obligations set forth in this provision shall survive the termination or expiration of this Agreement.

Contractor further agrees that all future contracts in furtherance of this contract between Contractor and any of its subcontractors will designate Owner and REL as intended third party beneficiaries of that contract. Contractor hereby agrees to specifically label Owner and REL as an "intended third party beneficiaries" in all contracts entered in furtherance of this contract.

7-2 INSURANCE REQUIREMENTS

7-2.01 GENERAL

The Contractor and any Subcontractors shall obtain and thereafter keep in force for the term of the contract the insurance coverage specified in 7-2.02 MINIMUM INSURANCE REQUIREMENTS.

The Contractor shall not commence work under the Contract until all the insurance required by this section or any Special Provisions has been obtained. The insurance companies must be authorized to do business in the State of Illinois for Work in Illinois and the State of Indiana for Work in Indiana.

The insurance companies providing coverage shall be rated in the Best's Key Rating Guide with a rating not lower than A- and shall have a financial size category of not less than VII.

The Contractor shall be solely responsible for enforcing compliance with these insurance requirements by all Subcontractors of any tier.

A. PRIMARY INSURANCE

All insurance required of the Contractor shall be specifically endorsed so that it is Primary Insurance as to all additional insureds with respect to all claims arising out of operations by or on their behalf. If additional insureds have other applicable insurance coverage, those coverages shall be deemed to be on an excess or contingent basis.

B. NO WAIVER OF INSURANCE REQUIREMENT BY OWNER

Under no circumstances shall the Owner be deemed to have waived any of the insurance requirements of this Contract by any act or omission, including, but not limited to:

1. Allowing work by Contractor or any Subcontractor of any tier to start before receipt of certificates of insurance, endorsements, and other required insurance documents; or
2. Failure to examine, or to demand correction of any deficiency of, any certificate of insurance received.

The Contractor agrees that the obligation to provide insurance is solely the Contractor's responsibility and cannot be waived by any act or omission of the Owner.

C. INSURANCE DOES NOT LIMIT LIABILITY

The purchase of insurance by the Contractor under this Contract shall not be deemed to limit the liability of the Contractor in any way for damages suffered by Owner (e.g., in excess of policy limits, because of deductibles, or not covered by the policies purchased).

D. NOTIFICATION OF PERSONAL INJURY/PROPERTY DAMAGE

The Contractor shall notify the Owner, in writing, of any possible or potential claim for personal injury or property damage arising out of the work of this Contract promptly whenever the occurrence giving rise to such a potential claim becomes known to the Contractor.

7-2.02 MINIMUM INSURANCE REQUIREMENTS

The insurance coverage required of the Contractor and any Subcontractors shall be written for not less than the following, or greater if required by law:

- A. Workers' Compensation and Occupational Disease Insurance** in accordance with applicable state and federal laws, and Employer's Liability Insurance with a bodily injury per accident limit of liability of at least \$ 500,000, bodily injury by disease limit each employee of \$500,000 and bodily injury by disease policy limit of \$500,000 or such greater sum as may be reasonably required by Owner.

B. Commercial General Liability Insurance provided by ISO form CG 0001 with a combined Bodily Injury and Property Damage limit of at least \$1,000,000 per occurrence, \$2,000,000 products and completed operations aggregate and \$2,000,000 general aggregate, or such greater sum as may be reasonably required by Owner.

1. Completed Operations and Products liability insurance shall be maintained for a period of 2-years after completion and acceptance of the Project by Owner, or such longer period as may be reasonably required by the Owner.
2. The above policy shall include an endorsement identifying Owner, Robinson Engineering, Ltd, and any other parties as may be reasonably required by Owner or REL as Additional Insured. ISO endorsements CG 2010 and CG 2037 any edition, or equivalent forms, must be used to provide this coverage. Copies of the endorsements must be included with the certificate of insurance as required in paragraph L.
3. Claims-Made coverage triggers are not acceptable to Owner.
4. ISO form CG2503, Designated Construction Project(s) General Aggregate Limit or an equivalent form must be endorsed to the policy and identified on the certificate of insurance. An Owners and Contractors Protective Liability policy can be utilized in lieu of aggregate limits per project, (see 7-2.020 for OCP requirements)
5. The policy shall not contain a sunset provision, commutation clause or any other provision which would prohibit the reporting of a claim and the subsequent defense and indemnity that would normally be provided by the policy.
6. The policy shall not contain any provision, definition or endorsement which would serve to eliminate third party action over claims.
7. Residential Work exclusions or limitations, in any form, are not acceptable to Contractor.

C. Comprehensive Automobile Liability Insurance covering use of all owned, non-owned and hired vehicles with Bodily Injury and Property Damage limit of at least \$1,000,000 Combined Single Limit, or such greater sum as may be reasonably required by the Owner. This policy shall include coverage for Owner, REL, and any other parties as may be reasonably required by Owner, for liability arising out of the actions of Contractor, whether by endorsement or otherwise.

- D. Excess or Umbrella Liability Insurance** limits of no less than \$5,000,000 per occurrence for Employer's Liability, Commercial General Liability and Comprehensive Automobile Liability, in excess of the minimum policy limits stated below:

Employer's Liability	\$500,000 / \$500,000 / \$500,000
Commercial General Liability	\$1,000,000 per occurrence
Commercial General Liability	\$2,000,000 general aggregate
Commercial General Liability	\$2,000,000 completed operations aggregate
Comprehensive Auto Liability	\$1,000,000 combined single limit

Excess/Umbrella coverage shall be provided as no less than Follow Form and shall name Owner, REL, and any other parties as may be reasonably required by Owner, as Additional Insured on a Primary and Non-Contributory basis.

- E. Pollution Liability** in the amount of \$1,000,000 per occurrence and in the aggregate or such sum as may be reasonably required by the Owner. This requirement covers the Contractor's use of, transportation, removal and/or disposal of hazardous materials and/or pollutants. Additionally, this requirement must apply to any disposal site receiving hazardous materials and/or pollutants. Pollution means the actual or alleged discharge, dispersal, release, seepage, migration, growth, or escape of smoke, soot, fumes, acids, alkalis, toxic chemicals, mold, mildew, spores, fungi, microbes, bacterial matter, legionella pneumophila, asbestos, lead, silica, liquids or gases, waste materials, contaminants, or other irritants, into or upon land, the atmosphere, any structure on land, the atmosphere contained within that structure, or any watercourse or body of water, including groundwater. Radioactive matter shall also be considered a pollutant, except as otherwise covered or protected by insurance or protections provided pursuant to 42 U.S.C. § 2014(w), as amended, or Section 170 of the Atomic Energy Act of 1954, as amended.

- F. Professional Liability** in the amount of \$2,000,000 per occurrence and in the aggregate or such sum as may be reasonably required by the Owner. This requirement covers the Contractor's duties that involve professional architectural, engineering, design or consultation work. Any applicable deductibles and/or retention's must be noted on the Certificate of Insurance. Policy exclusions are not allowed for pollution, including mold, fungi or bacteria including the vapor produced or arising therefrom. Please see the project Special Provisions for the project specific needs of this policy.

- G. *Property and Equipment*** Contractor shall purchase and maintain at its own discretion and expense, Builder's Risk/Installation Floater Insurance in an amount equal to the insurable value of the Contractor's property, whether off site or in transit, to cover any equipment, tools or tangible personal property. Contractor assumes all liability and risks, and agrees to waive all claims against Owner and REL for damage to or loss of equipment, machinery, tools, supplies and other tangible personal property owned or supplied by Contractor and utilized or intended to be utilized during the course of Contractor's Work. Any insurance carried by Contractor covering such damage or loss shall be endorsed with a waiver of subrogation in favor of Owner and REL. Any and all subcontractors agree to assume the same liabilities and risks as Contractor.
- H. *Each of Contractor's*** General Liability, Auto Liability, Pollution Liability, Professional Liability and Excess/Umbrella Liability policies must be endorsed as Primary and Non-Contributory as to any insurance maintained by the Additional Insured(s) and shown on the certificate of insurance.
- I. *An endorsement*** in favor of the Additional Insured(s) waiving the Contractor's and its insurer's rights of subrogation shall be issued with respect to the Commercial General Liability, Comprehensive Auto Liability, Pollution Liability, Professional Liability and Workers' Compensation and Employers Liability policies. Evidence of this endorsement must be noted on the certificate of insurance.
- J. *Self-funded*** or other non-risk transfer insurance mechanisms or deductibles/self-insured retentions greater than \$25,000 per occurrence are not acceptable to Owner on any insurance coverage required in this agreement. If the Contractor has such a program, full disclosure must be made to Owner and REL prior to any consideration being given.
- K. *Any subcontractor*** employed by Contractor shall have equivalent coverage.
- L. *A Certificate of Insurance***, including copies of the Additional Insured endorsements, shall be sent to REL prior to the commencement of any Work (please see the sample attached at the end of Section 7). All Certificates of Insurance and Endorsements verifying the existence of the above required insurance shall be in form and content satisfactory and acceptable to Owner and REL and shall be submitted to REL in a timely manner so as to confirm Contractor's full compliance with these insurance requirements stated herein, throughout the entire term of this Agreement.

Certificates must be sent to: RELcertificates@thehortongroup.com

M. Contractor shall provide written notice via email to RELcertificates@thehortongroup.com of any cancellation notice received by Contractor from any insurer providing insurance as required in this Agreement within two (2) business days of Contractor's receipt of such notice.

N. Permitting Contractor to commence Work prior to RELs receipt of the required certificate shall not be a waiver of the Contractor's obligation to provide all of the above insurance. Acceptance by Owner or REL of insurance submitted by Contractor shall not relieve or decrease in any manner the liability of the Contractor for its performance under this Agreement.

In the event Contractor fails to obtain or maintain any of the foregoing required coverage, the Owner may purchase such coverage and charge the expense thereof to the Contractor, or may terminate this Agreement.

These Insurance provisions are intended to be a separate and distinct obligation on the part of Contractor. Therefore, these provisions shall be enforceable and Contractor shall be bound thereby regardless of whether or not the Indemnity provisions of this Agreement are determined at any time to be enforceable in the jurisdiction in which the Work covered by this Agreement is performed. The obligation of the Contractor to provide the insurance herein specified shall not limit in any way the liability or obligations assumed by the Contractor elsewhere in this Agreement.

In the event Contractor or its insurance carrier(s) defaults on any obligations under this Insurance provision, Contractor agrees that it will be liable for all reasonable expenses and attorneys' fees incurred by Owner in the enforcement of the terms of this provision.

O. Owner's And Contractor's Protective Liability Insurance

If the Contractor is unable or unwilling to provide the required General Liability Additional Insured forms, an Owner's and Contractor's Protective Policy can be purchased as an acceptable alternate; Required limits of insurance;

1. Bodily Injury and Property Damage Combined

\$5,000,000 Each Occurrence

\$10,000,000 Annual Aggregate

2. The Contractor will furnish and maintain during the entire period of construction an Owner's and Contractor's Protective Liability policy written in the name of the Owner and REL with not less than the limits indicated. The named insureds shall be:

- a. Owner
- b. Robinson Engineering, Ltd.

- 3. Proof of insurance for the coverages required to be purchased by the Contractor, including the Owner's and Contractor's Protective Policy shall be submitted to REL for transmittal to the Owner for his approval prior to the start of construction. Proof of the Owner's Protective Policy shall consist of providing an entire copy of that policy to REL. With respect to all other coverages required to be purchased by the Contractor, proof of insurance shall consist of a Certificate of Insurance issued by the Contractor's insurance agency.
- 4. It is further understood that any insurance maintained or carried by Owner and Robinson Engineering, Ltd. shall be in excess of any coverage provided by any Contractor or Subcontractor.

P. Railroad Protective Insurance will be required by Special Provisions if needed.

Q. Builder's Risk Insurance is not provided by the Owner. The Contractor is responsible for any loss that would be insured by such coverage. On Contracts for construction of buildings, bridges, or other structures, all Builder's Risk coverage may be required by Special Provisions. Such coverage shall name the Owner, Contractor, subcontractors, and suppliers, as their interests may appear as named insureds.

7-3 PERMITS AND LICENSES

The Contractor, prior to commencing work, shall at his own expense procure all permits, licenses, and bonds necessary for the prosecution of the work, required by Municipal, County, State and Federal regulations, unless specifically provided otherwise in the Special Conditions of the Contract.

The Contractor shall also give all notice, pay all fees, and comply with all Federal, State, County and Municipal laws, ordinances, rules and regulations and building and construction codes bearing on the conduct of the Work.

7-4 PATENTS AND ROYALTIES

If any design, device, material or process covered by letters patent or copyright is used by the Contractor, he shall provide for such use by legal agreement with the owner of the patent or a duly authorized licensee of such owner, and shall save harmless the Owner and the Engineer from any and all loss or expense on account thereof, including its use by the Owner.

7-5 STATE AND FEDERAL PARTICIPATION

When the County, State, and/or the Federal Government pays all or any portion of the cost of the Work, the Work shall be subject to the inspection of the appropriate agency.

7-6 SANITARY PROVISIONS

The Contractor shall comply with all rules and regulations of the Federal, State, County, and local health departments, and shall take precautions to avoid creating unsanitary conditions. The Engineer shall not be responsible for determining whether the Contractor is in compliance with these rules and regulations.

7-7 PUBLIC CONVENIENCE AND SAFETY

The Contractor shall notify the Owner at least five (5) days in advance of the starting of Work, which might in any way inconvenience or endanger traffic, so that arrangements may be made, if necessary, for closing the road and providing suitable detours. The Contractor shall at all times conduct the Work as to insure the least obstruction to vehicular and pedestrian traffic. The convenience of the general public and of residents along the roadway shall be provided for in an adequate and satisfactory manner. (See also 7-9, 7-14 and 8-6.)

If a temporary road is required for the convenience of the general public and/or residents along the roadway, temporary road requirements will not be paid for separately, but will be incidental to the Contract and no extra compensation will be allowed.

7-8 BARRICADES AND WARNING SIGNS

When any section of road is closed to traffic, the Contractor shall provide, erect, and maintain barricades, red flags, signs and lights at each end of the closed section and at all intersecting roads in accordance with the Illinois Manual of Uniform Traffic Control Devices.

If during the progress of the work, it is necessary to provide access to private property along the road, the Contractor shall provide, erect, and maintain within the closed portion of the road, such barricades, signs, flags and lights as may be necessary to protect the Work and to safeguard local traffic.

When traffic is to be permitted to use the road during construction, the Contractor shall protect the work and provide for safe and convenient public travel by providing, erecting, and maintaining such barricades, red flags, and lights as are necessary.

The Contractor's responsibility for the work, as provided in Section 7-15, shall apply, even though barricades, signs, red flags, and lights are installed as required above.

The cost of furnishing and maintaining barricades, warning signs, red flags, and lights as required herein shall be incidental to the Contract and no extra compensation will be allowed. The Engineer shall not be responsible for determining whether the Contractor is in compliance with these rules and regulations.

7-9 DEBRIS ON TRAVELED SURFACE OR STRUCTURES

Where the Contractor's equipment is operated on any portion of the traveled surface or structures used by traffic on or adjacent to the section under construction, the Contractor shall clean the traveled surface of all dirt and debris at the end of each day's operation.

The cost of this work shall be included in the unit prices bid and no additional compensation will be allowed. The Engineer shall not be responsible for determining whether the Contractor is in compliance with these rules and regulations.

7-10 EQUIPMENT ON TRAVELED SURFACE AND STRUCTURES

The traveled surface and structures on or adjacent to the work shall be protected, from damage by lugs or cleats on treads or wheels of equipment.

All equipment used in the prosecution of the work shall comply with the legal loading limits established by the statutes of the State of Illinois or local regulations when moved over or operated on any traveled surface or structure unless permission in writing has been issued by the Owner. Before using any equipment, which may exceed the legal loading, the Contractor shall secure a permit, allowing ample time for making an analysis of stresses to determine whether or not the proposed loading would be within safe limits. The Owner will not be responsible for any delay in construction operations or for any costs incurred by the Contractor as a result of compliance with the above requirements. The Engineer shall not be responsible for determining whether the Contractor is in compliance with these rules and regulations.

7-11 USE OF EXPLOSIVES

When the use of explosives is necessary for the prosecution of the Work, the Contractor shall be governed by the rules and regulations of the Department of Mines and Minerals of the State of Illinois and any local regulations, which govern the use of explosives. The Engineer shall not be responsible for determining whether the Contractor is in compliance with these rules and regulations.

7-12 USE OF FIRE HYDRANTS

If the Contractor desires to use water from hydrants, he shall make application to the proper authorities, and shall conform to the municipal ordinances, rules or regulations concerning their use. Water from

hydrants or other sources shall be at the Contractor's expense unless otherwise provided in the Special Provisions.

Fire hydrants shall be accessible at all times to the Fire Department. No material or other obstructions shall be placed closer to a fire hydrant than permitted by municipal ordinances, rules or regulations, or within ten feet (10') of a fire hydrant, in the absence of such ordinances, rules or regulations.

7-13 PROTECTION AND RESTORATION OF PROPERTY

If corporate or private property interferes with the Work, the Contractor shall notify, in writing, the owners of such property, advising them of the nature or disposition of such property. The Contractor shall furnish the Owner with copies of such notifications and with copies of any agreements between him and the property owners concerning such protection or disposition.

The Contractor shall take all necessary precautions for the protection of corporate or private property, such as walls and foundations of buildings, vaults, underground structures of public utilities, underground drainage facilities, overhead structures of public utilities, trees, shrubbery, crops and fences contiguous to the Work, of which the Contract does not provide for removal. The Contractor shall protect and carefully preserve all official survey monuments, property marks, section markers, and Geological Survey monuments, or other similar monuments, until the Owner or an authorized surveyor or agent has witnessed or otherwise referenced their location or relocation. The Contractor shall take reasonable precautions to avoid disturbing any archeological and other historic remains encountered during construction. The Contractor shall notify the Owner of the presence of an such survey or property monuments or archeological and other historic remains as soon as they are discovered.

The Contractor shall be responsible for the damage or destruction of property of any character resulting from error, neglect, misconduct or omission in his manner or method of execution or non-execution of the Work, or caused by defective Work or the use of unsatisfactory materials, and such responsibility shall not be released until the Work shall have been completed and accepted and the requirements of the Specifications complied with.

Whenever public or private property is so damaged or destroyed, the Contractor shall at his own expense, restore such property to a condition equal to that existing before such damage or injury was done by repairing, rebuilding, or replacing it as may be directed, or he shall otherwise make good such damage or destruction in an acceptable manner. If he fails to do so, the Owner may, after the expiration of a period of forty-eight (48) hours after giving him notice in writing, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof shall be deducted from any compensation due, or which may become due the Contractor under his contract.

The Contractor shall remove all mailboxes within the limits of construction, which interfere with construction operations and shall erect them at temporary locations. As soon as construction

operations permit, he shall set the mailboxes at their permanent locations. The Contractor shall replace at his own expense any mailbox or post which has been damaged by his operations.

The cost of all materials required and all labor necessary to comply with the above provisions will not be paid for separately, but shall be considered as incidental to the Contract, unless otherwise specified in the Special Provisions.

7-14 PROTECTION AND RESTORATION OF TRAFFIC SIGNS

Any traffic sign within the limits of construction, which interferes with construction operations, may be removed by the Contractor when authorized by the traffic sign owner. Any traffic sign, which has been removed, shall be re-erected immediately by the Contractor at the temporary location designated by the traffic sign owner, and as soon as construction operations permit, the sign shall be set at its permanent location. The cost of all materials required and all labor necessary to comply with this provision will not be paid for separately, but shall be considered as incidental to the contract.

The Contractor shall replace at his own expense any traffic sign or post which has been damaged due to his operations.

Any traffic sign designated as critical by the traffic sign owner shall not be disturbed and no additional compensation will be allowed the Contractor for any delays, inconvenience, or damage sustained by him due to any special construction methods required in prosecuting his work due to the existence of such traffic signs.

7-15 CONTRACTOR'S RESPONSIBILITY FOR WORK

The Work shall be under the control and care of the Contractor until final acceptance or use or occupancy by the Owner. The Contractor shall assume all responsibility for injury or damage to the Work by action of the elements or from any other cause whatsoever, and shall rebuild, repair, restore, and make good, at his expense, all injuries or damages to the Work, except that when the Work is opened to usage by written order of the Owner, the provisions of this article shall not apply to damage caused by such use and not due to the Contractor's fault or negligence.

When materials are furnished to the Contractor by the Owner for inclusion in the work, the Contractor's responsibility for handling and installation of all such materials shall be the same as for materials furnished by him.

In case of suspension of Work by the Contractor, the Contractor shall be responsible for the Work and shall take such precautions as may be necessary to prevent damage to the Work, provide for normal drainage and shall erect any necessary temporary structures, signs, or other facilities at his expense.

7-16 GUARANTEE PERIOD

The Contractor shall warrant all Work performed for a period of one (1) year from the date of final acceptance in writing by the Engineer. In case of acceptance of a part of the work for use or occupancy prior to final acceptance of the entire Work, the guarantee for the part so accepted shall be for a period of one year from the date of such partial acceptance, in writing, by the Engineer.

In placing orders for equipment, the Contractor shall purchase same only under a written guarantee from the respective manufacturers that the equipment supplied will function satisfactorily as an integral part of the completed Work in accordance with the Plans and Specifications, and that the manufacturer will repair or otherwise make good any defects in workmanship or materials which may develop within a period of one (1) year from the date of final acceptance. Furthermore, the Contractor shall require that the manufacturer agree in writing at the time the order for equipment is placed that he will be responsible for the proper functioning of the equipment in cooperation with the Contractor, and that whenever necessary during the installation period or tuning up period following construction period, the manufacturer will supply without additional cost to the Owner, such superintendence and mechanical labor and any adjustments and additional parts and labor needed to make the equipment function satisfactorily, even if same was not shown on the approved shop drawings.

7-17 PERSONAL LIABILITY OF OWNER'S AGENTS

In carrying out the provisions of this contract, or in exercising any power or authority granted to the Owner, there shall be no personal liability upon any officer or authorized agent of the Owner provided the Owner is a governmental body, it being understood that all such persons act as agents and representatives of the Owner.

7-18 NO WAIVER OF LEGAL RIGHTS

The Owner and the Engineer shall not be precluded by any measurement, estimate, or certificate made either before or after the completion and acceptance of the Work and payment therefor, from showing the true amount and character of the Work performed and materials furnished by the Contractor, or from showing that any such measurement, estimate, or certificate is untrue or incorrectly made, or that the Work or materials do not conform in fact to the Contract. The Owner shall not be precluded, notwithstanding any such measurement, estimate, or certificate and payment in accordance therewith, from recovering from the Contractor and his sureties such damages as if it may sustain by reason of his failure to comply with the terms of the Contract. Neither the acceptance by the Owner, nor any representative of the Owner, nor any payment for or acceptance of the whole or any part of the work, nor any extension of time, nor any possession taken by the Owner, shall operate as a waiver of any portion of the Contract, or of any power herein reserved, or any right to damages herein provided. A waiver of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach.

7-19 SAFETY

Contractor shall comply with State and Federal Safety regulations as outlined in latest revision of Federal Construction Safety Standards (Series 1926) and with applicable provisions and regulation of Occupation Safety and Health Administration (OSHA) Standards of the Williams-Steiger Occupational Health and Safety Act of 1970 (rev.). The Engineer shall not be responsible for determining the Contractor's compliance with these regulations.

The Contractor is solely responsible for the safety procedures, programs and methods of its employees, subcontractors of every tier, and agents. Contractor shall hold the Owner and the Engineer harmless for any and all damages resulting from violations thereof.

7-20 USE OF PRIVATE LAND

The Contractor shall not use any vacant lot or private land as a plant site, depository for materials, or as a spoil site without the written authorization of the owner of the land (or his agent), a copy of which authorization shall be filed with the Owner.

7-21 USE OF WATER

Contractors desiring to use water furnished by the Owner will be required to make application for extension to the proper authorities and conform to the rules and regulations provided in such cases by the municipal ordinances and pay the usual water rates.

7-22 COST OF SERVICES

The Contractor will be required to pay the established water rates for water obtained from the Owner. Large quantities of water for flushing trenches, filling mains, testing or other operations shall be drawn only at night or at times specifically authorized by the Owner.

The cost of all power, lighting and heating required during construction shall be paid by the Contractor and its costs merged in the contract price.

7-23 WORK IN BAD WEATHER

No construction work shall be done during stormy, freezing or inclement weather, except such as can be done satisfactorily, and to secure first-class construction throughout, and then only subject to permission of the Owner.

7-24 SUNDAY WORK

No work shall be performed under these specifications at night or on Sunday and legal holidays without the approval of the Owner. If it is found necessary to continue the work at night or on Sunday or on a legal holiday, the Contractor will be charged for the Engineering and observation at such times at the rate of Seven Hundred Fifty Dollars (\$750.00) per day of eight (8) working hours for each person doing such work on the job, and the amount will be deducted from money due to the Contractor at the time of settlement.

7-25 WATCHMEN

Watchmen are to be provided by the Contractor at the site of the project to prevent loss, damage to property, or accidents.

7-26 CONSTRUCTION DEBRIS

The Contractor shall not conduct any generation, transportation, or recycling of construction or demolition debris, clean or general or uncontaminated soil generated during construction, remodeling, repair, and demolition of utilities, structures, and roads that is not commingled with any waste, without the maintenance of documentation identifying the hauler, generator, place of origin of the debris or soil, the weight or volume of the debris or soil, and the location, owner, and operator of the facility where the debris or soil was transferred, disposed, recycled or treated. This documentation must be maintained by the Contractor for 3 years.

7-27 SAMPLE INSURANCE CERTIFICATE

EMAIL ALL CERTIFICATES TO RELCERTIFICATES@THEHORTONGROUP.COM



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER YOUR INSURANCE AGENT		CONTACT NAME _____ PHONE (A/C, No. Ext.) _____ FAX (A/C, No.) _____ E-MAIL _____ ADDRESS _____	
INSURED YOUR NAME AND ADDRESS		INSURER(S) AFFORDING COVERAGE	
		INSURER A: CARRIERS MUST BE RATED	
		INSURER B: A- VII OR BETTER	
		INSURER C: _____	
		INSURER D: _____	
		INSURER E: _____	

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDITIONAL INSURANCE	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR	<input type="checkbox"/> Y <input type="checkbox"/> Y	POLICY NUMBER	EFF DATE	EXP DATE	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (E&O) \$ ANY LIMIT MED EXP (Any one person) \$ ANY LIMIT PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMPROP AGG \$ 2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC					
	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input checked="" type="checkbox"/> ALL OWNED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS	<input type="checkbox"/> Y <input type="checkbox"/> Y	POLICY NUMBER	EFF DATE	EXP DATE	COMBINED SINGLE LIMIT (E&O) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
	<input checked="" type="checkbox"/> UMBRELLA LIAB <input type="checkbox"/> EXCESS LIAB	<input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS-MADE	POLICY NUMBER	EFF DATE	EFF DATE	EACH OCCURRENCE \$ 5,000,000 AGGREGATE \$ 5,000,000
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/EMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below.	<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N <input type="checkbox"/> A	POLICY NUMBER	EFF DTE	EFF DATE	<input checked="" type="checkbox"/> NO STATUTORY LIMITS E.L. EACH ACCIDENT \$ 500,000 E.L. DISEASE - EA EMPLOYER \$ 500,000 E.L. DISEASE - POLICY LIMIT \$ 500,000
	POLLUTION PROFESSIONAL	<input type="checkbox"/> <input type="checkbox"/>	POLICY NUMBER	EFF DATE	EFF DATE	\$1,000,000/1,000,000 AGG \$1,000,000/2,000,000 AGG

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

REL JOB NUMBER AND PROJECT NAME AND ADDRESS:

Additional Insured with respect to General Liability, Auto Liability and Umbrella/Excess Liability on a primary and noncontributory basis when required by written contract (Owner and Robinson Engineering Ltd.) Owner is Certificate Holder. Waiver of Subrogation in favor of listed additional insureds with respect to General Liability, Auto Liability, Umbrella/Excess Liability and Workers' Compensation policies. Additional Insured with respect to General Liability coverage per ISO forms CG2010 and CG2037 or equivalent forms. Umbrella/Excess is on a follow form basis and is primary and non-contributory.

CERTIFICATE HOLDER	CANCELLATION
OWNER	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE

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ACORD 25 (2010/05)

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SECTION 8. PROSECUTION AND PROGRESS

8-1 SUBLETTING OR ASSIGNMENT OF CONTRACT

The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the Contract or Contracts or any portion thereof, or of his right, title, or interest therein, without written consent of the Owner. In case such consent is given, the Contractor will be permitted to sublet a portion thereof, but shall perform with his own organization, Work amounting to not less than 50 per cent of the total Contract, except that any items designated in the Contract as "specialty items" may be performed by subcontract and may be deducted from the total Contract price before computing the amount of work required to be performed by the Contractor with his own organization. No subcontracts, or transfer of Contract, shall in any case release the Contractor of his liability under the Contract. All transactions of the Owner shall be with the Contractor; subcontractors shall be recognized only in the capacity of employees or workmen and shall be subject to the same requirements as to character and competence.

8-2 PROGRESS SCHEDULE

Promptly after the award of the contract, if requested, the Contractor shall submit to the Owner a satisfactory progress schedule, which shall show the proposed sequence of work, and how the Contractor proposes to complete the various items of work within the number of days set up on the contract. The progress schedule shall be reviewed and revised periodically as working conditions warrant. The Contractor shall confer with the Owner in regard to the prosecution of the Work in accordance with this schedule. This schedule shall be used as a basis for establishing major construction operations, and for checking progress of the Work.

8-3 PRE-CONSTRUCTION CONFERENCE

Unless the need for a preconstruction conference is waived by the Engineer, the Contractor shall make himself and his representatives available to meet with the Engineer and other representatives of the Owner, prior to the start of construction to discuss scheduling, handling of materials, payments, etc.

8-4 PROSECUTION OF THE WORK

The Contractor shall begin the Work to be performed under the contract not later than ten (10) days after the execution and acceptance of the Contract, unless otherwise provided, but not prior to the execution of the Contract.

8-5 COMPLETION DATE

The Contractor shall complete all Work on or before the stipulated completion date, or on or before a later date determined as specified herein; otherwise, the Owner may proceed to collect liquidated damages described hereinafter.

When a delay occurs due to unforeseen causes beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of the public enemy, governmental acts, fires, floods, epidemics, strikes, extraordinary delays in delivery of materials caused by strikes, lockouts, wrecks, freight embargoes, governmental acts, or acts of God, the time of completion shall be extended in whatever amount is determined by the Owner.

An "Act of God" means an earthquake, flood, cloudburst, cyclone, or other cataclysmic phenomena of nature beyond the power of the Contractor to foresee or make preparation in defense against. A rain, windstorm or other natural phenomenon of normal intensity, based on U.S. Weather Bureau reports, for the particular locality and for the particular season of the year in which the work is being prosecuted, shall not be construed as an "Act of God", and no extension of time will be granted for the delays resulting therefrom.

8-6 *LIMITATIONS OF OPERATIONS*

The Contractor shall conduct his work so as to create a minimum amount of inconvenience to vehicular and pedestrian traffic. At any time when, in the judgment of the Owner, the Contractor has obstructed or closed the road or is carrying on operations on a greater portion of a street than is necessary for the proper prosecution of the Work, the Owner may require the Contractor to finish the section on which Work is in progress before the Work is started on any additional section. (See also Section 7-7).

8-7 *SUSPENSION OF WORK*

The Owner shall have authority to suspend the Work wholly or in part, for such period of time as he may deem necessary, due to conditions unfavorable for the satisfactory prosecution of the Work, or to conditions which in his opinion warrant such action; or for such time as is necessary by reason of failure on the part of the Contractor to carry out orders given, or to perform any or all provisions of the Contract. No additional compensation will be paid the Contractor because of any costs caused by such suspension, except when the suspension is ordered for reasons not resulting from any act or omission on the part of the Contractor. If it becomes necessary to stop Work for an indefinite period of time, the Contractor shall store all material in such manner that they will not obstruct or impede the traveling public unnecessarily or become damaged in any way, take every precaution to prevent damage or deterioration of the Work performed, provided suitable drainage of the roadway, and erect temporary structures where necessary. The Contractor shall not suspend Work without written authority from the Owner. (See also Section 7-15).

8-8 *DETERMINATION AND EXTENSION OF CONTRACT TIME FOR COMPLETION*

When the time for completion of the Work contemplated is specified in the Contract, it is understood that the completion of the Work within the time specified is an essential part of the Contract. If the Contractor finds it impossible to complete the Work within the time specified in the Contract, he may, at

any time prior to the last thirty (30) days of the Contract time specified, make written request to the Owner for an extension of Contract time. He shall set forth in full in his request the reasons, which he believes justify the granting of his request. If the Owner finds that the Work is delayed because of conditions beyond the control of the Contractor, or that the quantities of work done, or to be done, are in excess, he shall promptly grant an extension of time for completion, which appears reasonable and proper. The extended time for completion shall then be considered as in effect the same as if it were the original Contract time for completion.

8-9 FAILURE TO COMPLETE THE WORK ON TIME

Should the Contractor fail to complete the Work within the Contract time the Contractor shall be liable to the Owner in the amount shown in the following schedule of deductions, as liquidated damages, and not as a penalty, for each day of overrun in the Contract time or such extended time as may have been allowed.

SCHEDULE OF DEDUCTIONS FOR EACH DAY OF OVERRUN IN CONTRACT TIME

Original Contract Amount		Daily Charge	
From more than	To and Including	<u>Calendar Day</u>	<u>Work Day</u>
\$ 0	100,000	\$ 475	\$ 675
100,000	500,000	750	1,050
500,000	1,000,000	1,025	1,425
1,000,000	3,000,000	1,275	1,725
3,000,000	6,000,000	1,425	2,000
6,000,000	12,000,000	2,300	3,450
12,000,000	And over	5,800	8,125

8-10 DEFAULT ON CONTRACT

If the Contractor fails to begin the Work under Contract within the time specified, or fails to perform the Work with sufficient workmen and equipment or with sufficient materials to insure the completion of said Work within the Contract time, or shall perform the Work unsuitable, or shall neglect or refuse to remove materials or perform anew such Work as shall be rejected as defective and unsuitable, or shall discontinue the prosecution of the Work, or if the Contractor shall become insolvent or be declared bankrupt, or shall commit any act of bankruptcy or insolvency, or shall make an assignment for the benefit of creditors, the Owner shall give notice in writing to the Contractor and his surety of such delinquency, said notice to specify the corrective measures required.

If the Contractor, within a period of ten (10) days after said notice, shall not proceed in accordance therewith, the Owner shall have full power and authority to forfeit the rights of the Contractor and at its

option to call upon the surety to complete the Work in accordance with the terms of the contract, or it may take over the Work, including any or all materials and equipment on the ground as may be suitable and acceptable, and may complete the Work with his own forces, or may enter into a new agreement for the completion of said Contract according to the terms and provisions thereof, or use such other methods as, in its opinion, shall be required for the completion of said Contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under Contract, shall be deducted from the Contract amount. In case the expense so incurred by the Owner shall be less than the sum which would have been payable under the Contract if it had been completed by the Contractor, the Contractor shall be entitled to receive the difference subject to any claims for liens thereon in case such expense shall exceed the sum which would have been payable under the Contract, the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

8-11 *TERMINATION OF THE CONTRACTOR'S RESPONSIBILITY*

Whenever the Work called for by the Contract shall have been completely performed on the part of the Contractor and all parts of the Work have been approved and deemed to be in compliance with the Technical Plans and Specifications by the Engineer, according to the Contract, and the final estimate paid, the Contractor's obligations shall be considered fulfilled, except as set forth in his Bond, in Section 7-18 and his one-year guarantee, in Section 7-16.

SECTION 9. MEASUREMENT AND PAYMENT

9-1 MEASUREMENT OF QUANTITIES

All Work completed under the Contract will be measured by the Engineer according to United States Standard Measures. The method of measurement shall be described in the Specifications or the Special Provisions.

9-2 SCOPE OF PAYMENT

The Contractor shall receive and accept the compensation as herein provided, in full payment for furnishing all materials, labor, tools and equipment; for performing all Work contemplated and embraced under the Contract; for all loss or damage arising out of the nature of the Work or from action of the elements; for any unforeseen difficulties or obstructions which may arise or be encountered during the prosecution of the Work until its final acceptance by the Owner; for all risks of every description connected with the prosecution of the Work; also, for all such expenses incurred by or in consequence of suspension or discontinuance of such prosecution of the work as herein specified, or for any infringement of patents, trademarks, or copyrights, and for completing the Work in an acceptable manner according to the Contract Documents.

Contractor will be paid in cash and/or negotiable warrants at intervals, and in accord with the terms of the Contract. Except for subdivision contracts, the Owner will retain ten percent (10%) of each periodic payment until final completion and acceptance by the Owner of all Work included in the Contract.

The payment of any current estimate prior to final acceptance of the Work by the Owner shall in no way constitute an acknowledgment of the acceptance of the Work, nor in any way prejudice or affect the obligation of the Contractor, at his expense, to repair, correct, renew, or replace any defects or imperfections in the construction or in the strength or quality of the materials used in or about the construction of the Work under Contract and its appurtenances, nor any damage due or attributable to such defects, which defects, imperfections, or damage shall have been discovered on or before the final inspection and acceptance of the Work. Defects, imperfections, or damage, shall be determined by the Engineer observing the work for compliance with the Plans and Specifications, and the Contractor shall be liable to the Owner for failure to correct the same as provided herein.

9-3 INCREASED OR DECREASED QUANTITIES

Whenever the quantity of any item of Work as given in the Proposal shall be increased or decreased, payment shall be made on the basis of the actual quantity completed at the unit price for such item named in the Proposal, except as otherwise provided in Sections 4-3 or in the detailed specifications for each class of Work.

9-4 PAYMENT FOR EXTRA WORK

Extra Work which results from any of the changes as specified in Section 4-3 shall not be started, except in case of an emergency, until receipt of a written authorization or Work order from the Owner, which authorization shall state the items of work to be performed and the method of payment for each item. Work performed without such order will not be paid for.

Extra work will be paid for:

- A. Either at a lump sum price or at unit prices agreed upon by the Contractor and the Owner. (In case a Supplemental Agreement is signed between the Contractor and the Owner, the agreed prices pertaining thereto shall prevail).
- B. If acceptable to the Engineer, on the following force account basis:
 - 1. Labor. The Contractor will be paid the actual amount of wages for all labor and foreman in direct charge of the specific Work for each hour that said labor and foreman are actually engaged in such Work, to which cost shall be added twenty percent (20%) of the sum thereof.
 - 2. Bond, Insurance, Tax, Welfare Fund and other Payments. The Contractor will receive the actual cost of Contractor's bond, public liability and property damage insurance, workmen's compensation insurance, social security tax, welfare fund and other payments, if any, in accordance with agreements applicable to the Contract, required for force account work, to which no percentage shall be added. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such bond, insurance tax, welfare fund and other payments.
 - 3. Materials. The Contractor will receive the actual cost for all materials which are an integral part of the finished Work, including freight charges as shown by the original receipted bills, to which shall be added fifteen percent (15%) of the sum thereof.

The Contractor will be reimbursed for any materials used in the construction of the Work, such as sheeting, false work, form lumber, curing materials, etc., which are not an integral part of the finished Work. The amount of reimbursement shall be agreed upon in writing before such Work is begun, and no percent shall be added. The salvage value of such materials shall be taken into consideration in the reimbursement agreed upon.

4. **Equipment.** Machinery and equipment, which the Contractor has on the job for use on contract items, shall be used on extra Work as deemed necessary or desirable. The Contractor will be paid for all machinery and equipment used on extra work in accordance with the latest revision of "SCHEDULE OF AVERAGE ANNUAL EQUIPMENT OWNERSHIP EXPENSE WITH OPERATING COST" as issued by the Department of Transportation, State of Illinois, for the period that said machinery and equipment are in use on such Work, to which no percent shall be added. In the event that equipment is used which is not included in aforesaid publication, the latest edition of the "Compilation of Nationally Averaged Rental Rates for Construction Equipment" compiled by Equipment Distributors, 615 West 22nd Street, Oak Brook, Illinois 60521, shall be used to determine equipment rental rates and no percent shall be added to the rates indicated in such publication.

9-5 PAYMENT FOR SUBCONTRACTING, EXTRA WORK

Where an authorized subcontractor performs some or all of the Work qualifying as an Extra Work item and compensation is to be based on the terms of paragraph 9-4 (2), the cost of labor, bonds, material and equipment shall be the cost to the subcontractor on these items and an additional allowance to the prime Contractor of five percent (5%) of all costs as determined in paragraph 9-4 (2) shall be made in such instances.

9-6 PARTIAL PAYMENTS

Once each month, the Contractor will make an approximate estimate, in writing, of the materials in place complete, the amount of Work performed, and the value thereof, at the contract unit prices. From the amount so determined of completed work there shall be deducted ten percent (10%) to be retained until after the completion of the entire Work to the satisfaction of the Owner, and the balance certified to the Owner for payment.

In addition, an estimate may, at the discretion of the Owner and upon presentation of receipted bills and freight bills, be made for payment of the value of acceptable non-perishable materials delivered at the Work site or in acceptable storage places and not used at the time of such estimate. The care and storage of such material shall be the Contractor's responsibility. In the absence of receipted bills, an estimate may, at the request of the Contractor and at the discretion of the Owner, be made for payment of the value of materials in acceptable storage places and not used at the time of the estimate, but in such an event payment shall be made of such amounts by a check requiring the endorsement of both the Contractor and materials supplier. Endorsement of such a check by the material supplier shall be construed a waiver of lien for the cost of materials covered by the check. Such materials, when so paid for by the Owner, shall become the property of the Owner, and in the event of default on the part of the Contractor, the Owner may use or cause to be used such materials in the construction of the Work.

provided for in the Contract. The amount thus paid by the Owner shall be deducted from estimates due the Contractor as the material is used in the Work.

9-7 ACCEPTANCE AND FINAL PAYMENT

Whenever the Work provided for by the Contract shall have been completely performed on the part of the Contractor, and all parts of the Work have been deemed to be in substantial compliance with the Plans and Specifications by the Engineer and accepted by the Owner, a final estimate showing the value of the Work will be prepared by the Engineer as soon as the necessary measurements and computations can be made, all prior estimates upon which payments have been made being approximate only and subject to correction in the final payment. The amount of this estimate, less any sums that have been deducted or retained under the provisions of the Contract, will be paid to the Contractor as soon as practicable after the final acceptance, provided the Contractor has furnished to the Owner satisfactory evidence that all sums of money due for any labor, materials, apparatus, fixtures, or machinery furnished for the purpose of such Work have been paid or that the person or persons to whom the same may be due have consented to such final payment.

Neither the final payment on this contract by the Owner nor any provisions in the contract documents shall relieve the Contractor of the responsibility for negligence in the furnishing and installation of faulty materials or for faulty workmanship which shows up within the extent and period provided by law or within the guarantee period of one (1) year from final acceptance of the work performed under this Contract, whichever is greater, nor of the responsibility of remedying such faulty workmanship and materials.

The acceptance by the Contractor of the final payment shall constitute a release and waiver of all claims by the Contractor except those previously made and still unsettled.

9-8 OWNER'S RIGHT TO WITHHOLD CERTAIN AMOUNTS

The Owner may withhold, in addition to retained percentages, from payment to the Contractor, such an amount or amounts as may be necessary to cover:

- A. Payments that may be earned or due for just claims for labor and materials furnished in and about the Work.
- B. For defective Work not remedied.
- C. For failure of the Contractor to make proper payments to his subcontractors.
- D. For reasonable doubt that the contract can be completed for the balance then unpaid.

The Owner will disburse and shall have the right to act as agent for the Contractor in disbursing such funds as have been withheld pursuant to this paragraph to the party or parties who are entitled to payment therefrom. The Owner will render to the Contractor a proper accounting of all such funds disbursed in behalf of the Contractor.

The Owner also reserves the right, even after full completion and acceptance of the Work, to refuse payment of the final ten percent (10%) due the Contractor, until it is satisfied that all subcontractors, material suppliers, and employees of the Contractor have been paid in full.

9-9 RELEASE OF CLAIMS AND LIENS

Neither the final payment nor any part of the retained percentage shall become due until the Contractor shall deliver to the Owner a complete release of all claims or liens arising out of this contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he has knowledge or information the release and receipts include all the labor and materials for which a lien or claim could be filed; but the Contractor may, if a subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner to indemnify the Owner against any claim or lien (in cases where such payment is not already guaranteed by surety bond). If any claim or lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

DIVISION II

Technical Specifications

EXCAVATION AND CLEANUP

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SECTION 1. EXCAVATION AND BACKFILL FOR UNDERGROUND CONDUITS

1-1 DESCRIPTION

For the purpose of this section, underground conduits shall be considered sewer pipe, water main or any other pipe conduit indicated on the Plans. Wherever the term "pipe" or "pipe line" is used, it shall mean underground conduit.

Excavation and backfill shall include all excavation, backfilling, compacting, disposal of surplus material, restoration of all disturbed surface, and all other work incidental to the construction of trenches, including any additional excavation which may be required for manholes or other structures forming a part of the pipe line.

1-2 CONSTRUCTION DETAILS

1-2.01 SURFACE REMOVAL AND TOPSOIL PRESERVATION

Along the proposed pipe lines as indicated on the Plans, the Contractor shall remove the surface materials only to such widths as will permit a trench to be excavated which will afford sufficient room for proper efficiency and proper construction. Where sidewalks, driveways, pavements and curb and gutter are encountered, care shall be taken to protect such against fracture or disturbance beyond reasonable working limits. In areas specified on the Plans, topsoil suitable for final grading and landscaping shall be piled separately in locations approved by the Owner and preserved so that it may be restored after the remainder of the backfill is replaced.

1-2.02 WIDTH OF EXCAVATION

- A. The bottom width of the trench at and below the top of the pipe and inside the sheeting and bracing, if used, shall be in accordance with Section 550.04 of the Standard Specifications, unless otherwise noted.

Note: The strength or class of pipe shall be as indicated on the Plans.

- B. Trench sheeting and bracing or a trench shield shall be used as required by the rules and regulations of O.S.H.A. The Engineer shall not be responsible for determining whether the contractor is in compliance with this provision. The bottom of the trench excavation shall conform to the details shown on the Plan.
- C. If these trench widths are exceeded without the written permission of the Engineer, the pipe shall be installed with a concrete cradle or with concrete encasement or a stronger pipe than originally specified shall be used as approved by the Engineer.

1-2.03 EXCAVATION BELOW GRADE

In cases where the excavation is carried beyond or below the lines and grades given by the Engineer, the Contractor shall, at his own expense, refill all such excavated space with suitable granular material.

1-2.04 ROCK EXCAVATION

A. GENERAL

Wherever "rock" is used as the name of an excavated material, it shall mean boulders or pieces of rock, concrete, or masonry measuring one-half (1/2) cubic yard or more, hard shale or solid ledge rock and masonry which requires for its removal the continuous use of pneumatic tools or drilling and blasting.

Before payment is allowed for "Rock Excavation", the Contractor shall be required to demonstrate the material cannot be removed "by hand pick" or by power operated excavator or shovel. No payment will be made for Rock Excavation unless air tools or explosives were used by the Contractor. No payment will be made for "Rock Excavation" unless the Engineer approves such payment in writing in advance upon being satisfied that the material meets the above criteria.

B. MEASUREMENT FOR PAYMENT

Where "Rock Excavation" is to be measured for payment, quantities will be determined by the Engineer. Rock required to be removed shall be computed by the cubic yard. Width for pay purposes shall be the measured width of rock removed, but shall not exceed the width specified in Section 550.04 of the Standard Specifications, plus any sheeting and bracing if required. Depth for pay purposes shall be the difference in elevation between the top and bottom of the rock as determined by the Engineer. Where rock is encountered in the bottom of the trench, the maximum depth for payment purposes will be six inches (6") below the bottom of the pipe. Where the proposal does not contain a pay item for "Rock Excavation", the additional cost of rock removal as defined by the specifications shall be paid on extra work basis. (Division I, Section 9-4).

C. PAYMENT

Payment shall be made at the Contract unit price per cubic yard of "Rock Excavation". These prices shall be full compensation for furnishing all materials; for all preparation, excavation and disposal of rock; and for all labor, equipment, tools and incidentals necessary to complete the item.

1-2.05 SUBSURFACE EXPLORATION

All information available to the Owner, if any, on subsurface exploration will be made available for examination by prospective Bidders. However, it is understood and agreed that the Owner shall in no way be held responsible for interpretation of this information, its accuracy or its thoroughness. Prospective Bidders shall make such subsurface explorations as they believe necessary to verify and supplement information received from the Owner.

1-2.06 EXPLORATORY EXCAVATION

A. GENERAL

Whenever, in the opinion of the Engineer, it is necessary to explore an excavate in advance of the Work to determine the best line and grade for the construction of the proposed pipe line, the Contractor shall make explorations and excavations for such purposes.

B. PAYMENT

The cost of such excavation will be paid at the contract unit price per foot for "Exploration Trench", or if no Bid Item is included, on an extra work basis.

1-2.07 BRACED AND SHEETED TRENCHES

A. GENERAL

Open-cut trenches shall be sheeted and braced or otherwise protected as required by any governing Federal or State laws and municipal ordinances, and as may be necessary to protect life, property, or the Work. In any event, the minimum protection shall conform to the recommendations in the Occupational Safety and Health Act Standards for Construction (OSHA). A sand box or trench shield may be used in lieu of sheeting as permitted by OSHA. When close-sheeting is used, it shall be so driven as to prevent adjacent soil from entering the trench either below or through such sheeting. Tight sheeting shall be used in that portion of the excavation in or along state and county highways below the intersection of a 1 to 1 slope line from the nearest face of the excavation to the edge of the pavement.

Where sheeting and bracing are used, the trench width shall be increased accordingly. The sheeting will be driven to the full depth of work, or to a depth where the soil has the stability necessary to meet the OSHA standards, whichever is lower. The shallower depth of required sheeting may be established by soil boring and analysis, to be performed at the Contractor's sole cost. The owner shall have the right of consent in the selection of the soils engineer for the sampling and analysis. This provision shall not relieve the contractor, in any degree, from his responsibilities under the contract.

Sheeting and bracing, which are required to be left in place shall be cut off at the specified elevation. Trench bracing, except that specified to be left in place, may be removed when the backfilling reaches the said bracing's level. All sheeting except that required to be left in place may be removed as the excavation is refilled, in such a manner as to avoid bank cave-in(s) or disturbance to the adjacent area(s) or structure(s). The voids left by the withdrawal of the sheeting shall be carefully filled by jetting, vibrating, ramming or other satisfactory means.

B. PAYMENT

Payment for sheeting and bracing, and all other Work incidental to sheeting and bracing, shall not be made separately but shall be included in the Contract price for the pipe size, except when ordered left in place.

Payment for timber sheeting left in place when shown on the plans or directed by the Engineer shall be made at the Contract unit price per 1,000 board feet of "Timber Sheeting Left in Place."

Payment for steel sheet piling when specified shall be made at the Contract unit price per square foot for "Steel Sheet Piling."

Payment for steel sheet piling left in place when shown on the plans or directed by the Engineer shall be made at the Contract unit price per square foot for "Steel Sheet Piling Left in Place."

1-2.08 TRENCHES WITH SLOPING SIDES, LIMITED

The Contractor may, at his option, where working conditions and right-of-way permit, excavate pipe line trenches with sloping sides, but with the following limitations:

- A. In general, only braced and vertical trenches will be permitted in traveled streets, alleys or narrow easements.
- B. Where trenches with sloping sides are permitted, the slopes shall not extend below the top of the pipe, and trench excavations below this point shall be made with vertical sides with widths not exceeding those specified hereinbefore for the various sizes of pipe.

1-2.09 SHORT TUNNELS

In some instances, trees, fire hydrants, sidewalks and other obstructions may be encountered, the proximity of which may be a hindrance to open-cut excavation. In such cases, the Contractor shall excavate by means of short tunnels in order to protect such obstructions against damage. Where such obstructions are shown on the Plans, short tunnel work shall be considered incidental to the construction of the pipe line and shall not be grounds for extra payment or payment for tunnel work. Where such obstructions are not shown on the Plans, payment will be at the Contract unit price or as extra work in accordance with Division I, Section 9-4.

1-2.10 PILING EXCAVATION MATERIAL

All excavated material shall be stockpiled to avoid obstructing streets, sidewalks and driveways. Excavated material suitable for backfilling shall be stockpiled separately on the site. No material shall be placed closer than 2'0" to the edge of an excavation. Fire hydrants under pressure, valve pit covers, valve boxes, curb top boxes, or other utility controls shall be left unobstructed and accessible until the Work is completed. Gutters shall be kept clear or other satisfactory provisions made for street drainage. Natural watercourses shall not be obstructed or polluted. Surplus material and excavated material unsuitable for backfilling shall be transported and disposed of off the site in disposal areas obtained by the Contractor.

1-2.11 REMOVAL OF WATER

The Contractor shall at all times during construction provide and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the excavations or other parts of the Work until all Work to be performed therein has been completed. No sanitary sewer shall be used for disposal of trench water, unless specifically approved by the Engineer and then only if the trench water does not ultimately arrive at existing pumping or sewage treatment facilities. No water containing settle able solids shall be discharged into storm sewers.

1-2.12 BLASTING

Blasting for excavation will be permitted only after securing the approval of the Owner and only when proper precautions are taken for the protections of persons and property. The hours of blasting will be reviewed by the Owner. Any damage caused by blasting shall be repaired by the Contractor at his expense. The Contractor's methods of procedure in blasting shall conform to Federal and State laws and municipal ordinances and O.S.H.A. rules and regulations. The Engineer shall not be responsible for determining whether the contractor is in compliance with these rules and regulations.

1-2.13 SAFETY

A. BARRICADES, GUARDS AND SAFETY PROVISIONS

To protect persons from injury and to avoid property damage, adequate barricades, construction signs, lights and guards as required shall be placed and maintained by the Contractor at his expense during the progress of the construction Work and until it is safe for traffic to use the roads and streets. All material piles, equipment and pipe which may serve as obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor. The rules and regulations of O.S.H.A. and appropriate authorities respecting safety provisions shall be observed. The Engineer shall not be responsible for determining whether the contractor is in compliance with these rules and regulations.

B. STRUCTURE PROTECTION

Temporary support, adequate protection and maintenance of all underground and surface structures, drains, sewers and other obstructions encountered in the progress of the Work shall be furnished to the Contractor at his expense. Any structures which may have been disturbed shall be restored upon completion of the Work.

C. PROTECTION OF PROPERTY AND SURFACE STRUCTURES

Trees, shrubbery, fences, poles and all other property and surface structures shall be protected during construction operations unless their removal for purposes of construction is authorized by the Engineer. Any fences, poles, or other man-made surface improvements which are moved or disturbed by the Contractor shall be restored to the original conditions, after construction is completed, at the Contractor's expense. Any trees, shrubbery or other vegetation which are approved for removal or ordered for removal by the Engineer in order to facilitate construction operations shall be removed completely, including stumps and roots, by the Contractor. Responsibility for any damage or claims for damage caused by construction operations to shrubbery or other landscape improvements which were not authorized for removal by the Engineer shall be assumed by the Contractor.

1-2.14 DEVIATIONS OCCASIONED BY STRUCTURES OR UTILITIES

Wherever obstructions are encountered during the progress of the Work and interfere to such an extent that an alteration in the plan is required, the Engineer shall have the authority to change the Plans and order a deviation from the line and grade or arrange with the owners of the structures for the removal, relocation or reconstruction of the obstructions. Where gas, water, telephone, electrical, hot water, steam, or other existing utilities are an impediment to the vertical or horizontal alignment of the proposed pipe line, the Engineer shall order a change in grade or alignment or shall direct the Contractor to arrange with the owners of the utilities for their removal.

1-2.15 INTERRUPTION TO UTILITIES

The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures may be determined. Prior to proceeding with trench excavation, the Contractor shall contact all utility companies in the area to aid in locating their underground services.

The Contractor shall take all reasonable precautions against damage to existing utilities. However, in the event of a break in an existing water main, gas main, sewer or underground cable, he shall immediately notify the responsible official of the organization operating the utility interrupted. The Contractor shall lend all possible assistance in restoring services and shall assume all cost, charges, or claims connected with the interruption and repair of such services if the location of said utility was marked by the owner thereof prior to excavation.

1-2.16 MAINTENANCE OF TRAFFIC AND CLOSING OF STREETS

The Contractor shall carry on the Work in a manner which will cause a minimum of interruption to traffic, and may close to through travel not more than two consecutive blocks, including the cross street intersected. Where traffic must cross open trenches, the Contractor shall provide suitable bridges at street intersections and driveways. The Contractor shall post suitable signs indicating that a street is closed and necessary detour signs for the proper maintenance of traffic. Prior to closing of any streets, the Contractor shall notify responsible municipal authorities at least five (5) days in advance of the starting of the Work, unless otherwise approved by the municipality.

1-2.17 CONSTRUCTION IN EASEMENTS

In easements across private property, the Contractor shall confine all operations in the easement area and shall be responsible and liable for all damage outside of the easement area. Trees, fences, shrubbery or other type of surface improvements located in the easements will require protection during construction. The provisions of Section 1-2.14C above shall apply to all easement areas as well as to public right-of-way. Precautions shall be taken by adequate sheeting or other approved method to prevent any cave-in or subsidence beyond the easement limits or damage to improvements within the easement. In general, the easement area is intended to provide reasonable access and working area for efficient operation by the Contractor. Where easement space for efficient operation is not provided, the Contractor shall be responsible for organizing his operations to perform within the restrictions shown on the Plans. The Owner shall make available to the Contractor a copy of the construction easements.

1-2.18 UNDERGROUND CONDUIT CONSTRUCTED IN TUNNEL

A. GENERAL

Where shown on the plans or where specifically authorized by the Engineer, pipe lines shall be constructed in tunnel. This work will be made in accordance with requirements of any permits obtained by the Owner from railroads or state or county highway departments for tunnel work or in accordance with the following paragraph.

B. MATERIALS

Pipe materials shall be as shown on the Plans or as described in the Special Provisions.

C. EXCAVATION AND LAYING

Requirements for excavation and laying and for joints shall be those applicable for the type of pipe line involved, unless otherwise specified.

Before starting excavations for tunnel shafts or jacking or augering pits, the Contractor shall submit drawings of proposed sheeting and bracing arrangements which have been prepared, signed and sealed by a structural Engineer registered in the State of Illinois for Work in Illinois and by a structural Engineer registered in the State of Indiana for Work in Indiana.

An adequate ventilation system shall be provided to properly ventilate all parts of the tunnel.

D. METHODS OF CONSTRUCTION

1. The tunnel shall be only of sufficient width and height to provide free working space. The sides and roof of the tunnel shall be braced sufficiently to support the external loads and to prevent caving, bulging, and settlement of the earth.
2. The Contractor shall backfill all tunnels with well compacted sand, fine gravel or stone screenings as rapidly as the conditions permit.
3. The backfill material shall be deposited in the tunnel in such a manner as not to injure or disturb the pipe. The filling of the tunnel shall be carried on simultaneously on both sides of the pipe in such a manner that injurious side pressures do not occur. Special care shall be taken to compact the backfill under the haunches of the pipe. The remainder of the tunnel, or such portion of the remainder as may be possible, shall then be backfilled by one of the following methods, at the option of the Contractor.
 - a. The material shall be deposited in uniform layers not to exceed twelve inches (12") thick (loose measure) and such layer either inundated or deposited in water.

- b. The tunnel shall be backfilled with loose material or only partly backfilled at a time, if necessary, and settlement secured in either case by introducing water through holes jetted into the material to a point approximately two feet (2') above the top of the pipe.
4. If neither of the above methods is practicable or can be used for only a portion of the backfill, the remainder of the tunnel shall be completely backfilled with material carefully deposited in uniform layers and each layer compacted by ramming or tamping with appropriate tools.
5. When sheeting and bracing have been used, sufficient bracing shall be left across the trench as the backfilling progresses to hold the sides and top firmly in place without caving or settlement before the backfilling has been placed. This bracing may be removed as soon as practicable.
6. Any depressions which may develop within the area involved in the construction operations due to settlement of the backfilling material shall be filled.

E. *USE OF CASING PIPE*

The Contractor may use metal casing pipe as a tunnel liner in place of timber shoring for tunnel sections. The design data for such pipe, including, but not necessarily limited to, the diameter, gauge, type of pipe, method of placing and installation will be submitted for the owner's review. The void space between tunnel liners or casing pipe and the carrier pipe shall be filled with compacted sand or other approved material.

F. *JACKING OR BORING OF PIPE*

The Contractor may, subject to the approval of the Owner, use special cast iron or specially designed reinforced concrete jacking pipe jacked and/or bored into position with or without tunnel liners, for tunneled sections pipe.

G. *MEASUREMENT AND PAYMENT*

Underground conduit constructed in tunnel will be paid for at the unit prices Bid for "Underground Conduit Constructed in Tunnel" for the various type and sizes for the actual length of tunnel Work. Payment shall include all labor, materials and equipment necessary to construct the conduit and tunnel, complete in place, including excavation and backfill, shoring and bracing, furnishing and laying casing pipe where required and carrier pipe, and all other Work necessary for a complete installation.

1-2-19 SANITARY SEWERS

A. GENERAL

The methods of excavating and backfilling sanitary sewer pipe shall be in compliance with the latest edition of the Illinois Department of Transportation, "Standard Specifications for Road and Bridge Construction", and the Metropolitan Water Reclamation District of Greater Chicago, "Manual of Procedure", latest revision. Where there is a conflict of these specifications, the MWRDGC, "Manual of Procedure" shall be used.

B. MATERIAL

Pipe material shall be as shown on the Plans or as described in the Special Provisions. No substitution of material shall be made without written approval from the Owner.

C. EXCAVATION AND BEDDING

The trench shall be excavated to an elevation to allow for the following bedding.

Bedding, other than concrete embedment, shall consist of gravel, crushed gravel, crushed stone or crushed slag, 1/4" to 1" in size. As a minimum, the material shall conform to the requirements of Article 1004.01 of the State Specifications or ASTM Designation C-33. The gradation shall conform to Section 1004, gradation CA 11 or CA 13 or to ASTM Gradation No. 67. The pipe shall be laid so that it will be uniformly supported and the entire length of the pipe barrel will have full bearing. No blocking of any kind shall be used to adjust the pipe to grade except when used with embedment concrete. Bedding shall be required for all sewer construction, except ductile iron pipe, and shall be of a thickness equal to 1/4 of the outside diameter of the sewer pipe with a maximum thickness of eight inches (8") but shall not be less than four inches (4").

Where unsuitable material is encountered at the grade established, all such unsuitable soil shall be removed under the pipe and for the width of the trench, and shall be replaced with well compacted bedding material, to the satisfaction of the Engineer.

Where rock is encountered, it shall be removed below grade and replaced with a cushion of well compacted bedding material having a thickness under the pipe of not less than eight inches (8").

The cost of furnishing, placing and compacting bedding material will be considered as incidental work and no additional compensation will be allowed.

D. BACKFILLING

The backfilling of the sanitary sewer pipe trench shall be the same as for storm sewer pipe described in Section 550.07 of the Standard Specifications.

E. METHOD OF MEASUREMENT

The method of measurement shall be the same as for storm sewer pipe described in Section 550.09 of the Standard Specifications except measurements will be made to the center of manholes.

F. BASIS OF PAYMENT

This work will be paid for at the Contract unit price per foot for "Sanitary Sewer" of the type and diameter specified and measured as specified.

"Trench Backfill", when specified, will be measured and paid for at the Contract unit price per foot unless otherwise stated in the Special Provisions or contract documents.

1-2.20 WATER MAINS

A. GENERAL

The method of excavating and backfilling water mains shall be in compliance with the latest edition of the Illinois Department of Transportation, "Standard Specifications for Road and Bridge Construction," and those below.

B. MATERIAL

Pipe material shall be as shown on the Plans or as described in the Special Provisions. No substitution of material shall be made without written approval of the Owner.

C. EXCAVATION AND BEDDING

The trench shall be excavated to an elevation to allow the minimum cover over the pipe as called for on the plans. Provision must be made by the Contractor to allow for any future cuts to be made to the ground over the pipe to assure that the minimum cover is maintained.

Bedding as described in Section 1-2.21C for sanitary sewers shall be required for all water mains, except ductile iron pipe that requires no bedding. The method of bedding for unsuitable material and where rock is encountered shall also comply with the conditions of that Section.

The cost of furnishing, placing and compacting bedding material will be considered as incidental work and no additional compensation will be allowed.

D. BACKFILLING

The backfilling of the water main pipe shall be the same as for storm sewer pipe as described in Section 550.07 of the Standard Specifications except that the moist fine aggregate backfill to the elevation of the center of the pipe will not be required for ductile iron pipe. For PVC or any other type of pipe, the moist fine aggregate shall be

brought to a level 12" above the top of the pipe and it shall be compacted as described in that Section.

E. METHOD OF MEASUREMENT

"Water main" pipe of the different types and diameters will be measured by the lineal foot in place.

Unless they are listed as separate Bid items, the water main item shall include all fittings required and all other material, except trench backfill within the specified trench.

F. BASIS OF PAYMENT

This work will be paid for at the Contract unit price per lineal foot for "Water main" of the type and diameter specified and measured as specified.

"Trench Backfill", when specified, will be measured and paid for at the Contract unit price per foot, unless otherwise specified in the special provisions or contract documents.

SECTION 2. RESTORATION OF SURFACES

2-1 GENERAL

Restoration of surfaces shall include the removal of the existing surface, the disposal of surplus material, and the construction of new surfaces as indicated on the plans or Special Provisions. The type of surface restoration required shall be shown on the Plans or described in the Special Provisions.

2-2 CONSTRUCTION DETAILS

2-2.01 TEMPORARY SURFACE OVER TRENCH

Wherever conduits are constructed under traveled roadways, driveways, sidewalks, or other traveled surfaces, a temporary surface shall be placed over the top of the trench as soon as possible after compaction, as specified above, has been satisfactorily completed. The temporary surface shall consist of a minimum of six inches (6") of coarse aggregate conforming to the current specifications of the State Specifications for Grade No. CA-9 or CA-10. The top of the temporary surface shall be smooth and meet the grade of the adjacent undisturbed surface. The temporary surface shall be maintained at the Contractor's expense until final restoration of the street surface is completed, unless specific items for temporary aggregate is specified. No permanent restoration of street surface shall be initiated until authorized by the Engineer.

2-2.02 REMOVAL OF PAVEMENT, SIDEWALK, DRIVEWAY AND CURB

Wherever the pipe is located along or across an improved surface, the width of the trench shall be held as nearly as possible to the maximum width specified in Section 1-2.02. Where brick or concrete pavement, sidewalk, driveway or curbing is cut, the width of the cut shall exceed the actual width of the top of the trench by twelve inches (12") on each side or a total of two feet (2'). Exposed surfaces of portland cement or asphaltic concrete shall be cut with a pavement saw before breaking. Care shall be taken in cutting to insure that a straight joint is sawed.

2-2.03 REPLACEMENT OF PERMANENT TYPE PAVEMENT, SIDEWALKS, DRIVEWAYS, CURBS, GUTTERS AND STRUCTURES.

The Contractor shall restore (unless otherwise specified or ordered by the Engineer) all permanent type pavements, sidewalks, driveways, curbs, gutters, shrubbery, fences, poles and other property and surface structures removed or disturbed during or as a result of construction operations to a condition which is equal in appearance and quality to the condition that existed before the Work began. The surface of all improvements shall be constructed of the same material and match in appearance the surface of the improvement which was removed. Where trench backfill is used, the restoration shall be made as soon as possible after jetting of the backfill has been completed.

2-2.04 REPLACING EXISTING TEMPORARY STREET AND ALLEY SURFACES

A. GENERAL

For the purpose of this specification, all existing street and alley surfaces shall be considered temporary except:

(1) concrete or brick pavements; (2) an asphaltic concrete or a bituminous treated surface over a soil cement, concrete, crushed stone or selected gravel base. Specifically included as temporary street surfaces, shall be compacted earth, cinders, shale, mixtures of gravel and earth or crushed stone and earth, whether or not these respective materials are further stabilized by road oil or bituminous surface treatment. This work should not be confused with Temporary Surface Over Trench as specified in Section 2-2.01.

Where conduits are constructed under temporary street or alley surfaces, or where such surfaces are used for the placement of backfill material or are disturbed by construction operations, the Contractor shall reconstruct, by grading and shaping, the entire width of roadway, and any drainage facilities which may have existed, to the original condition at the Contractor's expense, including that portion within the specified trench width where removal and restoration is paid for under a separate payment item.

Where, in the opinion of the Engineer, the conduit is located in the traveled portion of the temporary street or alley traveled surface, a new temporary surface shall be constructed over the trench, as specified in Section 2-2.01 of this Division. After this surface has been placed, it shall be maintained by the Contractor until final restoration is authorized. Just prior to final restoration, the entire width of the street to be restored shall be scarified. For final surface restoration, the Contractor shall apply a bituminous treatment to the entire width of the traveled surface, as ordered by the Engineer. The bituminous treatment shall consist of the application of a bituminous prime coat and a bituminous surface treatment corresponding to the materials and construction methods described in the State Specifications for bituminous surface treatment, Class A-1, A-2, or A-3 as specified, or shown in the bid items.

The Engineer reserves the right to order the omission of Bituminous Surface Treatment in any locations where such omission may be, in his opinion, in the public interest.

B. MEASUREMENT

Measurement for purposes of payment shall be computed by using the actual length and width of surface to which treatment is applied, in accordance with these Specifications.

C. PAYMENT

The cost of final restoration of the surface shall be paid for at the contract unit price per foot, unless so stated in the Special Provisions or for all State of Illinois projects, for "Bituminous Surface Treatment", of the type specified. Such price shall include the cost of all labor and materials necessary to provide the bituminous treatment as specified.

2-2.05 DISPOSAL OF SURPLUS EXCAVATED MATERIAL

Surplus excavated material not needed for backfill shall be promptly removed from the site to locations provided by the Contractor. The cost of removal and disposal of surplus excavated materials will be included in the respective unit prices for pipeline or conduit construction and no additional payment will be allowed therefor.

2-2.06 CLEANING UP

All surplus materials and all tools and temporary structures shall be removed from the site by the Contractor. All dirt, rubbish and excess earth from the excavation shall be hauled to a dump provided by the Contractor and the construction site left clean and acceptable to the Owner at the earliest possible date.

SECTION 3. FINISHING AND CLEAN UP FOR UNDERGROUND CONDUITS

3-1 CLEAN UP

Before acceptance of underground conduits construction, all pipes, manholes, catch basins, fire hydrants and other appurtenances shall be cleaned of all debris and foreign material.

After all backfill has been completed, the ground surface shall be shaped to conform to the contour of adjacent surfaces. General clean up of the entire construction area shall otherwise conform to applicable requirements specified.

DIVISION II

Technical Specifications

SANITARY SEWER AND FORCE MAIN

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SECTION 1. PIPE MATERIAL FOR SEWERS

1-1 DESCRIPTION

Pipe used in sanitary sewer construction, unless otherwise specified, shall be Polyvinyl Chloride Pipe (PVC) or Ductile Iron Pipe (DIP). All sanitary sewer pipe shall have flexible gasketed joints unless otherwise specified.

The Contractor shall only use the sewer pipe material specified on the Plans unless he receives written permission from the Engineer to substitute one of the other materials mentioned herein. No verbal approval, regardless of the source, will be recognized for changing the pipe material, class or type of joint.

1-2 GENERAL

Where reference is made to an ASTM or ANSI designation, it shall be the latest revision at the time of call for Bids, except as noted on the Plans or in the Special Provisions.

CERTIFICATION shall be the responsibility of the pipe manufacturer to certify that pipe and joint material furnished is capable of withstanding the infiltration or exfiltration basis as specified or required, if properly installed.

1-3 MATERIALS

1-3.01 PIPE MATERIALS

The type, class and strength of pipe to be used shall be as shown on the Plans or described in the Special Provisions.

A. DUCTILE IRON PIPE AND FITTINGS

Ductile Iron Pipe shall conform to ANSI A 21.51 (AWWA C-151), Class 52 designed per ANSI A 21.50 (AWWA C-150), tar (seal) coated and/or cement lined per ANSI A 21.4 (AWWA C-104), with mechanical or rubber ring (slip seal or push on) joints. Ductile Iron fittings shall conform to ANSI/AWWA C110 for mechanical, push-on or flanged joints. Cement-mortar and/or tar (seal) coat per ANSI A 21.4 (AWWA 104) and as specified.

B. POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

Polyvinyl Chloride pipe (PVC) and fittings shall conform to ASTM F 679 or ASTM D 3034, except that it shall be made of PVC plastic having a minimum cell classification of 12454B.

1-3.02 JOINT MATERIALS

The type of joint materials to be used shall be as shown on the Plans or described in the Special Provisions.

JOINTS FOR SANITARY SEWERS

- A. Polyvinyl Chloride (PVC) pipe joints shall conform to ASTM D 2855 for solvent joints or ASTM D 3212 for gasket joints.
- B. Ductile iron pipe (DIP) joints shall conform to American National Standard C111/A21.50-90 for Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

1-3.03 FITTINGS

Unless otherwise specified, tee fittings shall be provided in the sanitary sewer main for service sewer connections; a log of all tee fitting locations shall be kept by the Contractor during installation and one legible copy of each such log shall be turned over to the Owner prior to completion. Tees shall be six inches (6") inside diameter, unless otherwise specified or noted. All fittings shall be of the same material as the pipe. Material joining the fitting to the pipe shall be free from cracks and shall adhere tightly to each joining surface.

1-3.04 CAP FOR FITTINGS

All fittings shall be capped with a plug of the same material as the pipe, and gasketed with the same gasket material as the pipe joint, or be of material approved by the Engineer. The plug shall be secured to withstand test pressures specified herein.

SECTION 2. PIPE LAYING, JOINTING AND TESTING OF SEWERS

2-1 CONSTRUCTION DETAILS

2-1.01 SEWER PIPE LAYING

Laying of sewer pipe shall be accomplished to line and grade in the trench only after it has been dewatered and the foundation and/or bedding has been prepared in accordance with Division II, Excavation and Cleanup. Mud, silt, gravel and other foreign material shall be kept out of the pipe and off the jointing surfaces.

Variance from established line and grade shall not be greater than one thirty-second of an inch ($1/32''$) per inch of pipe diameter and not to exceed one-half inch ($1/2''$), provided that any such variation does not result in a level or reverse sloping invert; provided also that variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed one sixty-fourth of an inch ($1/64''$) per inch of pipe diameter, or one-half inch ($1/2''$) maximum.

The sewer pipe, unless otherwise approved by the Engineer, shall be laid upgrade from point of connection on the existing sewer or from a designated starting point. The sewer pipe shall be installed with the bell end forward or upgrade, unless approved otherwise. When pipe laying is not in progress, the forward end of the pipe shall be kept tightly closed with an approved temporary plug.

A. SEWER PIPE AND WATER MAIN SEPARATION

Sanitary sewers, house sewers or storm drains that are laid in the vicinity of pipe lines designated to carry potable water shall meet the following conditions as set forth in Division II, Water Distribution, Section 2-2.01.

B. SEWER MANHOLES

Sewer manholes shall be constructed so that no water pipe is in contact with or enclosed by any part of a sewer or sewer manhole. See also Division II, Water Distribution, Section 2-2.01.

2-1.02 DEWATERING

Dewatering sufficient to maintain the water level twelve inches (12") below the surface of the trench bottom or base of the bedding course, shall be accomplished prior to pipe laying and jointing, if not prior to excavation and placing of the bedding as called for in other sections of the Specifications or Special Provisions. The dewatering operation, however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the trench. The normal water table shall be restored to its natural level in such a manner as to not disturb the pipe and its foundation

2-1.03 BEDDING

The pipe bedding shall be placed so that the entire length of the pipe will have full bearing. No blocking of any kind shall be used to adjust the pipe to grade except when used with concrete encasement.

2-1.04 PLUGS AND CONNECTIONS

Plugs for pipe branches, stubs or other open ends which are not to be immediately connected shall be made of an approved material and shall be secured in place with a joint comparable to the main line joint. Stoppers may be of an integrally cast breakout design.

2-1.05 PIPE MARKINGS

All pipe shall have a homing mark on the spigot provided by the manufacturer.

2-1.06 PIPE JOINTING

Type of joint to be used will conform to the requirements of Section 1-3.02.

All pipe and jointing for sanitary sewers shall be subject to the tests specified in Section 2-1.09.

A. GASKET TYPE JOINTS

All extensions, additions and revisions of a sanitary sewer system, unless otherwise indicated in the Special Provisions, shall be made with sewer pipe jointed by means of a flexible gasket which shall be fabricated and installed in accordance with the specifications that follow. When gaskets are placed on the pipe in the field, the surfaces on which the gasket seats must be thoroughly cleaned. The gasket, lubricated according to the manufacturer's instructions, is placed on the pipe.

Pipe handling after the gasket has been affixed shall be carefully controlled to avoid disturbing the gasket and knocking it out of position or loading it with dirt or other foreign material. Any gaskets so disturbed shall be removed and replaced, cleaned and relubricated if required, before the jointing is attempted.

Care shall be taken to properly align the pipe before joints are entirely forced home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned.

Sufficient pressure shall be applied in making the joint to assure that it is home, as described in the installation instructions provided by the pipe manufacturer. Sufficient restraint as specified in Section 2-1.02 shall be applied to the line to assure that joints once home are held so, until fill material under and alongside the pipe has been sufficiently compacted. At the end of the work day, the last pipe laid shall be blocked in an effective way to prevent creep. The pipe shall be closed with a suitable "night cap".

Pipe required to be laid on curved alignment shall be joined in straight alignment and then be deflected, joint by joint. Special care shall be taken in blocking the pipe just previously laid, by tamped fill or otherwise to resist the misaligning forces generated during compression of the joints being made.

B. JOINTING OF DISSIMILAR PIPES

Suitable adaption couplings shall be specified in the Special Provisions for the jointing of dissimilar pipes. Where suitable adaptor couplings are not available for dissimilar pipes the jointing shall be accomplished with a special fabricated coupling to concrete encasement as specified, or as submitted by the Contractor and approved by the Engineer.

2-1.07 SEWER LINE CONNECTIONS

Sewer line connections to trunks, mains, laterals, or side sewers shall be left uncovered until after an acceptance observation has been made. After approval of the connection, the trench shall be backfilled as specified in Division II, Excavation and Cleanup, Section 1-2.20 after first covering the bare pipe with select material compacted to a depth of six inches (6") above the crown of the pipe.

No existing sewer shall be connected to a sanitary sewer unless specifically authorized in each instance by the Engineer. Storm drains and drain tiles shall not be connected to a sanitary sewer.

2-1.08 SERVICE RISERS

Where the depth of the sewer invert is greater than twelve feet (12') below the surface of the ground, a service riser shall be constructed to an elevation of ten feet (10') below the ground elevation or as directed by the Engineer.

The service riser shall be constructed with the six-inch (6") tee as shown on the Plans placed to receive the six-inch (6") riser pipe. The tee shall be bedded as shown on Plans.

The riser pipe shall extend to the proper elevations and shall terminate with a manufactured plug.

Extreme care shall be taken in backfilling around risers. Where the excavated material is not suitable for this purpose in the opinion of the Engineer, granular material shall be placed around the riser.

2-1.09 TESTING AND INSPECTION FOR ACCEPTANCE OF SANITARY SEWER

Testing and inspection of sanitary sewers for acceptability shall be conducted by:

- A. Exfiltration of water
- B. Infiltration of water
- C. Exfiltration of air under pressure
- D. Lamping
- E. Televising (Optional procedure to supplement items A. through E.)

At a minimum, all sanitary sewers shall be tested for acceptability by either A., B., or C. above or a combination thereof. All lines shall be cleaned of debris and flushed clean as necessary. Debris shall not be flushed into sanitary sewer.

A. *SELECTION OF TEST SECTIONS*

Unless otherwise specified or directed by the Engineer, the first section of sanitary sewer constructed of approximately 1,200 feet in length or the entire length of sewer if it is less than 1,200 feet shall be tested by the exfiltration, infiltration, or air testing method before additional excavation is permitted.

The Contractor may at his option divide the first section of sewer into subsections of more convenient length for testing. If the section or subsection tested does not pass the tests, it shall be repaired and the test repeated until a satisfactory test is obtained. Excavation shall not proceed beyond the first 1,200 foot section until test results for the entire 1200 feet are satisfactory.

In the event the first 1,200 foot section of sewer or portion thereof did not pass the test on the first trial, the next section of sanitary sewer of approximately 1,200 feet in length shall also be tested, repaired if necessary, and retested until a satisfactory test is obtained before additional excavation is started.

When favorable test results are obtained on the first trial on a full 1,200 foot section of pipe, the Engineer may designate additional sections for testing as conditions in his opinion warrant. The Engineer reserves the right to select the location and lengths of additional test sections when construction operations or materials change or where construction difficulties indicate leakage or deflection may be present or in sections selected at random.

The Engineer shall notify the Contractor of the location where a test is to be required no later than 15 days after the sewer installation has been completed in the section to be tested. Unless otherwise authorized, the Contractor shall arrange to commence the test within 15 days after the sewer has been installed or 15 days after notification by the Engineer, whichever date is later.

B. *TESTING TECHNIQUE*

All Testing Methods: All wyes, tees and stubs shall be plugged with flexible jointed caps, or acceptable alternate, securely fastened to withstand the internal test pressure. Such plugs or caps shall be readily removable.

1. Exfiltration Method Procedures: The section of sewer to be tested shall be sealed by inserting inflatable rubber bags in the pipes or by other means approved by the Engineer, and then water shall be introduced into a manhole until the section is completely filled. The Contractor shall fill the pipe to the test level prior to the time of exfiltration testing to permit normal absorption into the pipe walls.

Throughout the test period of at least one (1) hours, the water level in the upper manhole shall be maintained at least twenty-four inches (24") above the

crown of the upper end of the pipe or at least twenty-four inches (24") above the ground water table, whichever is higher. The length of pipe tested shall be limited so that the pressure on the center line of the lower end of the section tested shall not exceed six feet (6') of water column.

2. Infiltration Method Procedures: The section of sewer to be tested shall have been trench backfilled and the tests conducted by inducing infiltration conditions by jetting the sewer trench for a sufficient length of time to insure that the water level in the trench is a minimum of twenty-four inches (24") over the crown of the sewer pipe at the upper end of the pipe. The test must be performed before existing sewers are connected and before sewage flow is allowed in the sewers.
3. Air Testing Method Procedures: The section of sewer to be tested shall have been trench backfilled and cleared. Pneumatic plugs (having a sealing length equal to or greater than the diameter of the pipe to be tested) placed in both ends of the pipe to be tested shall be inflated to 25 psig. The sealed sewer pipe shall then be pressurized to 4 psig above the average back pressure of ground water over the sewer pipe and the air pressure allowed to stabilize for at least two minutes.

After the stabilization period the line shall be pressurized to 3.5 psig and the time in minutes measured for pressure to drop to 2.5 psig. If groundwater is present, the air pressure within shall be increased to 3.5 psig above the level of the ground water and the drop of one pound of air pressure measured in minutes.

Air testing techniques shall be in accordance with the latest ASTM standard practice for testing sewer lines by low-pressure air test method for the appropriate pipe material, except that the time shall not be less than that shown in the Air Test Table contained in Section 2-1.11C.

4. Testing Procedures for PVC pipe shall include the following;

All sanitary sewers and manholes shall be tested by low pressure air testing and deflection testing. Deflection test shall not occur within less than thirty (30) days of completion of the section of sewer being tested including backfilling to finished grade.

A five percent (5%) Mandrel Deflection Test shall be performed on all PVC gravity sanitary sewer pipe. These pipes shall be mandrelled with a rigid device sized to pass five percent (5%) or less deflection (or deformation) of the base inside diameter of the sewer pipe.

Laser Profiling of the installed pipe to measure pipe deflection is acceptable in lieu of mandrell testing. The laser profiler shall be a "Scanner 3-D" type, which permits the measuring of actual deformities with a precision of at least 0.25%. The measurement of the actual pipe deformity must be calculated with the actual interior diameter on all points of the pipe (not the nominal diameter). The laser profiler must be able to give a series of at least a 1000 diametrical measurements at any given measuring point in a pipe. The laser profiling and observation measuring equipment must be certified on an annual basis by a qualified and accredited third party laboratory.

After the placement base material or compacted soils, a video recording of the interior of the installed pipe will be properly documented utilizing equipment indicated in this specification. Provide a video and report.

The contractor will dewater, clean, and bypass (if necessary) the installed pipe and provide the Engineer with a video and report using low barrel distortion video equipment with laser profile technology, non-contact laser aim video micrometer, and associated software.

For video recorded, laser profiled pipe that indicates deflection that is in excess of that allowed in the specification, the engineer may require the removal, replacement, repair, and/ or retesting of the pipe that has failed to meet the specific deflection requirements for the type of pipe installed, at no cost to the Owner.

For video recorded, observation and/or defect measured pipe that indicates that it exceeds that allowed in the specification, the engineer may require the removal, replacement, repair, and/ or retesting of the pipe that has failed to meet the specific observation and/or defect specification for that type of pipe installed, at no cost to the Owner.

Provide high quality video recording of the CCTV inspection in a high definition format video with a standard resolution of 720x 480. Utilize a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe and rotating 360 degrees. Use equipment suitable to be able to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition.

The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe. The video will include identification, at a minimum, before each line section of pipe to be filmed, the project number, the

structure number corresponding to the structure number on the set of plans for the project, size of pipe, the date and time, and indicate which pipe is being filmed if multiple pipes are connected to the structure. Written or typed television inspection logs shall be taken during the video recording process. Provide the engineer with copies of these "logs" along with the video.

Move the camera and Laser profiler through the pipe at a speed no greater than 30 feet per minute. Mark the video with the distance down the pipe. The distance meter shall have an accuracy of one foot per hundred feet (300mm in 328 meters). Stop the camera and pan when necessary to properly document observations and defects. Film the entire circumference at each joint. The operator must measure each joint, defect and crack discovered during the videotaping process surpassing the permitted values of the present specification.

A report of field conditions utilizing the laser profiler must, at a minimum, contain the following:

- a. graphic indicating the actual deformity registered in real-time for each section of the pipe (every 10mm);
- b. The description and a picture of the pipe and of the laser ring for each deformity surpassing the permitted values by the present standard;
- c. A copy of the calibration certificate from an accredited third party laboratory specifying the technology used, the device used and the certificate's validity date for this device;
- d. A recorded (video and written) measurement of crack lengths and width surpassing the permitted values of the present specification;
- e. A recorded (video and written) measurement of all pipe joints surpassing the permitted values of the present specification;
- f. Documentation of all pipe deformities, actual pipe measurements, leaks, debris and any other damage or defects;
- g. Deviation in pipe line and grade, joint gaps, and joint misalignment;
- h. Indexed and interactive display software for graphics (profile and isometric views), as well as two separate windows showing the video inspection and the laser profiler video inspection simultaneously.

5. Lamping shall be performed on all sewer pipeline by the Engineer.

C. ALLOWABLE TESTING LIMITS FOR SANITARY SEWERS

1. Exfiltration leakage shall not exceed 200 gallons per inch of pipe diameter per mile per day of sewer pipe, including manholes in the test section.
2. Infiltration flow shall be measured by a 90-degree V-notch weir with free fall discharge or other means acceptable to the Engineer. Infiltration leakage shall not exceed 200 gallons per inch of pipe diameter per mile per day of sewer pipe, including manholes in the test section.
3. Air leakage test results shall not be less than the time per inch of pipe diameter per length of sewer pipe as specified in the table entitled "Air Test Table".
4. Three-fourths (3/4) of the pipe circle shall be observed both vertically and horizontally for lamping.

AIR TEST TABLE

SPECIFICATION TIME (min:sec) REQUIRED FOR PRESSURE DROP FROM 3-1/2 TO 2-1/2 PSIG WHEN TESTING ONE PIPE DIAMETER ONLY

PIPE DIAMETER, INCHES

Length of Sewer Pipe In Feet	4	6	8	10	12	15	18	21	24
25	0:04	0:10	0:18	0:28	0:40	1:02	1:29	2:01	2:38
50	0:09	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17
75	0:13	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55
100	0:18	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34
125	0:22	0:50	1:28	2:18	3:18	5:09	7:26	9:55	11:20
150	0:26	0:59	1:46	2:45	3:58	6:11	8:30		
175	0:31	1:09	2:03	3:13	4:37	7:05			
200	0:35	1:19	2:21	3:40	5:17				12:06
225	0:40	1:29	2:38	4:08	5:40			10:25	13:36
250	0:44	1:39	2:56	4:35			8:31	11:35	15:07
275	0:48	1:49	3:14	4:43			9:21	12:44	16:38
300	0:53	1:59	3:31				10:12	13:53	18:09
350	1:02	2:19	3:47			8:16	11:54	16:12	21:10
400	1:10	2:38			6:03	9:27	13:36	18:31	24:12
450	1:19	2:50			6:48	10:38	15:19	20:50	27:13
500	1:28			5:14	7:34	11:49	17:01	23:09	30:14

D. PAYMENT FOR TESTS

Payment for tests will not be paid for separately, but shall be included in the unit price of pipe, per foot. If any section fails to meet the test, it shall be repaired at the Contractor's expense and retested until it meets the leakage limitation.

2-2 MEASUREMENT

For payment purposes, the length of sewers installed shall be measured along the centerline. No deductions in length will be made for tees or fittings.

2-3 PAYMENT

Payment for pipe sewers shall be made at the contract unit price of the size and type indicated on the bid item at the contract unit price per foot for the size and type indicated. The cost of all items of construction not specifically listed for separate payment shall be included as an incidental expense in the contract price. No more than ninety percent (90%) of the value of work included in the unit price shall be eligible for inclusion in a partial payment estimate until leakage tests have been performed as specified and the pipes and joints are found to be satisfactory.

2-4 MEASUREMENT AND PAYMENT

The cost of all items described under "Pipe Laying, Jointing and Testing" not shown as bid items on the Proposal shall not be measured or paid for by item, but shall be included as part of the respective unit bid prices per foot for conduit construction of the size and type specified.

SECTION 3. MANHOLES FOR SANITARY SEWERS

3-1 DESCRIPTION

Manholes shall be leak-tight and shall be constructed of pre-cast concrete units, or cast-in-place concrete only, all in compliance with Plans and these Specifications.

3-2 MATERIALS

3-2.01 REINFORCED CONCRETE

Reinforced concrete shall consist of Portland Cement, mineral aggregates and water, in which steel has been embedded in such manner that the steel and concrete set together.

A. CEMENT

Cement shall conform to the requirements of the Specifications for Portland Cement ASTM C 150, and may be either standard Portland Cement or air-entrained Portland Cement of any type unless otherwise specified in the Special Provisions.

B. WIRE FABRIC REINFORCEMENT

Reinforcement shall consist of wire conforming to ASTM A185 or A497. Also, smooth wire conforming to ASTM A8Z and deformed wire conforming to ASTM A496.

C. BAR REINFORCEMENT

Bar reinforcement shall conform to ASTM A615, grade 40.

D. AGGREGATES

Aggregates shall conform to ASTM C33, except that the requirements for gradation shall not apply to precast items.

E. MIXTURES

The aggregates shall be so sized and graded, and proportioned and thoroughly mixed in proportions of cement and water as will produce a homogeneous concrete mixture of such quality that the manhole components will conform to the strength and watertightness requirements of these specifications.

F. CURING

Cast-in-place manhole components shall be moist-cured for a period not less than seven (7) days except that when high-early-strength cement is used, the curing shall be not less than three (3) days. Pigmented membrane curing compound or other approved method may be applied in lieu of moist curing.

G. STRENGTH

All concrete placed under these specifications shall have a minimum compressive strength of thirty-five hundred (3,500) psi at twenty-eight (28) days. Strength

determination shall be in accordance with ASTM C-39, unless otherwise approved by the Engineer.

3-2.02 STEPS

Manhole steps shall be cast iron ASTM A48 furnished and installed as shown on the Plans with load and pullout ratings meeting OSHA standards.

3-2.03 CAST IRON FRAMES AND COVERS

Castings shall conform to the requirements of gray iron castings ASTM A48 and conform to the details shown on the Plans. They shall be adjusted to final grade with precast concrete rings and mortar.

3-2.04 PRECAST MANHOLE COMPONENTS

Precast manholes shall conform with ASTM C-478 and with design dimensions. Cones and sections shall be substantially free from fractures, large or deep cracks and surface roughness. Slabs shall be sound and free from gravel pockets.

3-2.05 ADJUSTING RINGS

Final adjustment of frames and grates to grade shall be accomplished through the use of precast concrete adjusting rings. The rings shall be designed to provide a structural capacity equal to the cones and sections. They shall have a device for positively positioning and securely fastening the ring to the frame so as to match the surface grade and slope and prevent movement when under traffic loadings.

3-2.06 MONOLITHIC CONCRETE MANHOLES

Monolithic concrete manholes shall conform to detailed shop drawings submitted to the Engineer for approval prior to beginning Work and shall conform to the dimensional requirements specified. Walls and base shall be six inches (6") minimum thickness and space of steps shall be sixteen inches (16").

3-3 CONSTRUCTION DETAILS

3-3.01 FOUNDATION PREPARATION

A. DEWATERING

Dewatering of the site shall conform to the requirements for sewer trench de-watering in Section 2-1.02.

B. SUB-BASE PREPARATION

Adequate foundation for all manhole structures shall be obtained by removal and replacement of unsuitable material with well graded granular material; or by tightening with coarse ballast rock, or by such other means as provided for foundation preparation of the connected sewers, or as shown on the Plans.

3-3.02 BEDDING

Precast base sections shall be placed on a well graded granular bedding course conforming to the requirements for sewer bedding in Section 2, but not less than six inches (6") in thickness and extending

to the limits of the excavation. The bedding course shall be firmly tamped and made smooth and level to assure uniform contact and support of the precast element.

3-3.03 CAST-IN-PLACE BASES

Unless otherwise specified, cast-in-place bases shall be at least eight inches (8") in thickness and shall extend at least six inches (6") radially outside of the outside diameter of the manhole section.

3-3.04 PRECAST MANHOLES

Precast manholes may be constructed with a precast base section or a monolithic base structure as specified or shown on the Plans.

A precast base section shall be carefully placed on the prepared bedding so as to be fully and uniformly supported in true alignment and making sure that all entering pipes can be inserted on proper grade.

All lift holes on precast elements for sanitary sewer manholes shall be completely filled with a concrete plug and sealed with an approved bitumastic material. All joints between precast elements on sanitary sewer manholes shall be made with an approved bitumastic material or an approved rubber gasket.

The first precast section shall be placed on the monolithic base structure before the base has taken initial set, and shall be carefully adjusted to true grade and alignment with all inlet pipes properly installed so as to form an integral watertight unit; or the section shall be mortared into a suitable groove provided in the top of the monolithic base. The first section shall be uniformly supported by the base concrete, and shall not bear directly on any of the pipes.

Precast sections shall be placed and aligned to provide vertical sides and vertical alignment of the ladder rungs. The completed manhole shall be rigid, true to dimensions, and be watertight.

3-3.05 MONOLITHIC CONCRETE MANHOLES

Monolithic concrete manholes shall be constructed in accordance with the provisions of this Section and the details shown on the Plans.

3-3.06 EXCAVATION AND BACKFILLING

In order to permit the joints to be mortared properly and also to permit proper compaction of the backfill material, the excavation shall be made to a diameter of at least six inches (6") greater than the diameter of the structure.

The space between the sides of the excavation and the outer surfaces of the manhole, shall be backfilled with selected granular backfill if the manhole is in a pavement or if the nearest point of the excavation for the manhole falls within 2 feet of the pavement edge. If the structure falls beyond these limits, other backfilling material may be used, provided it meets with the approval of the Engineer.

3-3.07 INLET AND OUTLET PIPES

Pipe or tile placed in the masonry for inlet or outlet connections shall extend through the wall and beyond the outside surface of the wall a sufficient distance to allow for connections, and the masonry shall be carefully constructed around them so as to prevent leakage along the outer surfaces.

3-3.08 PLACING CASTINGS

Casting placed on concrete or masonry surface shall be set in full bituminous mastic beds. Castings shall be set accurately to the finished elevation so that no subsequent adjustment will be necessary.

A. STREETS AT GRADE

Where Work is in paved streets or areas which have been brought to grade, not more than sixteen inches (16") shall be provided between the top of the cone or slab and the underside of the manhole casting ring for adjustment of the casting ring to street grade.

B. STREETS OR ALLEYS WITH NO ESTABLISHED GRADE

Where Work is in the streets or other areas which have not been brought to grade, not less than four inches (4") nor more than sixteen inches (16") shall be provided between the top of the cone or slab and the underside of the manhole casting ring for adjustment of the casting ring to street grade.

The top of the manhole casting shall be flush with the street surface unless otherwise directed by the Engineer.

C. MANHOLES NOT WITHIN STREET OR ALLEY AREAS

Where Work is in cultivated areas, the top of the casting, unless otherwise directed by the Engineer, shall be eighteen inches (18") below the established ground surface.

Unless otherwise directed, in non-cultivated areas, the top of manhole castings shall be at grade of existing surface.

D. SEALING MANHOLES

Sanitary sewer manholes which are covered with earth or are located in low areas than can collect rainwater, and any other manholes indicated on the Plans, to be sealed, shall be equipped with an approved self-sealing lid.

3-3.09 CHANNELS

Channels shall be made to conform accurately to the sewer grade and shall be brought together smoothly with well rounded junctions, satisfactory to the Engineer, and in conformance with details shown on the Plans.

3-3.10 PIPE CONNECTIONS

Special care shall be taken to see that the openings through which pipes enter the structure shall be provided with flexible watertight connections conforming with ASTM C 923, "Standard Specifications For Resilient Connectors Between Reinforced Concrete Manhole Structures And Pipes." Other methods may be used to ensure watertightness when specified in the Special Provisions.

3-3.11 DROP MANHOLE CONNECTIONS

Drop manhole connections, whenever shown on the Plans, shall conform in all respects to details shown on the Plans.

3-3.12 CLEANING

All newly constructed manholes shall be cleaned of any accumulation of silt, debris, or foreign matter of any kind, and shall be free from such accumulations at the time of final inspection.

3-4 PAYMENT

Payment for each Manhole shall consist of a basic price for each.

3-5 MEASUREMENT AND PAYMENT

The following items under "Manholes for Sanitary Sewers" are specifically listed for separate measurement and payment:

"Manholes" of the type and size indicated.

"Drop Manholes" of the type and size indicated.

SECTION 4. SERVICE SEWERS

4-1 DESCRIPTION

A service sewer is a branch sanitary sewer line constructed from the main sanitary sewer line to a point described on the Plans or to a point established by the Engineer.

The general requirements for construction of sewers in other sections of these Specifications shall apply for service sewers unless they are inconsistent with any of the provisions of this particular section, and the Specifications shall apply alike to all service sewers on public rights of way and private property.

Unless otherwise specified, service sewers and fittings shall be six inches (6") in diameter.

4-2 MATERIALS

4-2.01 PIPE AND FITTINGS

Approved pipe and fitting materials shall be ductile iron, PVC, or vitrified clay. All other materials shall conform to the material requirements for sanitary sewer construction in other sections of the Specifications.

4-2.02 JOINTS

Approved jointing material shall be flexible gasketing. Flexible gasketing shall be construed to include rubber, synthetic rubberlike and plastic materials specially manufactured for the joint, pipe size, and use intended and shall be furnished by the manufacturer of the pipe to be used. Physical properties of the flexible gasketing shall conform to that defined in Section 1.

4-3 CONSTRUCTION DETAILS

4-3.01 GENERAL

Service sewer construction shall conform to all applicable ordinances or regulations unless otherwise stated in the Special Provisions. The Owner will obtain any necessary permits for service sewer construction.

4-3.02 EXCAVATION AND BACKFILL

Excavation and backfilling for service sewers shall conform to the requirements of other sewers, excepting that no backfill in excess of that required to hold the pipe in true alignment shall be placed prior to inspection.

4-3.03 PIPE LAYING AND JOINTING

Pipe laying and jointing, except as hereinafter provided, shall in general conform to the requirements of Section 2. During the pipe laying and jointing, the service sewer shall be kept free of any water, dirt or objectionable matter.

A watertight, factory-made plug shall be installed at the end of each sewer service.

A. LINE AND GRADE

Pipe shall be laid with a minimum grade of one-eighth inch (1/8") per lineal foot unless otherwise ordered. The Contractor shall establish such alignment and grade control as is necessary to properly install the service sewer.

B. PIPE LAYING

Pipe shall be laid in a straight line at a uniform grade between fittings, or on a uniform horizontal or vertical curvature achieved by deflecting pipe joints within the limits recommended by the manufacturer of the pipe used.

4-3.04 FITTINGS

All fittings shall be factory-produced and shall be designed for installation on the pipe to be used. Fittings shall be of the same quality and material as the pipe used.

The maximum deflection permissible at any one (1) fitting shall not exceed 45 degrees (one-eighth (1/8) bend). The maximum deflection of any combination of two adjacent fittings shall not exceed 45 degrees (one-eighth (1/8) bend) unless straight pipe of not less than two and one-half feet (2-1/2') in length be installed between such adjacent fittings, or unless one of such fittings be a wye branch with a cleanout provided on the straight leg.

Service sewers shall be connected to the tee, wye, or riser provided in the public sewer where such is available, utilizing approved fittings or adaptors. Where no tee, wye, or other riser is provided or available, connection shall be made by machine made tap and suitable saddle, or other methods as specified in the Special Provisions.

4-3.05 CLEANOUTS

Cleanouts shall be provided at locations and in accordance with details shown on the Plans.

4-3.06 RESTORATION, FINISHING AND CLEANUP

The Contractor shall restore all paved surfaces, curbing, sidewalks, or other surfaces to their original condition in such manner as to meet the requirements of applicable sections. All surplus material and temporary structures, as well as all excess excavation, shall be removed and the entire site of Contractor operations shall be left in a neat and clean condition.

4-4 MEASUREMENT

Measurement shall be along the pipe from the outside surface of the main sewer to the extreme end of the last pipe or fitting placed. Measurement shall be to the nearest one foot (1').

4-5 PAYMENT

Payment for service sewers shall be at the unit contract price per foot or each for "Service Sewers" of the size indicated. Tees, wyes, bends, adaptors, and plugs shall be considered as incidental to the construction.

All other costs shall be considered as incidentals to the construction of the service sewer and shall be included in the unit Contract prices for "Service Sewers".

4-6 MEASUREMENT AND PAYMENT

The cost of all items described under "Service Sewers" shall not be measured or paid for by item, but shall be included as part of the respective unit bid prices for conduit construction of the size specified.

SECTION 5. PIPE COVERING AND EMBANKMENT FOR SEWER CONSTRUCTION

5-1 DESCRIPTION

This section of the Specification applies to the construction of pipe covering and embankment. Pipe covering shall be constructed where the invert of the pipe is so shallow that placing of earth over the pipe becomes necessary to provide a minimum depth of cover. Pipe cover and embankment shall be constructed where the invert of the pipe is above the existing ground and it becomes necessary to construct an embankment upon which the pipe and pipe covering is to be placed. The embankment and cover shall be constructed to lines shown on the Plans.

5-2 CONSTRUCTION DETAILS

5-2.01 PIPE BED

The area upon which the embankment for the pipe bed is to be placed shall be stripped to the extent the Engineer directs to provide a firm bedding.

The embankment upon which the pipe is to be installed shall be constructed up to the spring line in six inch (6") lifts, each lift being compacted to a density equal to ninety-five percent (95%) of ASSHTO T 99 density. The material used in constructing the embankment shall be such that it will readily compact to required density. The Contractor may use any type of compacting equipment he wishes provided the required end result is obtained, and provided no damage occurs to surface or subsurface improvements.

5-2.02 PIPE COVER

The pipe cover material above the compacted embankment shall be placed without compacting, and shall be shaped to the required section.

5-2.03 SOURCE OF MATERIAL

The source of material shall be that which is specified in the Special Provisions.

5-3 MEASUREMENT

Measurement will be by the cubic yard of embankment as calculated from cross sections based on elevations of the ground surface after stripping and the neat line of the section conforming to the drawing. No deduction will be made for pipe volume displacement.

5-4 PAYMENT

Payment will be made at the unit Contract price per cubic yard for Pipe Covering and Embankment, which price shall be full compensation for furnishing all labor, equipment, and materials necessary to strip, construct and compact the embankment and cover as specified to the satisfaction of the Engineer.

SECTION 6. FORCE MAIN MATERIAL AND INSTALLATION

6-1 DESCRIPTION

Pipe used in force main construction, unless otherwise specified, shall be Polyvinyl Chloride Pipe (PVC) or Ductile Iron Pipe (DIP). All force main shall have flexible gasketed joints unless otherwise specified.

The Contractor shall only use the force main pipe material specified on the Plans unless he receives written permission from the Engineer to substitute one of the other materials mentioned herein. No verbal approval, regardless of the source, will be recognized for changing the pipe material, class or type of joint.

6-2 GENERAL

Where reference is made to an ASTM or ANSI designation, it shall be the latest revision at the time of call for Bids, except as noted on the Plans or in the Special Provisions.

6-3 CERTIFICATION

It shall be the responsibility of the pipe manufacturer to certify that pipe and joint material furnished is capable of withstanding the pressure rating as specified or required, if properly installed.

6-4 MATERIALS

A. DUCTILE IRON FORCE MAIN AND FITTINGS

Ductile Iron Pipe (DIP) force main shall conform to ANSI A21.51 (AWWA C151), designed per ANSI A21.50 (AWWA C150), and shall comply with the American National Standard C104/A21.4-95 for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water. Flanged fittings shall be Class 53 that meet the requirements of AWWA C110/A21.10. Flanged joints shall meet the requirements of AWWA C115/A21.15 with full-face gaskets for joints on 12-inch diameter and smaller pipe and ring type gaskets for larger pipe. Mechanical joint fittings shall meet the requirements of AWWA C153/A21.53. Mechanical joints shall comply with American National Standard C111/A21.50-90 for Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings. All underground DIP force main shall be Class 52 wrapped in 8-mil thick polyethylene encasement in accordance with ANSI/AWWA C105/A21.5, Method B, with pipe and joints wrapped separately. For ductile iron pipe and fittings with mechanical joints that require harnessing, provide ductile iron mechanical joint retainer glands that are designed to resist pullout of the joints at the test pressures specified. Provide stainless steel bolts and nuts meeting the requirements of ASTM A 307, Grade B. Where required provide wall castings and connecting pieces meeting the requirements of AWWA C110/A21.10.

Installation of DIP shall be governed by AWWA Standard C600-93, AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances. Bedding shall be in

accordance with ASTM C 12. All piping shall be installed and tested in accordance with AWWA standard C600-93, AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances.

DIP force main shall utilize mechanical joint fittings for force restraint. The mechanical joint restraint devices shall be:

1. EBAA Iron, Inc., MegaLug 1100 series
2. Uni-Flange Series 1400, One-Lok Series SLD
3. Engineer-approved equal

Measurement shall be made along the centerline of force main installed. The contract unit price bid for DIP force main construction shall include the cost for piping, joint-restraint devices, polyethylene encasement, excavation, trench dewatering and maintenance, trench bottom reshaping, bedding, haunching, compaction, testing, and all other work necessary for a complete job. This work will be paid for at the contract unit price bid of LINEAL FOOT for DUCTILE IRON FORCE MAIN at the diameter specified. Fittings in the force main will be paid for at the contract unit price bid per POUND for DUCTILE IRON FITTINGS at the diameter specified.

B. POLYVINYL CHLORIDE (PVC) FORCE MAIN AND FITTINGS

Polyvinyl Chloride (PVC) force main and fittings shall be Pressure Class 200, DR 14 conforming to AWWA C900 (AWWA Standard for Polyvinyl Chloride [PVC] Pressure Pipe and Fabricated Fittings, 4 in. Through 12 in. [100 mm Through 300 mm], for Water Distribution) with fittings and elastomeric gasketed joints meeting the requirements of AWWA C907 (Injection-Molded Polyvinyl Chloride [PVC] Pressure Fittings, 4 in. Through 12 in. [100 mm Through 300 mm], for Water Distribution), unless otherwise directed by the Engineer.

All PVC piping shall be installed and tested in accordance with AWWA C605 (Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water).

PVC force main shall utilize mechanical joint fittings for force restraint. The mechanical joint restraint devices shall be:

1. EBAA Iron, Inc., MegaLug 1100 series
2. Uni-Flange Series 1400, One-Lok Series SLD
3. Engineer-approved equal

Each PVC pipe length and fitting shall be clearly marked with the following:

1. Manufacturer's Name
2. Nominal Pipe Size
3. Cell Classification
4. Minimum Pipe Stiffness

The Contractor shall take great care not to scratch, indent, puncture or otherwise damage the PVC pipe during installation. All pipe materials used shall be inspected and approved by the Engineer before and during installation. If a pipe section has been damaged in any way before or during installation, it shall be removed and replaced with a pipe section acceptable to the Engineer. Pipe installation shall strictly conform to the manufacturer's recommendations.

A detectable metallic tracing and warning tape of a type approved by the Engineer shall also be installed. This work shall consist of burying of metallic tape in the trench running along the centerline of the force main. The tape shall be laid in the trench 2 feet above the buried force main. The tape shall be 2" wide and read "CAUTION – BURIED FORCE MAIN BELOW."

Measurement shall be made along the centerline of force main installed. The contract unit price bid for PVC force main construction shall include the cost for piping, joint-restraint devices, magnetic pipe location tape, excavation, trench dewatering and maintenance, trench bottom reshaping, bedding, haunching, compaction, testing, and all other work necessary for a complete job. This work will be paid for at the contract unit price bid of LINEAL FOOT for PVC FORCE MAIN at the diameter specified. Fittings in the force main will be paid for at the contract unit price bid per POUND for PVC FITTINGS at the diameter specified.

6-5 CONNECTION TO EXISTING SANITARY SEWER MANHOLE

This work involves connection of the force main to an existing sanitary manhole at the location shown on the plans, or as directed by the Engineer. The contractor will have to provide sheeting, scaffolding or bracing to insure that no movement of the exposed manhole will take place while core drilling the exposed wall to allow the pipe installation. Should the structure be found to deflect, displace or fall out of plumb, the contractor shall be responsible for correcting the movement.

In the process of core drilling the wall, extreme care shall be taken so that minimal structural damage is done to the manhole. All debris falling into the manhole must be entirely removed. Connections to existing manholes shall be made using an A-Lok gasket, rubber boot, or other approved flexible seal.

The cost for all equipment, labor and materials, including core drilling the manhole wall opening, excavation, furnishing, erecting, and removing shoring, scaffolding and/or bracing, water stop, and backfilling will be paid for at the contract unit price per EACH for CONNECTION TO EXISTING SANITARY SEWER MANHOLE.

6-6 STEEL SLEEVES-AUGERED

The Contractor is advised to review the site and familiarize himself with the soil conditions prior to finalizing his bid for this portion of the work. No additional compensation shall be allowed for changes in the construction method due to ground conditions that may exist at the time of construction. All work shall be performed in accordance with Section 552 of the Standard Specification except as described in the following specifications and the Steel Sleeve Specification contained herein.

This work shall consist of auguring a steel sleeve at the location and at the line and grades provided on the plans or as where directed by the Engineer. The Contractor shall field verify the elevations and locations of any and all utilities that may cross beneath or over the proposed auger prior to ordering structures, or beginning the auger operation so as to not damage the existing utilities during auger operations. No additional compensation shall be given for any modifications required to be made to the proposed force main design (including but not limited to re-ordering/restocking structures), or for any delay time incurred due to a difference in assumed and actual elevations of the existing utilities.

The Contractor shall take all necessary precautions to prevent the undermining of roadways, structures, embankments, or property including the utilization of trench boxes, sheeting, etc., to properly maintain the auger and receiving pit excavations such that underlying soils between the pavement edge etc. and auger limits are prevented from entering the excavation. In the event that settlement or any other damage occurs to adjacent roadways, property or structures between the time the auguring is completed and the end of the contract bond guaranty period, the Contractor shall be fully responsible for any repairs deemed necessary by the Engineer.

This work shall consist of the construction of steel sleeves (casing pipe) augured at the locations indicated in the contract drawings or as directed by the Engineer. The minimum thickness of the steel sleeves shall be as listed below. All casing pipe shall be smooth, Grade B welded steel pipe meeting the requirements of ASTM A139 and ANSI/ AWWA C200 (AWWA Standard for Steel Water Pipe—6 in. (150 mm) and Larger), minimum yield strength of 35,000 psi. Sleeves shall be installed as indicated in the detail drawings, unless otherwise approved by the Engineer.

After installation of the steel sleeve is completed, the proposed force main shall be constructed in place within the sleeve. The water main shall be inserted and centered by use of model CCS stainless steel casing spacers as manufactured by Cascade Waterworks Mfg. Co. of Yorkville, IL or Engineer-approved equal.

Caser spacing shall be bolt on style with a two-piece shell made from T-304 stainless steel of a minimum 14-gauge thickness. Each shell section shall have bolt flanges formed with ribs for added strength. Each connecting flange shall have a minimum of three (3) five-sixteenths inch (5/16") T-304 bolts. The shell shall be lined with a ribbed PVC extrusion with a retaining section that overlaps the edge of the shell and prevents slippage. Bearing surfaces (runners) made from UHMW polymer with a static coefficient of friction of 0.11-0.13 shall be attached to support structures (risers) at appropriate positions to properly support the carrier within the casing and to ease installation. The runners shall be attached mechanically by T-304 threaded fasteners inserted through the punched riser section and TIG welded

for strength. Risers shall be made of T-304 14-gauge stainless steel. All risers over two inches (2") in height shall be reinforced. Risers shall be MIG welded to the shell. All metal surfaces shall be fully passivated.

The cost for excavating, shoring, trench backfill, and backfilling of the jacking pit and receiving pit, including dewatering (if necessary), stabilization, and installing the steel sleeve shall be considered incidental to the contract unit price for the steel sleeve auger.

Standard Sizes of Steel Sleeves Used As Casings*

<u>Carrier Pipe ID in Inches</u>	<u>Casing Wall Thickness in Inches</u>	<u>Casing Outside Diameter in Inches</u>
6	0.344	20
8	0.344	20
12	0.375	24
16	0.469	30
20	0.563	36
24	0.625	42
30	0.719	48
36	0.781	54
42	0.875, 0.938	60, 66
48	1.000	72

*Adapted from City of Chicago, IL Water Department Standard Specifications

The cost of furnishing and installation of the steel sleeve, and all incidental work necessary for its installation, including casing spacers, will be paid for at the contract unit price bid per LINEAL FOOT for [SPECIFIED SIZE] DIAMETER STEEL SLEEVE, [SPECIFIED SIZE] WALL THICKNESS, AUGERED. The cost for force main constructed within the sleeves will be paid for at its unit price.

6-7 STEEL SLEEVES-OPEN CUT INSTALLATION

The work for open cut installation of steel sleeves shall be identical to the work described in Section 6.6, except that no augering, jacking, or receiving pits are required.

The cost for excavating, shoring, trench backfill, and backfilling of the open cut area, including dewatering (if necessary), stabilization, and installing the steel sleeve shall be considered incidental to the contract unit price for the steel sleeve auger.

The cost of furnishing and installation of the steel sleeve, and all incidental work necessary for its installation, including casing spacers, will be paid for at the contract unit price bid per LINEAL FOOT for [SPECIFIED SIZE] DIAMETER STEEL SLEEVE, [SPECIFIED SIZE] WALL THICKNESS, OPEN CUT INSTALLATION. The cost for force main constructed within the sleeves will be paid for at its unit price.

6-8 SEWER FLOW CONTROL AND BYPASS PUMPING

It is the intent of this specification to provide the minimum requirements for sewer flow control bypass pumping.

The Contractor shall provide all labor, equipment, supervision, and materials necessary to control flows via bypass pumping through a section or sections of pipe designated for replacement. The Contractor shall be responsible for controlling and maintaining all sanitary and storm flows within the sewer system during the Work. The Contractor may drain flows by pipes, chases, fluming, bypass pumping, or other appropriate methods approved by the Owner.

Precautions shall be taken to ensure that flow control and dewatering operations shall not cause flooding or damage to public or private properties. In the event flooding or damage occurs, the Contractor shall make provisions to correct such damage at no additional cost to the Owner. The Contractor shall be responsible for any damages to public or private property, overflows from the sewer system and violations resulting in fines as a result of the dewatering/bypass operation.

When required for this project, the Contractor shall provide all labor, equipment, and materials necessary for the transfer of flow around the sections of pipe and/or the existing lift station. If the Contractor utilizes a subcontractor for bypass pumping operations, the subcontractor shall have at least five years of experience in the bypass pumping industry.

The bypass shall be made by diversion of the flow from an existing upstream location, around the section(s) to be taken from service for inspection or rehabilitation, to an existing downstream location. The bypass system shall be of adequate capacity to handle all flows, including wet weather related flows. If bypass pumping is utilized by the Contractor to control flows, the Contractor shall be responsible for monitoring the bypass pumping operation at all times until Work is complete. The location of pump(s), force main, discharge point, pumping rates, etc., shall be approved by the Owner.

The Contractor shall prepare a detailed Flow Control Plan that describes the measures to be used to control flows. The Contractor shall submit the Plan to the Engineer for review prior to beginning any flow control work. The Contractor's Plan shall include, but not necessarily be limited to, the following:

- A. Stand-by/back-up pump set for the bypass application.
- B. Detail plan for 24-hour monitoring.
- C. Fueling of pump sets on demand.
- D. Location of flow diversion structures, collapsible sewer plugs, dams, pumps, and related materials and equipment. Sewer plug method and type of plugs or gates to be used.
- E. Key operational control factors, (i.e. maximum flow elevations upstream of dams).
- F. Pump sizes and flow rates.
- G. Destination of bypassed flows, including routing of force mains and provisions for vehicular and pedestrian traffic as necessary.
- H. Wet weather event procedures.

- I. Staging areas for the pumps.
- J. Number, size, material, locations, and method of installation of suction piping.
- K. Bypass pump sizes, capacity, number of each size to be on site, and power requirements.
- L. Calculations of static lift, friction loss, and flow velocity.
- M. Stand-by power.
- N. Downstream discharge plan.
- O. Method of noise control for each pump.
- P. Temporary pipe supports and anchoring required.
- Q. Heavy equipment needed for installation of pumps and piping.

The number and size of pumps utilized in bypass pumping shall be such that if the largest pump is out of service, bypass flows will be maintained during the bypass operation. Bypass pumping equipment shall include pumps, conduits, engines, and related equipment necessary to divert the flow or sewage around the section in which work is to be performed. In addition, the Contractor shall maintain at the same location and in operable condition, duplicate equipment to be used in case there is equipment failure. In this event, the Contractor shall promptly repair or replace the failed equipment to the satisfaction of the Owner.

The bypass system shall be of sufficient capacity to handle the peak flow of the pipe. The Contractor shall provide the necessary labor and supervision to set up and operate the pumping and bypassing system. The Contractor shall comply with any local sound ordinance. The equipment shall be manned continuously. During bypass pumping operations, the Contractor shall provide the necessary labor to continually monitor the operation and ensure uninterrupted and sufficient pumping at all times. The bypass pumping system shall be fueled every 24 hours or when the fuel tank reaches one quarter full, whichever comes first.

The Contractor shall provide all materials and labor as necessary to maintain flows in the existing sewer interceptor and all collector and lateral lines at all times and under all weather conditions. Interruption of flows will not be permitted. Overflows from bypass operations will not be permitted to enter into any streams or bodies of water. The Contractor will be solely responsible for any legal actions taken by the federal or state regulatory agencies if such overflows occur during construction.

New sewer pipes may be used by the Contractor to carry the sanitary flows after the new pipes have passed inspection and testing. Any "temporary" connections to the new sewer pipes shall be approved by the Owner.

New sewer pipes may be used by the Contractor to carry the sanitary flows after the new pipes have passed inspection and testing. Any "temporary" connections to the new sewer pipes shall be approved by the Owner.

Engine driven equipment for bypass pumping equipment shall have "critical grade mufflers." The enclosure shall be portable in order to allow the enclosure to be moved when bypass pumping equipment is moved. These conditions are subject to any other additional stipulations that may be required by local sound ordinances.

Bypass pumping, including all elements detailed above, will be paid for at the contract lump sum price of SEWER FLOW CONTROL AND BYPASS PUMPING.

6-9 WATER USE

The Contractor desiring to use water from municipal hydrants will be required to make an application to the Owner, and if the request is granted, shall conform with the ordinances of the municipality, as well as with the rules and regulations of the Water Department, and will be held responsible for all damages to hydrants and water pipe used for the purposes of securing water. Pipe wrenches approved by the Water Department shall be utilized for opening and closing hydrants and other appurtenances.

When additional water from fire hydrants is necessary to avoid delay in normal work procedures, the water shall be conserved and not used unnecessarily. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant.

The Owner wishes to keep accurate records of the amount of water used for the construction purposes. The Contractor shall use an approved water meter to record usage, and shall report the total water used to the Water Superintendent at the end of each working day. The Contractor will be responsible for the cost of the water billed at the normal residential rate.

SECTION 7. FORCE MAIN VALVES

7-1 GENERAL

Provide valve operators complete, including a suitable enclosure, with all appurtenances necessary for the operator to perform its intended function. Such appurtenances include, but are not limited to, anchor bolts and other mounting hardware, extension stems, operating nuts, direct burial valve boxes, and other such items.

7-2 MANUFACTURERS

Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

- A. Automatic Air Valves:
 - 1. Val-Matic Valve & Mfg. Corporation
 - 2. GA Industries
 - 3. APCO
 - 4. Engineer-approved equal
- B. Eccentric Plug Valves:
 - 1. DeZURIK
 - 2. GA Industries
 - 3. Engineer-approved equal
- C. Single Disc Swing Check Valves:
 - 1. American Flow Control
 - 2. Clow Valve Company
 - 3. M&H Valve Company
 - 4. Mueller Company
 - 5. GA Industries
 - 6. Engineer-approved equal

7-3 MATERIALS

Fabricate valves and operators of materials resistant to corrosion for the required service. For valve components the following standards shall apply:

- A. Operator housings and pedestal handwheels:
 - 1. Cast iron ASTM A 126, Class B
 ASTM A 48, Class 30 or 35
 - 2. Ductile iron ASTM A 395
 ASTM A 536, Grade 65-45-12
 - 3. Cast steel ASTM A 27/A27M

- | | | |
|----|-----------------------|----------------------------------------------------------------|
| B. | Operator worms, steel | ASTM A 29/A29M Grade
Designation 8620 |
| 1. | Operator gears, steel | ASTM A 572/A572M (spur & helical) |
| 2. | Worm gears, bronze | ASTM B 148, Alloy C95400 or C95500
ASTM B 584, Alloy C86300 |

7-4 VALVE JOINTS

Fabricate all valves with flanged ends, unless otherwise specified. For metallic flanged joints, provide flanges that are faced accurately at right angles to the axis of the casting. Face and drill flanges and shop coat with a rust-preventive compound before shipment. For flanged joints, provide flanges whose dimensions and drillings meet the requirements of ASME B16.1, 125 pounds as a minimum. For valves installed in force mains with test pressure requirements higher than 125 psi, provide flanges whose pressure ratings equal or exceed the specified test pressure of the force main. Furnish special drillings where required. For valves having flanges that do not conform to the thickness requirements of ASME B16.1, test each valve in accordance with the hydrostatic shell test pressure requirements of ASME B16.1.

7-4 OPERATING FORCE

Fabricate valves to limit the maximum force required to operate all manual valves, including but not limited to valves with wrench operated nuts, levers, handwheels and chainwheels, to 40 pounds. Limit the overall length of each wrench or single-arm lever to 18 inches. Limit the overall length of each dual-arm lever to 36 inches.

7-5 FLOOR AND BENCH STANDS

Accurately center floor and bench stands over the valve. Solidly bolt stands to the floor or support structure, with through-bolts wherever possible. Place approximately 3/4 inch of non-shrink cement grout beneath stands mounted on concrete or similar construction to assure uniform support. For stands installed within the area of a removable type floor, platform, or grating, securely mount them on their own support structure independent of the removable element, unless otherwise shown or specified.

7-6 VALVE VAULTS

Where a valve is shown or specified to be located within a vault, the vault shall be furnished and installed as shown on the drawings.

7-7 TYPE-SPECIFIC VALVE SPECIFICATIONS

Provide valves of the type(s) specified conforming to the specifications detailed in the sections below.

7-7.01 AIR RELEASE VALVES

A. SCOPE AND INTENT

This specification is intended to cover the design, manufacture, and testing of 1 in. (25 mm) through 8 in. (200 mm) Wastewater Combination Air Valves suitable for pressures up to 150 psig (1000 kPa).

Wastewater Combination Air Valves shall be fully automatic float operated valves designed to exhaust large quantities of air during the filling of a piping system and close upon liquid entry. The valve shall open during draining or if a negative pressure occurs. The valve shall also release accumulated air from a piping system while the system is in operation and under pressure. The valve shall perform the functions of both Wastewater Air Release and Wastewater Air/Vacuum Valves and furnished as a single body and dual body type as indicated on the plans.

B. STANDARDS, APPROVALS, AND VERIFICATION

Valves shall be manufactured and tested in accordance with American Water Works Association (AWWA) Standard C512. The manufacturer shall have a quality management system that is certified to ISO 9001:2000 by an accredited, certifying body.

C. CONNECTIONS

Single body valves sizes 4 in. (100 mm) and smaller shall have full size NPT inlets and outlets equal to the nominal valve size with a 2 in. (50 mm) inlet on 1 in. (25 mm) valves. The body inlet connections shall be hexagonal for a wrench connection. The body shall have 2" NPT cleanout and 1" NPT drain connection on the side of the casting. The valve shall have three additional NPT connections for the addition of backwash accessories.

D. DESIGN

Valves shall provide an extended body with a through flow area equal to the nominal size. Floats shall be unconditionally guaranteed against failure including pressure surges. Valves 4 in. (100 mm) and larger employing a bottom float guide shall be provided with a resilient bumper to cushion the float during sudden opening conditions. The seat shall provide drop tight shut off to the full valve pressure rating.

Single body valves shall have a full port orifice, a double guided plug, and an adjustable threaded orifice button. The 1 in. (25 mm) body shall be globe style to increase float clearance and reduce clogging. The plug shall be protected against direct water impact by an internal baffle and extended float stem. The float shall include a sensitivity skirt to minimize spillage.

E. MATERIALS AND CONSTRUCTION

Body material shall be ASTM A536 Grade 65-45-12 ductile iron. The float, plug, guide shafts, and bushings shall be constructed of Type 316 stainless steel. Non-metallic guides and bushings are not acceptable. Resilient seats shall be Buna-N. Interior of valve to be coated with fusion bonded epoxy. The exterior of the valve shall be coated with a universal alkyd primer.

Backwash accessories shall be furnished and shall consist of an inlet shut-off valve, a blow-off valve, a clean water inlet valve, rubber supply hose, and quick disconnect couplings. Accessory valves shall be quarter-turn, full ported bronze ball valves.

F. MANUFACTURER QUALIFICATIONS

The manufacturer shall demonstrate a minimum of five (5) years' experience in the manufacture of air valves. The valves shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512. When requested, the manufacturer shall provide test certificates, dimensional drawings, parts list drawings, and operation and maintenance manuals.

Wastewater Combination Air Valve shall be manufactured by Val-Matic Manufacturing Corporation, Elmhurst, IL, USA; GA Industries, Cranberry Township, PA, USA or Engineer-approved equal.

7-7.02 ECCENTRIC PLUG VALVES

A. SCOPE AND INTENT

This specification is intended to cover the design, manufacture, and testing of quarter turn plug valves meeting the requirements of AWWA C517 having an eccentric action that causes the plug to rise off the seat contact during the opening movement rather than sliding from its seat.

B. MATERIALS AND CONSTRUCTION

Provide plug valves with Buna-N or Chloroprene faced plugs.

Construct plug valves of cast iron or semi-steel at least equal to ASTM A 126, Class B, or ductile iron at least equal to ASTM A536 Grade 65-45-12. Construct the body seats with a welded-in overlay, of not less than 90 percent pure nickel, on all surfaces contacting the plug face. Make the overlay a minimum of 1/16-inch thick. Provide zinc plated bonnet bolts, studs and nuts on exposed valves and stainless steel buried valves.

Make the water-tightness of the valve seating adjustable. Provide a seating adjustment device that is external to the valve and that can be used without the need to remove the valve from the piping and with the valve under pressure.

Furnish plug valves with oil impregnated, permanently lubricated, Type 316 stainless steel bearings in the upper and lower journals.

Provide a stem seal consisting of multiple, self-adjusting and replaceable chevron type packing rings and a packing gland. Make the stem seal adjustable and replaceable without removing the valve from the piping and without the need to disassemble the valve and operator. For buried or submerged service, provide a sealed enclosure to keep the stem seal clean.

Unless otherwise specified, construct the valve with a minimum port area of 80 percent of the full area of the pipe in which the valve is installed.

Equip plug valves, except for buried or submerged service, with external visible indication of the plug position.

Unless otherwise shown or specified, equip valves with quarter-turn gear operators. Furnish one wrench for each size valve in each individual room or space in which valves are located. All geared operators to have bronze bearing located above and below the worm gear, as well as grease seals.

Unless otherwise shown or specified, for eccentric plug valves installed in horizontal piping, orient the valve such that when the shaft is in the horizontal position the seat is in the downstream position, and when the valve is in the open position, the plug is up. Unless otherwise shown or specified, for eccentric plug valves installed in vertical piping, orient the valve with the plug up when the valve is in the closed position.

C. SOURCE QUALITY CONTROL

Perform a bi-directional seat leakage shop test on each eccentric plug valve in accordance with Section 5 of AWWA C517. Demonstrate that there is no leakage past the plug.

Give each eccentric plug valve hydrostatic shop pressure tests in accordance with Section 5 of AWWA C517. Demonstrate with the hydrostatic tests that the valve is structurally sound and that there are no leaks through the external surfaces of the valve.

7-7.03 SINGLE DISC SWING CHECK VALVES

A. SCOPE AND INTENT

Provide single disc swing check valves designed to allow a full diameter passage and to operate with a minimum loss of pressure.

B. MATERIALS AND CONSTRUCTION

Provide 1/8- through 3-inch check valves that meet the requirements of MSS SP-80. Except as specified herein, provide 4-inch through 24-inch check valves that meet the requirements of AWWA C508.

Equip check valves with cast or ductile iron body; bronze or stainless steel renewable seat rings; bronze, cast or ductile iron disc with replaceable bronze or rubber disc rings; bronze disc hinge bushings; and stainless steel hinge pins. Carefully mount discs and provide discs that swivel in disc hinges. Provide pins, discs and other parts that are non-corrosive, non-sticking, and properly cured to operate satisfactorily within a temperature range of 34 to 100 degrees Fahrenheit and with the fluid specified.

Check valves shall be of the lifting arm type. Screw type check valves will not be allowed. Equip 6-inch and larger check valves with outside levers and weights.

7-8 PAYMENT

This work shall be paid for at the contract unit price per each for the type of valve specified at the diameter specified, complete with the valve vault (if specified), which payment shall include full compensation for furnishing labor, materials, and equipment, complete, in-place, and accepted, and for all materials necessary to complete the work as shown on the plans and specified above.

DIVISION II

Technical Specifications

WATER DISTRIBUTION

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SECTION 1. PIPE FOR WATER MAINS AND SERVICE CONNECTIONS

1-1 GENERAL

These Specifications cover the pipe fittings and accessory items normally used for water distribution systems. Special considerations will be covered in the Plans and Special Provisions.

Specification references made herein for manufactured materials such as pipe, hydrants, valve and fittings refer to designations for American Water Works Association (AWWA) or to American National Standards Institute (ANSI), as they are effective on the date of call for bids.

Copies of these publications may be obtained at nominal cost from the American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235 and from the American National Standards Institute, 1430 Broadway, New York, New York 10018.

1-2 PIPE MATERIALS

The type of pipe and fittings to be used in water mains will be stated in the Special Provisions, Plans or Bid items.

Where new water main is proposed to be constructed in the vicinity of an existing non potable force main, the water main shall be identified as a potable water line in a manner approved by the Engineer.

The Contractor shall be responsible for all material furnished by him and shall replace at his own expense all such material found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all material and labor required for the replacement of installed material discovered defective prior to the final acceptance of the Work.

The Contractor shall be responsible for the safe storage of material furnished by or to him, and accepted by him, and intended for the Work, until it has been incorporated in the completed project. The interior of all pipe fittings and other accessories shall be kept free from dirt and foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.

Any material furnished by the Owner that becomes damaged after acceptance by the Contractor shall be replaced by the Contractor at his own expense.

1-2.01 CONCRETE CYLINDER PIPE

Reinforced concrete water pipe, steel cylinder type prestressed, shall conform to the latest AWWA Standard C 301. Size, class marking, specials, lengths, etc., shall be as specified on the Plans or in the Special Provisions.

1-2.02 DUCTILE IRON PIPE

Ductile Iron Pipe shall conform to ANSI A 21.51 (AWWA C151), class to thickness designed per ANSI A 21.50 (AWWA C150), tar (seal) coated and/or cement lined per ANSI A 21.4 (AWWA C104), with mechanical or rubber ring (slip seal or push on) joints. Plans or Special Provisions shall indicate standard designation, thickness, class, coating and/or lining, and joint type.

1.2.03 CAST IRON OR DUCTILE IRON PIPE FITTINGS

All cast iron or ductile iron fittings, 3 inch through 48 inch shall conform to the latest ANSI/AWWA C110. Cast or ductile iron, coatings or linings or other items shall be specified in the Special Provisions.

1-2.04 SERVICE PIPE, STOPS, FITTINGS, AND BOXES

A. SERVICE PIPE

All service pipe shall be copper water tube, Type K, soft temper, for underground service, conforming to ASTM B-88 and B251. The pipe shall be marked with the manufacturer's name or trade mark indicative of the type of pipe. The outside diameter of the pipe shall conform to ASTM B251 Table 2.

B. STOPS AND FITTINGS

All corporation stops and curb stops shall be fabricated of brass and shall be provided with outlets suitable for copper connections. Curb stops shall be of the round-way type. Fittings for service pipe shall be copper and of the compression type.

1-2.05 SPECIALTY VALVES

Specialty valves and fittings such as cutting-in valves, tapping sleeves and valves, inserting valves, and air release valves shall conform to the requirements of the Special Provisions and shall be installed at locations indicated on the Plans.

1-2.06 SERVICE METERS AND APPURTENANCES

Service meters and appurtenances shall be located, furnished and installed in accordance with the requirements of the Special Provisions and the Plans. Appurtenances where required may include meter box, meter box cover, meter yoke, corporation cock, curb stop and incidental fittings.

SECTION 2. PIPE INSTALLATION FOR WATER MAINS

2-1 GENERAL

Pipe shall be installed in accordance with the manufacturer's specifications and instructions for the type of pipe used and applicable AWWA standards, such as C600 and C603, unless modified or changed in the Special Provisions.

2-2 CONSTRUCTION

2-2.01 PROTECTION OF WATER MAINS

A. GENERAL

Water mains and water service lines shall be protected from sanitary sewers, storm sewers, combined sewers, house sewer service connections and drains as follows:

B. HORIZONTAL SEPARATION-WATER MAINS AND SEWERS

1. Water mains shall be located at least ten feet horizontally from any existing or proposed drain, storm sewer, sanitary sewer, combined sewer or sewer service connection.
2. Water mains may be located closer than ten feet to a sewer line when
 - a. local conditions prevent a lateral separation of ten feet; and
 - b. the water main invert is at least 18 inches above the crown of the sewer; and
 - c. the water main invert is either in a separate trench or in the same trench on an undisturbed earth shelf located to one side of the sewer.
3. When it is impossible to meet (1) or (2) above, both the water main and drain or sewer shall be constructed of slip-on or mechanical joint cast or ductile iron pipe or prestressed concrete pipe, equivalent to water main standards of construction. The drain or sewer shall be pressure tested to the maximum expected surcharge head before backfilling.

C. VERTICAL SEPARATION-WATER MAINS AND SEWERS

1. A water main shall be separated from a sewer so that its invert is a minimum of 18 inches above the crown of the drain or sewer whenever water mains cross storm sewers, sanitary sewers or sewer service connections. The vertical separation shall be maintained for that portion of the water main located within ten feet horizontally of any sewer or drain crossed. A length of water main pipe

shall be centered over the sewer to be crossed with joints equidistant from the sewer or drain.

2. Both the water main and sewer shall be constructed of slip-on or mechanical joint cast or ductile iron pipe, prestressed concrete pipe, equivalent to water main standards of construction when:
 - a. it is impossible to obtain the proper vertical separation as described in (1) above; or
 - b. the water main passes under a sewer or drain.
3. A vertical separation of 18 inches between the invert of the sewer or drain and the crown of the water main shall be maintained where a water main crosses under a sewer. Support the sewer or drain lines to prevent settling and breaking the water main, as shown on the Plans or as approved by the Engineer.
4. Construction shall extend on each side of the crossing until the perpendicular distance from the water main to the sewer or drain line is at least ten feet.

D. WATER SERVICE LINES

1. The horizontal and vertical separation between water service lines and all storm sewers, sanitary sewers, combined sewers or any drain or sewer service connection shall be the same as water main separation described in Sections 2-2.02B and 2-2.01C above.
2. Water pipe described in Sections 2-2.01B, 2-2.01C and 2-2.01D shall be met unless special considerations are covered in the Plans and Special Provisions.

E. SPECIAL CONDITIONS

Conditions in Sections 2-2.01B, 2-2.01C and 2-2.01D shall be met unless special considerations are covered in the Plans and Special Provisions.

F. SEWER MANHOLES

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

2-2.02 EXCAVATION AND BACKFILL

Excavation and backfill for water mains shall conform to the provisions of Division II, Sections 1, 2 and 3 of the Excavation and Cleanup Specifications and the requirements below.

A. DEPTH OF PIPE COVER

Unless otherwise shown on the plans or indicated in the Special Provisions, all pipe shall be laid to a minimum depth of five (5') feet measured from the existing ground surface

or established grade to the top of the barrel of the pipe. In areas subject to subsequent excavation or fill, the mains shall be laid to assure a minimum depth of five (5') feet or to grades shown on the Plans.

B. TRENCH WIDTH

The trench width may vary and depend upon the size of pipe, depth of trench and the nature of the excavated material encountered. In any case, the trench width shall be ample to permit the pipe to be laid and jointed properly and the backfill to be placed and compacted.

C. PIPE FOUNDATIONS

The trench, unless otherwise specified, shall have flat bottom conforming to the grade to which the pipe is to be laid. The pipe shall be laid on sound soil cut true and even so that the barrel of the pipe will have a bearing for its full length. Bell holes shall be excavated for joints. Any part of the trench excavated below grade shall be corrected with an approved material and thoroughly compacted.

D. DEWATERING OF TRENCH

Where water is encountered in the trench, it shall be removed during pipe-laying and jointing operation. Provisions shall be made to prevent floating of the pipe. Trench water shall not be allowed to enter the pipe at any time.

2-2.03 HANDLING OF THE PIPE

All types of pipe shall be handled in such manner as will prevent damage to the pipe or coating. Accidental damage to pipe or coating shall be repaired to the satisfaction of the Engineer or be removed from the job and methods of handling shall be corrected to prevent further damage when called to the attention to the Contractor.

Threaded pipe ends shall be protected by couplings or other means until laid.

The pipe and fittings shall be inspected by the Contractor for defects while suspended above grade.

Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned and re-laid. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or by other means approved by the Engineer to ensure absolute cleanliness inside of the pipe.

2-2.04 LAYING OF PIPE ON CURVES

Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflections at the joints. If the pipe is shown curved on the Plans and no special fittings are shown, the Contractor can assume that the curves can be made by deflection of the joints with standard lengths of pipe.

Where field conditions require deflections of curves not anticipated by the Plans, the Engineer will determine the methods to be used. No additional payment will be made for laying pipe on curves as shown on the Plans, nor for field changes involving standard lengths of pipe deflected at the joints.

Maximum deflections at pipe joints and laying radius for the various pipe lengths are as found in the following standards:

Ductile Iron Pipe Bell and Spigot Joints only Required for Special Conditions	ANSI/AWWA C600
Ductile Iron Pipe Mechanical Joints	ANSI/AWWA C600
Ductile Iron Pipe Push on Joints	NSI/AWWA C-600
Concrete Cylinder Pipe	See Manufacturer's Recommendations

When rubber gasketed pipe is laid on a curve, the pipe shall be jointed in a straight alignment and then deflected to the curve alignment. Trenches shall be made wider on curves for this purpose.

2-2.05 DUCTILE IRON PIPE

A. JOINTS FOR DUCTILE IRON PIPE

Joints for ductile iron pipe shall be in accordance with the following applicable specifications unless otherwise noted:

1. Mechanical Joints - AWWA C111 and C600
2. Push-On Joints - AWWA C111 and C600

B. JOINTING MECHANICAL JOINT PIPE

The outside of the spigot and inside of the bell of mechanical joint pipe shall be thoroughly cleaned to remove all foreign matter from the joint. The cast iron gland shall then be slipped on to the spigot end of the pipe with the lip extension of the gland toward the socked or bell end. The rubber gasket shall be placed on the spigot end with

the thick edge toward the gland. The pipe shall be pushed forward to completely seat the spigot end in the bell. The gasket shall then be pressed into place within the bell, being careful to have the gasket evenly located around the entire joint. The cast iron gland shall then be moved along the pipe into position and bolted.

Nuts spaced 180 degrees shall be tightened alternately to AWWA C600 Standards in order to produce an equal pressure on all parts of the gland.

C. JOINTING RUBBER GASKET JOINT PIPE (AWWA C111)

The inside of the bell shall be thoroughly cleaned to remove all foreign material from the joints. The circular rubber gasket shall be inserted in the gasket seat provided.

A thin film of gasket lubricant shall be applied to the inside surface of the gasket. Gasket lubricant shall be a solution of vegetable soap or other solution supplied by the pipe manufacturer and approved by the Engineer.

The spigot end of the pipe shall be cleaned and entered into the rubber gasket in the bell, using care to keep the joint from contacting the ground. The joint shall then be completed by forcing the plain end into the seat of the bell. Pipe which is not furnished with depth mark shall be marked before assembly to assure that the spigot end is inserted to the full depth of the joint.

Field-cut pipe lengths shall be bevelled to avoid damage to the gasket and facilitate making the joint.

To insure electrical conductivity on ductile iron pipe water mains, brass wedges shall be installed as follows:

<u>Pipe Size</u>	<u>Wedges Required</u>
2" thru 12"	2 each (180° apart)
Above 12"	2 pair of 2 each (180" apart)

Caldweld bonding, as approved or specified by Engineer, may also be utilized.

2-2.06 CONCRETE PRESSURE PIPE

A. LAYING CONCRETE PRESSURE PIPE

Pipe shall be laid and jointed in accordance with manufacturer's recommendations and these Specifications. In the absence of manufacturer's recommendations, the AWWA installation manual M-9 shall be used.

B. JOINTING CONCRETE PRESSURE PIPE

All joint surfaces of the bell and spigot (tongue and groove) shall be thoroughly cleaned to remove all dirt and foreign material. The spigot or tongue end of the pipe with the gasket in place and with all surfaces lubricated as recommended by the pipe manufacturer shall be inserted in the bell or groove. The pipe shall then be shoved or pulled home.

The outside annular space at the joint shall be filled with cement mortar or with a preformed joint filler when approved by the Engineer.

The grouting of the outside joints shall be made by wrapping the joint with two bands of strong waterproof Sisalkraft paper or other approved material. The band of paper shall then be tightly strapped to the pipe using tools recommended by the manufacturer. The joints shall then be filled with mortar from one side only, until the mortar appears on the other side of the pipe. Mortar shall be mixed with the least amount of water that will permit placing by the method described. Flexible wires shall be worked around the joint to assist grouting and ensure proper filling of the joint. The top of the pipe shall then be grouted and the paper band laid over the entire joint to protect it while curing.

The inside annular space in pipe 42 inches and larger in diameter shall also be filled with cement mortar and troweled flush. Mortar shall consist of one (1) part portland cement and two (2) parts of plaster sand. Mortar for inside joints shall be mixed with only enough water for "dry packing".

No grouting of joints will be allowed within two joints of laying operations. A representative of the Engineer will be present when joints are being poured.

2-2.07 THRUST BLOCKING

Blocking to prevent movement of lines under pressure shall be placed at all bends, tees, caps, valve and hydrants with Portland Cement Concrete, a minimum of 12" thick, placed between solid ground and the fittings, and shall be anchored in such a manner that pipe and fitting joints will be accessible for repairs.

All bends of 11-1/4 degrees or greater, and all tees and plugs shall be thrust protected to prevent movement of the lines under pressure as shown on the Plans.

Where conditions prevent the use of concrete thrust blocks, tied joints or restrained joints of a type approved by the Engineer shall be used.

2-2.08 CONNECTIONS TO EXISTING MAINS

All connections to water mains in use shall be made by the Contractor unless otherwise provided in the Special Provisions. All crosses or other specials required to be inserted in an existing main shall be furnished and set by the Contractor.

Where the connection of new work to old requires interruption of service and notification of customers affected, the superintendent of the Municipality, and the Contractor shall mutually agree upon a date and time for connections which will allow ample time to assemble labor and materials, and to notify all customers affected.

2-2.09 WATER SERVICE PIPING

A. GENERAL

Water service pipe shall be installed in accordance with provisions in Section 2.

B. EXCAVATION AND BACKFILL

The Contractor shall open side trenches and construct services from the main to such depth and lengths as directed by the Engineer. Unless otherwise directed, depths shall not be less than specified for water mains. Excavation and backfill of side trenches shall be as specified in Division II, Excavation and Cleanup Specifications.

C. LAYING WATER SERVICE PIPE

1. Underground water service pipe shall be laid not less than ten (10') feet horizontally from the building drain, and shall be separated there from by undisturbed or compacted earth.
2. Where conditions in paragraph (1) cannot be met, the water service pipe shall be installed in accordance with the following provisions:
 - a. The bottom of the water service pipe, at all points, shall be at least eighteen (18") inches above the top of the building drain line at its highest point.
 - b. The water service pipe shall be placed on a solid shelf excavated to one side of the common trench.
3. Where both the water service pipe and building drain line are installed with less separation than in paragraph (2) or in the same trench, the building drain line shall be constructed of cast iron soil pipe with push-on joints, type K hard-tempered copper pipe with sweated joints, or rigid plastic pipe as specified in the Illinois State Plumbing Code. The trench shall not be backfilled until the installation is approved by the Engineer.

2-2.10 WATER SERVICE CONNECTION

The Contractor shall make all taps for service connections and install the service pipe, unless otherwise provided on the Plans and in the Special Provisions.

Each water service pipe shall be connected to the water main through a brass corporation stop. The main shall be tapped at an angle of forty-five degrees (45°), with the vertical, and the stop must be turned so that the T-handle will be on top.

The service pipe shall be laid in the trench sufficiently weaving to allow not less than one (1') foot extra length in its entire length.

A curb stop shall be furnished and installed for each service at a location shown on the Plans, specified or as directed by the Engineer. A cast iron service box shall be furnished and installed over the curb stop and held in a truly vertical position, until sufficient backfill has been placed to insure permanent vertical alignment of the box. The top of the box shall be adjusted and set flush with the established ground surface grade.

2-2.11 PRESSURE TESTING OF WATER MAINS

A. PRESSURE TEST

After the pipe has been laid and partly backfilled as specified herein, all newly laid pipe or any valved sections of it shall, unless otherwise expressly specified, be subjected to a hydrostatic pressure equal to 50 per cent more than the operating pressure at the lowest elevation of the pipe section, but not to exceed the pressure rating of the type of pipe specified. The duration of each pressure test shall be for a period of not less than one hour and not more than six hours. The basis provisions of AWWA C603 and C600 shall be applicable, if specified.

B. PROCEDURE FOR TEST

Each section of pipe to be tested, as determined by the Engineer, shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump pipe shall be furnished by the Contractor. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation and afterwards tightly plugged. Any cracked or defective pipes, fittings, valves, or hydrants discovered in consequence of this pressure test shall be removed and replaced by the Contractor with sound material and the test shall be repeated until satisfactory to the Engineer. Provisions of AWWA C600 and C603, where applicable, shall apply.

C. LEAKAGE TEST

1. After completion of the pressure test, a leakage test shall be conducted to determine the quantity of water lost by leakage under the specified test pressure. Test pressure is defined as the maximum operating pressure of the section under test and is based on the elevation of the lowest point in the line or section under test corrected to the elevation of the test gauge. Applicable provisions of AWWA C-600 and C603 shall apply. Duration of each leakage test shall be a minimum of one (1) hour in addition to the pressure test period.

2. Allowable leakage in gallons per hour for pipeline shall not be greater than that determined by the formula:

$$L = NDP^{1/2}/7400$$

Note: L = Allowable leakage in gallons per hour

N = Number of joints in length of pipeline tested.

D = Nominal diameter of the pipe in inches.

P = Average test pressure during leakage test in pounds per square inch gauge.

3. Leakage is defined as the quantity of water to be supplied in the newly laid pipe or any valved section under test, which is necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.

4. Flanged pipe shall be "bottle tight".

2-2.12 DISINFECTION OF WATER MAINS

A. FLUSHING

Sections of pipe to be disinfected shall first be flushed to remove any solids or contaminated material that may have become lodged in the pipe. If no hydrant is installed at the end of the main, then a tap should be provided large enough to develop a velocity of at least two and five-tenths feet (2.5') per second in the main. One two and one-half inch (2-1/2") hydrant openings will, under normal pressures, provide this velocity in pipe sizes up to and including twelve-inch (12").

All taps 2" size and smaller required for chlorination or flushing purposes, or for temporary or permanent release of air shall be provided for by the Contractor as a part of the construction of water mains. Taps larger than 2" shall be paid for as a bid item or as an extra.

B. REQUIREMENT OF CHLORINE

Before being placed into service, all new mains and repaired portions of, or extensions to existing mains shall be chlorinated so that the initial chlorine residual is not less than 50 mg/1 and that a chlorine residual of not less than twenty-five (25 mg/1) remains in the water after standing twenty-four (24) hours in the pipe.

See Division I, Section 7-12 "Use of Fire Hydrants" regarding use of water for flushing and disinfection.

C. FORM OF APPLIED CHLORINE

Chlorine shall be applied by one of the methods which follow subject to approval by the Engineer.

1. LIQUID CHLORINE

A chlorine gas-water mixture shall be applied by means of a solution-feed chlorinating device, or the dry gas may be fed directly through proper devices for regulating the rate of flow and providing effective diffusion of the gas into the water within the pipe being treated. Chlorinating devices for feeding solutions of the chlorine gas, or the gas itself, must provide means for preventing the backflow of water into the chlorine.

2. CHLORINE-BEARING COMPOUNDS IN WATER

A mixture of water and high-test calcium hypochlorite (65-70%Cl) may be substituted for the chlorine gas water mixture. The dry powder shall first be mixed as a paste and then thinned to a one per cent (1%) chlorine solution by adding water to give a total quantity of seven and five-tenths (7.5) gallons of water per pounds of dry powder. This solution shall be injected in one end of the section of main to be disinfected while filling the main with water in the amounts as shown in the table which follows:

Chlorine Requirements to Produce 50 mg/1 Concentration in 100 Foot of Pipe - By Diameter		
Pipe Size Inches	100% Chlorine, Lb.	1% Chlorine Solution, Gals.
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88

3. ***TABLET DISINFECTION***

Tablet disinfection is best suited to short extensions (up to 2500 ft.) and smaller diameter mains (up to 12-inches). Since preliminary flushing must be eliminated in using this method, it should be utilized only when scrupulous cleanliness has been used in construction. It shall not be used if trench water or foreign material has entered the main or if the water is below 41°F.

Tablets should be placed in each section of pipe, hydrants, hydrant branches and other appurtenances. Tablets must be at the top of the main and shall be attached by an adhesive, such as Permatex No. 1 or any alternative approved by the Engineer. Tablets in joints between pipe sections, hydrants, hydrant branches or appurtenances are to be crushed and placed inside the annular space, rubbed like chalk in butt ends of sections to coat them if the type of assembly does not permit crushing.

In filling a section of piping with water when using the tablet method, water velocity shall be less than one foot (1') per second.

Number of 5-Grain Hypochlorite Tablets Required
For a Dosage of 50 mg/1 per Length of Pipe Section

<u>Pipe Size,</u> <u>Inches</u>	<u>Length of Pipe Section</u>				
	<u>Foot</u>				
	<u>Up to 13</u>	<u>18</u>	<u>20</u>	<u>30</u>	<u>40</u>
2	1	1	1	1	1
4	1	1	2	2	2
6	2	2	3	3	4
8	2	3	4	5	6
10	3	5	7	7	9
12	5	6	10	10	14

D. ***POINT OF APPLICATION***

The preferred point of application of the chlorinating agent is at the beginning of the pipe line extensions or any valved section of it, and through a corporation stop inserted in the pipe. The water injector for delivering the chlorine-bearing water into the pipe should be supplied from a tap made on the pressure side of the gate valve controlling the flow into the pipe line extension. Alternate points of application may be used when approved by the Engineer.

E. ***PREVENTING REVERSE FLOW***

Valve shall be manipulated so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water. Check valves may be used if desired.

F. RETENTION PERIOD

Treated water shall be retained in the pipe at least twenty-four (24) hours. After this period, the chlorine residual at pipe extremities and at other representative points shall be at least twenty-five (25) mg/1.

G. CHLORINATING VALVES AND HYDRANTS

In the process of chlorinating newly laid pipe, all valves or other appurtenances shall be operated while the pipe line is filled with the chlorinating agent and under normal operating pressure.

H. FINAL FLUSHING AND TESTING

Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremity until the replacement water throughout its length shows upon test, a chlorine residual of less than 1 mg/1. In the event chlorine is normally used in the source of supply, then the test shall show a residual of not in excess of that carried in the system.

After flushing, water samples collected on two (2) successive days from the treated piping system, as directed by the Engineer, shall show satisfactory bacteriological results. Bacteriological analyses must be performed by a laboratory approved by the Illinois Department of Public Health.

I. REPETITION OF FLUSHING AND TESTING

Should the initial treatment result in an unsatisfactory bacterial test, the original chlorination procedure shall be repeated by the Contractor until satisfactory results are obtained.

2-2.13 MEASUREMENT

In addition to the items listed for separate measurement and payment in Division II, Excavation and Backfill for Underground Conduits, and Restoration of Surfaces, the following items shall be measured for payment when required for water main construction:

WATER MAIN:

Water main shall be listed in the bid items by size and type, and shall be measured in lineal feet, slope measurement, along the center line without deduction for valves and fittings. However, when the water main terminates in a hydrant valve or other main connection, measurement shall be from the center of the hydrant valve or other main connection.

GATE VALVES AND VALVE BOXES OR VAULTS

Gate valves and valve boxes of the size required shall be measured for payment as an installed unit.

BUTTERFLY VALVES

Butterfly valves of the type and size required shall be measured for payment as an installed unit.

CAST OR DUCTILE IRON FITTINGS

Cast or Ductile iron fittings shall be measured for payment by the pound, or by units as shown on the Proposal Form. The weight of accessories shall be included as part of the weight of the fittings. Shipper's invoice weight shall be taken as the weight for payment purposes, subject to confirmation by actual weighing near the site if there is reason to doubt the accuracy of invoice weights.

SERVICE PIPE

Service pipe of the size and type required shall be measured by the lineal foot for installed length, or by units (Long Tap or Short Tap) as shown as a Bid item.

FIRE HYDRANTS

Fire hydrants by size and type required shall be measured for payment as an installed unit complete with accessories and thrust blocking. Where a gate valve is required on the connection between the water main and the fire hydrant, the gate valve shall be included with the payment for fire hydrant.

SPECIALTY VALVES

Specialty valves shall be measured as an installed unit by size and type required.

WATER MAIN IN TUNNEL

Water Main in Tunnel, Water Main Jacked or Water Main in Casing of the size and type indicated shall be measured in lineal feet installed in accordance with requirements of the Plans.

CONNECTIONS TO EXISTING MAINS

Where shown as a separate pay item, this work will be measured for separate payment. If not shown as a separate bid item, this work will be included as an incidental expense in the unit price for water main. In no event will payment be made when separate payment is provided for a tapping sleeve and a tapping valve.

THRUST BLOCKING AND RESTRAINED JOINTS

Unless otherwise provided in the Special Provisions, thrust blocking, restrained joints or ties as specified shall be included as an incidental expense in the payment for water mains and shall not be measured for separate payment.

SECTION 3. GATE VALVES FOR WATER MAINS

3-1 DESCRIPTION

The valves shall be suitable for ordinary waterworks service, intended to be installed in a normal position on buried pipe lines for water distribution systems.

The minimum requirements for all gate valves shall, in design, material and workmanship, conform to the standards of the latest AWWA C500. All materials used in the manufacture of waterworks gate valves shall conform to the AWWA standards designed for each material listed.

3-2 MATERIALS

3-2.01 MANUFACTURE AND MARKING

The gate valves shall be standard pattern and shall have the name or mark of the manufacturer, size and working pressure plainly cast in raised letters on the valve body.

3-2.02 TYPE AND MOUNTING

The valve bodies shall be cast iron, mounted with approved non-corrosive metals. All wearing surfaces shall be bronze or other approved non-corrosive material and there shall be no moving bearing or contact surfaces of iron in contact with iron. Contact surfaces shall be machined and finished in the best workmanlike manner, and all wearing surfaces shall be easily renewable.

All gate valves shall be two-faced, non-rising stem, double disc, with parallel sets of bronze or other approved wedging devices placed between them. The stem shall be of high tensile strength bronze or other approved non-corrosive metal. All nonferrous bushings shall be of substantial thickness tightly fitted and pressed into machined seats. All valves shall open by turning to the left counter-clockwise, unless otherwise specified. Consideration shall be given to types of bronze used where high galvanic waters (high pH or specific conductance) are present. See AWWA C500. Paragraph 2.2.3.4.

3-2.03 END CONNECTIONS

End connections of gate valves shall consist of one of the following types unless otherwise provided in the Special Provisions or shown on the Plans:

- A. Mechanical Joints
- B. Push-On (Rubber-gasket) Joints
- C. Bell End Joints, lead (only where required for special conditions)
- D. Flange Joints
- E. Screwed or Threaded Joints.

3-2.04 GATE VALVES 16-INCH AND LARGER

Gate valves sixteen (16") inch and larger to be installed in a horizontal position in a horizontal pipeline shall be of the double-disc type and shall be equipped with solid-bronze (Grade I or IV) or 300 series stainless steel tracks securely fastened in body and bonnet. The weight of the gates shall be carried on rollers throughout their entire length of travel. For double-disc valves of the rolling-disc type, the discs shall serve as rollers. For double disc valves or other than the roller disc type, the discs shall be carried on solid-bronze) Grade I, II, III, or IV) rollers securely attached to them. All valves shall be equipped with bronze scrapers to traverse the tracks ahead of the rollers.

Valves sixteen (16") inch and larger installed in a vertical or inclined lines shall be equipped with tracks manufactured of an acceptable grade of bronze or 300 series stainless steel secured to the valve body and bonnet to support the lower disc during operation, and equipped with slides to assist the travel of the gate assembly.

They shall be non-rising stem type and shall be equipped with approved rugged gate position indicators. The valves shall be provided with handwheels of ample proportion.

All gears on gate valves shall be cut tooth steel gears housed in heavy cast iron grease cases or approved design.

When manually operated gate valve sixteen (16") inches and larger are required, they shall be equipped with a by-pass and by-pass valve. By-pass valve shall be of the same type as the main valve, shall be equipped with handwheel and shall have the stem in a vertical position unless otherwise indicated. Sizes shall be as follows:

<u>Valve Diameter (Inches)</u>	<u>By-Pass Diameter (Inches)</u>
16 to 20	3
24 and 30	4
36 and 42	6
48 and larger	8

All gate valves sixteen (16") and larger shall be geared with gearing designed for handwheel operation. Gear ratios shall not be less than as follows:

<u>Valve Diameter (Inches)</u>	<u>Gear Ratio</u>
16	2:1
20	2:1
24	2:1
30	3:1
36	3:1
42	4:1
48	4:1

3-2.05 GATE VALVE STEM SEALS

All gate valves of size twelve (12") inches shall be furnished with two (2) pressure actuated O-ring stem seals, with one (1) O-ring below the stem thrust collar and bearing surfaces and one (1) O-ring above. The area between the O-rings shall be filled with a lubricant to give continuous lubrication to the stem collar and bearing surfaces so as to provide long-term ease of operation. An upper and lower stem collar bushing of an acceptable grade of bronze shall be acceptable in lieu of the above if the stem collar and bearing surfaces are exposed to internal water pressure.

Valves larger than twelve (12") inches shall be as described above unless they are required to be furnished with extended stems with gear cases, in which case they shall be furnished with adjustable stuffing boxes so that they may be repacked without the need to disassemble and remove the gear case.

3-2.06 WRENCH NUTS

Wrench nuts shall be made of cast iron and shall be one and fifteen-sixteenths (1-15/16") inches square at the top, two (2") inches square at the base, one and three-fourths (1-3/4") inches high, unless otherwise designated in the Special Provisions. Nuts shall have a flanged base upon which shall be cast an arrow at least two (2") inches long showing the direction of opening. The word "Open" in one-half (1/2") inch or larger letters shall be cast on the nut to clearly indicate the direction of opening the valve.

3-2.07 TAPPING VALVES

Tapping valves shall be furnished with flanged inlet end connections having a machined projection on the flanges to mate with a machined recess on the outlet flanges of the tapping sleeves and crosses. The outlet ends shall conform in dimensions to the AWWA Standards for hub or mechanical joint conditions, except that the outside of the hub shall have a large flange of attaching a drilling machine. The seat opening of the valves shall be larger than normal size to permit full diameter cuts. Tapping sleeve or cross shall be of the same manufacturer as the tapping valve.

3-2.08 HYDROSTATIC TEST PRESSURE AT FACTORY

Each gate valve shall be tested at the factory for performance and operation prior to painting and shall be subjected to the following hydrostatic pressure tests: each three (3") inch to twelve (12") inch valve, inclusive, shall be subject to hydrostatic pressure test under pressures of both three hundred (300) psi and one hundred seventy-five (175) psi, and each sixteen (16") inch to forty-eight (48") inch valve, inclusive, shall be subject to test pressures of three hundred (300) psi and one hundred fifty (150) psi. These tests shall be conducted in accordance with provisions of AWWA C500. Tests for special valves shall be made as provided in the Special Provisions.

3-2.09 PAINTING AT THE FACTORY

After the factory test and inspection and before leaving the factory, all ferrous parts of the valves except finished or bearing surfaces shall be painted inside and out with a rust preventative compound.

3-3 *INSTALLATION OF GATE VALVES*

All gate valves shall be inspected upon delivery in the field to insure proper working order before installation. They shall be set and jointed to the pipe in the manner as set forth in the AWWA Standards for the type of connection ends furnished.

Valves twelve (12") inch and under shall be installed in a vertical position and be provided with a standard valve vault or case iron valve box so arranged that no shock will be transmitted to the valve. The box shall be centered over the operating nut, and the cast iron box cover shall be set flush with the road bed or finished surface.

After installation, all valves shall be subjected to the field test for piping as outlined in Section 2. of these specifications. Should any defects in materials or workmanship appear during these tests, the Contractor shall correct such defects with the least possible delay and to the satisfaction of the Engineer. Should the Contractor fail to do this within a reasonable period of time in the judgment of the Owner, he may cause such defects to be corrected and deduct the cost thereof from any money or payments due or to become due the Contractor.

SECTION 4. BUTTERFLY VALVES FOR WATER MAINS

4-1 DESCRIPTION

Butterfly valves to be installed in water main distribution systems shall conform to AWWA C504-70 specifications. As specified, a valve may be one of the following type or classes as designated by Plans or Special Provisions.

- A. Wafer Valves - Class 150B, in sizes through 20 inches
- B. Short-Body Valves - All classes, in 3 to 72 inch sizes
- C. Long Body Valves - Class 75A, 75B, 150A and 150B in 3 to 72 inch sizes.
- D. Mechanical Joint End Valves - Class 150B in size 3 through 20 inch diameter and all classes in 30 inch through 48 inch diameter sizes.

End connections shall consist of one of the following types as provided in the Special Provisions or as shown on the Plans:

- A. Mechanical Joints
- B. Push-On (Rubber-gasket) Joints
- C. Flange Joints
- D. Screw or Threaded Joints

4-2 DATA TO BE FURNISHED BY CONTRACTOR

If required, the Contractor shall submit for approval by the Engineer drawings showing the principal dimensions, general construction and materials used for all parts of the valves and operator. All work shall be done and all valves shall be furnished in accordance with these drawings after they have been approved by the Engineer.

4-3 WORKMANSHIP

Valve parts shall be designated, and manufacturing tolerances set, to provide interchangeability of parts between units of the same size and produced by any one manufacturer. When assembled, valves manufactured in accordance with this standard shall be well-fitted and smooth running, and body and shaft seal shall be watertight. All equipment shall be guaranteed against defects in workmanship or materials for one (1) year after installation or two (2) years after shipment, whichever time elapses first.

4-4 MARKINGS

Markings for other than wafer valves shall be cast on the body or shall be on cast plates with raised letters, attached to the valve body. The markings shall show the valve size, manufacturer, class and year of manufacture. The minimum size of letters shall be 1/4 inch for valves 3 to 12 inches in diameter, and

1/2 inch for valves larger than 12 inches in diameter. Corrosion- resistant plates attached to the body and with 1/8 inch etched or engraved letters may be used for markings on wafer valves.

4-5 PAINTING

Unless otherwise specified, all internal steel or cast iron surfaces of each valve, except finished or bearing surfaces, shall be shop painted with two (2) coats of asphalt varnish conforming to Federal Specification TT-V-51f, and exterior steel or cast iron surfaces of each valve, except finished or bearing surfaces, shall be shop painted with two (2) coats of zinc chromate conforming to Federal Specification TT-P-645A; or, in the case of valves for buried service, with two (2) coats of asphalt varnish conforming to Federal Specification TT-V-51f.

4-6 TESTS

Each butterfly valve shall be tested for leakage in the manufacturer's shop and such leakage shall conform to AWWA C504.

SECTION 5. VALVE VAULTS AND BOXES FOR WATER MAINS AND WATER SERVICES

5-1 GENERAL

This section shall apply to the construction of standard valve vaults or chambers, special valve vaults or changers, cast iron valve boxes, curb boxes and meter boxes, all in accordance with the Standard Drawings.

Deep valves shall be provided with cast iron valves boxes set over the operating stem, except where otherwise specified or shown on the Plan.

5-2 MATERIALS

5-2.01 RING AND COVER AND VALVE BOX CASTINGS

Castings for cast iron ring and cover and for cast iron parts of valve boxes shall conform to the requirements of Standard Specifications for Gray Iron Castings, ASTM. Designation A-48.

5-3 CONSTRUCTION DETAILS

5-3.01 VALVE VAULT (OR BASINS)

Valve vaults (or basins) may be either pre-cast or cast-in-place only, according to the details shown on the drawings. Applicable provisions of Division II, Sanitary Sewers and Storm Sewers, Section 4 shall govern construction of valve vaults and chambers.

5-3.02 CAST IRON VALVE BOXES

Cast iron valve boxes as shown on the drawing are placed for enclosing gate valves of small size in lieu of gate valve chambers.

Adjustable cast iron valve boxes shall be set to position during backfilling operations so they will be in a vertical alignment to the gate valve operating stem. The lower casting of the unit shall be installed first in such a manner as to be cushioned and to not rest directly upon the body of the gate valve or upon the water main. The upper casting of the unit shall then be placed in proper alignment into such an elevation that its top will be a final grade. Backfilling around both units shall be placed and compacted to the satisfaction of the Engineer.

5-3.03 CURB BOXES

Curb boxes shall be screwed type, with the base threaded to attach to the curb stop or shall be Buffalo or "arch" type, and of such construction that it shall be capable of extension to finished grade. The type of curb box shall be shown on the Plans, or indicated in the Special Provisions.

SECTION 6. FIRE HYDRANTS

6-1 DESCRIPTION

These specifications are to be used in conjunction with the AWWA Standard C502 for dry barrel fire hydrants for ordinary water works service.

6-2 MATERIALS

6-2.01 MATERIALS FOR HYDRANTS AND APPURTENANCES

Hydrants shall be of a manufacture and pattern approved by the Owner. The name or mark of the manufacturer, size of valve opening, and year of manufacturer shall be clearly cast in raised letters on the upper barrel section above finished grade.

Hydrants shall be designed for a working pressure of 150 psi, and equipped with not less than two (2) O-ring stem seals. Hydrant body castings shall be manufactured of cast iron or ductile iron. The lower barrel section, elbow (shoe) casting, and flanges below grade shall be either cast iron or ductile iron.

Hydrants shall be internally mounted with approved non-corrodible metals and in such a way that parts working together shall not both be iron or steel. Consideration shall be given to type of bronze used where high galvanic waters (high pH or specific conductance) is present. See AWWA C502, paragraph 2.8.

All wearing and working internal parts shall be accurately machined, easily renewable, and shall be removable through the top of the hydrant.

Lugs, if required for harnessing the hydrant to the connecting pipe from the main in the street, shall be provided on the bell of the elbow or on the hydrant bottom casting. A drawing of the lug construction shall be submitted for approval on request of the Engineer.

The hydrant barrel shall be provided with a clearly marked circumferential rib to denote the intended ground line. There shall be a flange above this point at a sufficient height to permit access to the flange. Unless indicated otherwise on the Plans, hydrants shall be of the "traffic" or "break-away" design with easily replaceable breaking devices for the gradeline flange and operating stem that prevent damage to barrel sections upon impact.

6-2.02 HYDRANT DETAILS

Unless required otherwise to conform to the Owner's existing equipment and specifications, the following hydrant details shall be provided:

Bury (trench) depth shall be as shown on the Plans.

When tested in accordance with AWWA C502, friction losses through the hydrant shall not exceed the maximum permissible losses listed in Table 3, AWWA C502.

Hydrants with six (6") inch inlet connections shall be furnished with two (2) 2-1/2 inch hose nozzles and one (1) 4-1/2 inch pumper nozzle. Hydrants with 4 inch inlet connections shall be furnished with two (2) 2-1/2 inch hose nozzles.

All nozzles shall be manufactured of an acceptable grade of bronze, properly secured to the barrel section to prevent blowing out, and accurately threaded in accordance with National Standard Hose Coupling Thread Specifications, or to match Owner's existing or as indicated in the Special Provisions.

All nozzles shall be furnished with inside threaded cast iron caps fitted with suitable gaskets for positive water tightness under test pressure. Operating nut and nozzle cap wrench nuts shall be 1-1/2 inch pentagon, measured from point to opposite flat at the base, tapering uniformly to 1-7/16 inch at the top, and the height of the nut shall be not less than 1 inch. Nozzle caps shall be securely chained to the upper barrel section.

The hydrant shall open by turning to the left (counter-clockwise) and the direction of opening shall be permanently and clearly marked on the bonnet assembly near the operating nut.

6-2.03 FACTORY HYDROSTATIC TEST

Before the hydrant is painted at the factory, it shall be subjected to an internal hydrostatic test of 300 pound per square inch with the hydrant valve in a closed position and again with the hydrant valve in an open position.

6-2.04 PAINTING

All iron parts of the hydrant both inside and outside shall be thoroughly cleaned and painted. All inside surfaces and the outside surfaces below the ground line shall be coated with asphalt varnish. They shall be covered with two coats, the first having dried thoroughly before the second is applied.

The outside of the hydrant above the finished ground line shall be thoroughly cleaned and thereafter painted with one coat of paint of a durable composition, and one additional coat of a color specified by the Owner.

6-3 CONSTRUCTION DETAILS

Hydrants shall be installed at the locations as shown on the Plans. They shall be plumb and shall be set so that the lowest hose connection is at least twenty-four (24") inches above the surrounding finished grade. All hydrants shall be inspected in the field upon delivery to the job to insure proper operation before installation. A minimum of 1/4 cubic yard of coarse stone, broken concrete, or like material shall be placed at and around the base of the hydrant to insure proper drainage of the hydrant after use. The

blocking of the hydrant shall consist of a wedge of P.C. Concrete of not less than 1/4 cubic yard extending from the hydrant to undisturbed soil and shall be so placed to form a solid barrier adjacent to the hydrant base to counteract the pressure of water exerted thereon. Care shall be taken to insure that weep holes are not covered by concrete. The hydrant shall be set on a concrete clock to insure a firm bearing for the hydrant base. The hydrant, valve and tee shall be interconnected by steel rods if required by Special Provision. The resetting of existing hydrants and moving and reconnecting of existing hydrants shall be handled in a manner similar to a new installation.

SECTION 7. PRESSURE CONNECTION

7-1 GENERAL

These Specifications cover the installation of fittings and valves on water mains while the mains are under operating pressure. Special Considerations will be covered in the Plans and Special Provisions.

Specification references made herein for manufactured material such as valves, saddles, tees, and fittings refer to designations for American Water Works Association (AWWA), or to American National Standards Institute (ANSI), as they are effective on the date of call for bids.

Copies of these publications may be obtained at nominal cost from The American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235, and from the American National Standards Institute, 1430 Broadway, New York, New York 10018.

7-2 DEFINITION OF TERMS

The following definitions shall apply to the terms used in this section.

PRESSURE TAPPING

A procedure by which a hole is cut into a water main under pressure, without taking the main out of service. A Tapping Fitting is attached, pressure tight, around the main. A Tapping Valve is then attached to the outlet of the Tapping Fitting, and a Tapping Machine is attached to the Tapping Valve, allowing the pressure tapping operation to begin.

TAPPING MACHINE

Any one of several machines designed and constructed for pressure tapping ductile iron, cast iron, steel, plastic, asbestos cement, or concrete water main. The Tapping Machine has a means of rotating and advancing a Shell Cutter through the side wall of the main being tapped. The Machine is pressure tight when bolted to the tapping valve. This allows the cut to be made without taking the main out of service, or losing pressure.

PILOT DRILL

The forward part of the Tapping Machine Boring Bar, which first penetrates the main. The Pilot Drill provides alignment for the Shell Cutter. The Pilot Drill must have latches, clips, or other approved means of retaining the Coupon as it is severed from the body of the main.

SHELL CUTTER

A hollow, cylindrical cutter, with teeth on its periphery; resembling a hole saw. The Shell Cutter is concentric with the Pilot Drill. The Shell Cutter removes the portion of the main called the Coupon, completing access to the main.

COUPON

That portion of the existing main removed by the Shell Cutter and held by the Pilot Drill, to be subsequently removed as the Pilot Drill-Shell Cutter assembly is withdrawn into the Tapping Machine adaptor.

TAPPING VALVE

Any full ported gate valve, which will allow the Shell Cutter to pass through it and effect the pressure tap.

TAPPING FITTING

Also called Sleeve, Saddle, or Tapping Tee; a two or three-piece bolted fitting, split to allow placement over the main to be pressure tapped.

7-3 MATERIALS

The type of valves and fittings to be used in the Pressure Connection will be specified in the Plans and Special Provisions.

7-4 VALVES

Valves shall conform to AWWA C500. All valves over 16" diameter should generally be provided with by-passes. Horizontal Valves shall have tracks, rollers, scrapers, and enclosed steel cut bevel gears.

7-5 TAPPING FITTINGS

Cast Iron Material shall conform to AWWA C110. Steel fittings shall have a factory-applied epoxy coating. All bolts and other fastening devices shall be stainless steel or other corrosion resistant material.

7-6 INSTALLATION PROCEDURE

The existing water main shall be uncovered and exposed to allow calipering of the pipe in advance of the pressure connection. If the main is reinforced concrete, or reinforced concrete cylinder pipe, the manufacturer shall be consulted for specifications, procedures, and design data.

Sufficient length of main shall be exposed to allow for operation of the tapping machinery. The main shall be supported on concrete pedestals, as detailed on the Project Plans, at sufficient intervals to properly carry its own weight, plus the weight of the tapping machinery and fitting. Any damage to the main due to improper or insufficient supports shall be repaired at the Contractor's expense.

After the tapping saddle or tee has been mounted on the main the tapping valve shall be bolted to the outlet flange, making a pressure tight connection.

The tapping machine, by means of a special adaptor shall then be bolted to the outlet flange of the tapping valve, also making a pressure tight connection. After the tapping machine is in place the installation shall be pressure tested at operating pressure plus 50%, to insure the integrity of the installation. Water under pressure can be introduced through a port in the tapping machine. The

tapping machine and the fitting shall be externally supported, so that no additional weight is placed upon the main.

The tapping valve shall then be opened; allowing the shell cutter-pilot drill assembly to advance through the valve body unit contact is made with the wall of the main. With the tapping machine's feed set, power shall be supplied, starting rotation of the cutter-pilot drill assembly.

The minimum diameter cut permitted shall be specified by the Design Engineer. For pressure taps through 12" diameter the minimum diameter shall be 1/2" less than the nominal diameter of the pipe to be attached. For 14" through 20" installations the minimum diameter shall be 1-1/2" less; for larger taps the allowable minimum diameter shall be 2" - 3" less than the nominal diameter of the pipe being attached.

When the pilot drill penetrates the wall of the main, the nozzle, valve body, and tapping machine will be filled with water. The bleeder valve on the tapping machine will indicate the presence of water. The cut shall be continued for a sufficient period of time after this indication to allow the coupon to be completely severed from the wall of the main.

The coupon shall be retained on the pilot drill by means of latches, spring detents, wire clips, or threads on the pilot drill; depending upon the make of the tapping machine. As the boring bar is retracted the coupon, pilot drill, and shell cutter return back into the tapping machine adaptor.

At this time the tapping valve shall be closed, sealing the main. The tapping machine shall be removed, and the valve shall be opened to flush any foreign material.

The same procedure shall be followed for the insertion of other fittings.

7-7 EXCAVATION AND BACKFILL

Excavation and Backfill for pressure connections shall conform to the provisions of Division II, Section 1, 2 and 3.

Poured concrete thrust blocks shall be provided to prevent movement of the installation when main pressure is applied.

SPECIAL PROVISIONS

ENGINEERING SPECIAL PROVISIONS

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VILLAGE OF TINLEY PARK
LEGACY DISTRICT SOUTH
PHASE 1 – DETENTION POND AND STORM SEWER IMPROVEMENTS

SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction", adopted April 1, 2016; the latest editions of the "Supplemental Specifications and Interim Special Provisions" and the "Illinois Manual on Uniform Traffic Control Devices for Streets and Highways"; the "Manual of Test Procedures for Materials" in effect on the date of the invitation for bids; the "Standard Specifications for Water and Sewer Main Construction in Illinois" the Division I General Requirements and Covenants; and the Division II Technical Specifications which apply to and govern the proposed improvement in Cook County, and in case of conflict with any part, or parts, of said specifications, the said Special Provisions shall take precedence and shall govern.

However, in all cases, the Division I General Requirements and Covenants of the specifications shall take precedence over the Division 100 General Requirements and Covenants of the Standard Specifications for Road and Bridge Construction and shall govern.

=====

SCOPE OF WORK

This project shall consist of earth excavation and other removal items in order to create a regional detention pond at the northeast corner of 175th Street and Ridgeland Avenue. The project shall also consist of storm sewer removal and installation, drainage structure removal and installation, concrete sidewalk removal and replacement, hot-mix asphalt pavement patching, natural area landscaping and all necessary restoration and landscaping to replace any areas disturbed by construction as designated by the Village or Authorized Representative.

The maximum width for pavement patching associated with the removal and/or installation of storm sewer shall be determined per IDOT standards for the size and depth of pipe. If, in the opinion of the Village or Authorized Representative, more surface area than necessary has been damaged, it shall be restored by the Contractor as specified herein without additional compensation.

The maximum width for landscaping restoration associated with the removal and/or installation of storm sewer shall be 1 foot on each side of the excavation unless otherwise agreed to by the Village or Authorized Representative. If, in the opinion of the Village or Authorized Representative, more surface area than necessary has been damaged, it shall be restored by the Contractor as specified herein without additional compensation.

Any irrigation systems, brick pavers, decorative rock, special corner landscaping, mailboxes, etc., within the ROW disturbed during construction will be the Contractors responsibility to repair and shall be included in the unit price for the various pay items.

The quantities called for in this contract indicate the approximate amount of work to be expected. The actual amounts for the various items may vary depending upon actual field conditions. The Village reserves the right to reduce or increase the scope of project quantities and to delete entire line items. It shall be understood and agreed upon that the unit prices for these items shall prevail throughout the period of the contract and that no additional compensation per unit price or otherwise will be allowed for any increase or decrease in the quantities including, but not limited to, decreases due to the deletion of an entire location/section of the improvement. No increase in unit price will be allowed if method of construction changes due to decreased quantity.

BASIS OF AWARD

This project has an alternate bid with additional pay items relating the monitoring and maintenance of the natural landscaping areas as a means for obtaining yearly costs for these items. The Contract will be awarded based on the lowest responsive responsible BASE bid. It is the Village's intent to utilize the ALTERNTE bid for budgeting purposes and retains the right to add ALTERNATE items to the project scope.

LOCAL REQUIREMENTS

It will be the Contractor's responsibility to verify with the Village of Tinley Park if a licensed plumber will be required for any portion of the work in addition to the Special Provision sections where it is already specified as required (e.g. work specific to water main removal and/or installation).

PREQUALIFICATION

The Contractor shall have sufficient experience, as determined by the Village and/or Authorized Representatives, in the field of municipal underground utility construction, earth excavation and natural area landscaping (as outlined in the Natural Area Landscaping Special Provisions) to warrant release of the bid documents. The Contractor shall provide such documentation as is deemed necessary upon request. If this information is not satisfactorily completed, the bid documents shall be withheld.

PREFERENCE TO VETERANS

Attention is called to assure compliance with Illinois Compiled Statutes Veteran's Preference Act 330 ILCS 55/. "In the employment and appointment to fill positions in the construction, addition to, or alteration of all public works undertaken or contracted for by the State, or by any political subdivision thereof, preference shall be given to persons who have been members of the armed forces of allies of armed forces of the United States or who while citizens of the United States, were members of the armed forces of allies on the United States in time of hostilities with a foreign country, and have served under one or more of the following conditions..."

WAGE RATES

This contract calls for the construction of a "public work," within the meaning of the Illinois Prevailing Wage Act, 820 ILCS 130/01 et seq. ("the Act"). The Act requires Contractors and Subcontractors to pay laborers, workers and mechanics performing services on public works projects no less than the "prevailing rate of wages" (hourly cash wages plus fringe benefits) in the county where the work is performed. For information regarding current prevailing wage rates, please refer to the Illinois Department of Labor's website at: <http://www.state.il.us/agency/idol/rates/rates.HTM>. All Contractors and Subcontractors rendering services under this contract must comply with all requirements of the Act, including but not limited to, all wage, notice and record keeping duties.

INSURANCE COVERAGE

The Insurance Requirements can be found in Section 7 of the General Requirements "Legal Relations and Responsibility to the Public". The Contractor and any Subcontractors shall obtain and thereafter keep in force for the term of the contract the insurance coverage specified in this section. The Contractor shall not commence work under the Contract until all the insurance required by this section or any Special Provision has been obtained.

Section 7-2.02E Pollution Liability WILL be required as part of this project.

Section 7-2.02F Professional Liability WILL NOT be required as part of this project.

PUBLIC CONSTRUCTION ACT, 30 ILCS 557/1

Pursuant to the home rule powers of the Village, Public Construction Act 30 ILCS 557/1 shall not be applicable to this contract.

WORK HOURS

The following work hours shall be kept unless written permission is received from the Village of Tinley Park. The Contractor may prosecute work between the hours of 7:00 a.m. and dusk each workday. However, no work will be permitted between dusk and 7:00 a.m., on Sundays, or on holidays, without prior written permission of the Village. Any hours of operation specifically applied by any of the permitting agencies will supersede these hours when doing work at the location covered by the aforementioned permit.

PUBLIC AND RESIDENT NOTIFICATION

If the Contractor is required to impede access to any driveway/property for any reason during the course of this project, the Contractor shall provide 24-hour advance written notice to the affected residents. The notification shall be of a form and method as approved by the Village of Tinley Park.

COORDINATION/SCHEDULING OF WORK

The Contractor shall be advised that the work of all Subcontractors will be coordinated by the General Contractor and not by the Village and/or Authorized Representative.

The sidewalk removal and replacement on the south side of the proposed detention pond must be coordinated with the Village and/or Authorized Representative as well as with Tinley Park High School's schedule.

All equipment must be removed off the Village streets during all holiday weekends at the request of the Village.

In addition, all equipment parking and work in general must be coordinated with the Village's event schedule.

COMPLETION SCHEDULE

All work associated with the excavation and grading of the regional detention pond, removal and installation of storm sewer and appurtenances, pavement and landscaping restoration and natural area landscaping for the first growing season as described in these contract documents shall be completed by November 30, 2017. It shall be the responsibility of the Contractor to coordinate and schedule their work with all Subcontractors appropriately to not only meet the overall project completion schedule, but to also meet the planting times and restrictions as outlined in these contract documents.

In addition to the above calendar day restrictions, the Contractor will need to coordinate the start date with Mr. Kevin Workowski, Public Works Director for Tinley Park at (708) 444-5520. The Contractor will also be required to provide to the Village of Tinley Park a construction schedule at the preconstruction meeting that shows the work staging. This schedule must be approved by the Village or Authorized Representative before any work can begin. Any changes or modifications to the approved schedule will need to be coordinated with the Village or Authorized Representative.

Penalties for both the completion date and the additional restrictions shall be assessed at the rate of \$1,000 per calendar day.

PUBLIC UTILITIES

The plans indicate the presence of various public utility lines along the construction route. These locations are from information supplied by the utility companies, and the Village and Authorized Representative, in no way, warrants their accuracy or completeness. It remains the Contractor's responsibility to contact the utility companies in order to obtain the definite locations prior to construction.

MATERIAL INSPECTION – REPORTS

The Contractor shall be responsible for material inspection required for various items incorporated in this project. All documentation is to be submitted to the Village and/or Authorized Representative immediately following completion

of the project. Five percent (5%) of the final contract amount due the Contractor will be withheld pending receipt of all documentation and approval of the Village's or Authorized Representative's Final Payment Estimate.

GUARANTEE

All materials and equipment (unless otherwise specified) shall be guaranteed for a period of one (1) year from the date of acceptance by the Village and/or Authorized Representative. Upon receipt of notice from the Village and/or Authorized Representative of failure of any part of the system during the guarantee period, new replacement parts shall be furnished and installed by the Contractor at no additional cost to the Village of Tinley Park.

VIDEO OF CONSTRUCTION ROUTE

Prior to the start of any construction or excavation, the Contractor shall video record the existing conditions in the area of the construction route. The video shall be done on standard color DVD. The Contractor shall supply the Village and/or Authorized Representative with two copies of the video prior to starting construction. The video shall include the following:

- | | | |
|----------------------|-----------------------|-------------------------------|
| 1. Full right-of-way | 2. Parkway condition | 3. Pavement condition |
| 4. Curb condition | 5. Driveway condition | 6. Existing manholes |
| 7. Fire hydrants | 8. Fences | 9. Trees and landscaped areas |

The video recordings shall also supply a continuous audio record of the location (preferably with address), all anticipated problem areas, items, and features for the complete area to be affected by the construction.

The video recording shall be made on a DVD or other approved equal, and shall conform to Japan Electronics and Information Technology Industries Association (JEITA) standards. The format of recording and type of media used shall remain the same throughout the project. When the recorded video information is replayed and reviewed, it shall be free of electrical interference.

The audio portion of the composite signal shall be sufficiently free of electrical interference, background noise, and heavy foreign or regional accents to provide an oral report that is clear and complete and easily discernible. The audio portion of the video report shall be recorded by the operating technician on the video as they are being produced and shall include references to the street address and type of construction to be performed at the site as specified in the plans. Audio comments pertaining to special circumstances, which may arise during the excavation, shall also be included. Dubbing the audio information onto the video tract after the video is completed will not be permitted.

Video recordings shall be enclosed in vinyl plastic containers, which shall clearly indicate the date the video was taken, the designated section(s) of construction contained on the tape, and the label "VILLAGE OF TINLEY PARK LEGACY DISTRICT SOUTH PHASE 1 – DETENTION POND AND STORM SEWER IMPROVEMENTS - Project #14-471." The actual street location shall also be listed on the DVD. One (1) copy of the finished video shall be delivered to the Village and/or Authorized Representative prior to commencing excavation.

The surface condition of excavated areas after final restoration shall be the same or better than the pre-construction site conditions as shown in the video. The cost of video and log preparation shall not be compensated for separately, but shall be considered incidental to the contract.

The surface condition of excavated areas after final restoration shall be the same or better than the pre-construction site conditions as shown in the videotape. The cost of video recording and log preparation shall not be compensated for separately, but shall be considered incidental to the contract.

TRACKING OF QUANTITIES

During the course of the contract, the Contractor shall maintain a list of each pay item with its associated location for which work was performed along with the individual quantities and cost breakdown. This tracking will help ensure that the funding allotment is not exceeded during the work. It is the responsibility of the Contractor to ensure his work does not exceed the funding limits established by the Village.

TRAFFIC CONTROL

Traffic Control shall be in accordance with the applicable sections of the Standard Specifications for Road and Bridge Construction, the applicable guidelines contained in the Illinois Manual on Uniform Traffic Control Devices for Streets and Highways, these Special Provisions and any special details and Highway Standards contained herein and in the plans and the Standard Specifications for Traffic Control Items.

Special attention is called to Articles 107.09 and 107.14 and Section 701 of the Standard Specifications for Road and Bridge Construction and the following Highway Standards relating to traffic control:

701301-04 701501-06 701801-06 701901-05

The Contractor shall obtain, erect, maintain and remove all signs, barricades, flagmen and other traffic control devices as may be necessary for the purpose of regulating, warning or guiding traffic. Placement and maintenance of all traffic control devices shall be in accordance with the applicable parts of Article 107.14 of the Standard Specifications and the Illinois Manual on Uniform Traffic Control Devices for Streets and Highways. The Contractor shall be solely responsible for ensuring that all traffic control devices are installed and maintained in accordance with applicable state standards. Traffic Control and Protection will not be paid for separately, but instead shall be considered incidental to the contract.

The Contractor is hereby advised that notification to all affected residents is his responsibility, including the placement of "No Parking signs", at least 24 hours prior to construction operations.

No streets are allowed to be completely closed to traffic. The Contractor must always maintain a minimum of one lane of traffic on Ridgeland Avenue and Oak Forest Avenue during working hours, and re-open all lanes at the end of each working day as outlined in the "STOCKPILING OF MATERIALS AND END OF DAY CLEAN UP" specification.

STOCKPILING OF MATERIALS AND END OF DAY CLEAN UP

Stockpiles shall not impede traffic, parking or access at any time. Any areas disturbed by stockpiles shall be restored to existing conditions and shall be considered incidental to the contract.

At the end of each working day, the Contractor shall provide a steel plate, barricades, warning tape and any other measures over the excavated area so that traffic, parking or access is not impeded during non working hours. All such traffic control shall be in accordance with applicable standards. Access to the property shall be maintained at all times. Placement of temporary aggregate in the roadway and in driveway areas disturbed by the construction shall be used until final conditions are met. Street clean up and sweeping is also required at the end of each working day. The cost for materials and traffic control items necessary to meet these requirements shall be considered incidental to the contract.

Also, it is hereby understood and agreed that no pavement patching will be permitted after Friday at 3:00 PM of each and every week and no holes will be allowed to remain open overnight or over the weekend.

CLEAN CONSTRUCTION OR DEMOLITION DEBRIS (CCDD) REQUIREMENTS PER 35 IAC 1100

If the Contractor is planning on disposing of uncontaminated materials at an Illinois Environmental Protection Agency (IEPA) permitted CCDD facility, the work shall be conducted in accordance with the criteria set forth in 35 Illinois Administrative Code (IAC) 1100 as amended on August 27, 2012. The following protocol must be followed:

1. The Contractor must identify in writing the name/location of the Contractor's intended CCDD facility to the Village or Authorized Representative prior to the commencement of any construction activities.
2. The Village or Authorized Representative will contact the Contractor's CCDD facility to identify the laboratory testing or certifications required for disposal acceptance.
3. The Contractor will assist the Village or Authorized Representative in obtaining the sample(s) through the use of the Contractor's equipment. The Contractor shall expose soils at one or more distinct locations as directed by the Village or Authorized Representative. The Village or Authorized Representative will determine the number, location and depth of the samples that will need to be collected for characterization of the excess soil that will be generated during the construction project.
4. The Village or Authorized Representative will be responsible for the sampling/testing of the soil and preparation of the required certification form.
5. The samples will be run with standard 5 to 7 working day turnaround time unless a rush is required by the Contractor. If so, the Contractor will be responsible for additional fees associates with fast-tracking the samples.
6. Once the appropriate certifications have been prepared, the Contractor will be responsible for all hauling/disposal of material at the CCDD facility.

The above work shall be considered incidental to the contract.

If any contaminated material is encountered that requires landfill disposal as a non-special waste, special waste or hazardous waste, it will be paid for per Article 109.04 of the IDOT Standard Specifications.

SOIL CONDITIONS

The Village and Authorized Representative assumes no responsibility in regard to the nature of the subsurface conditions which may be encountered during construction. The Bidder may satisfy themselves prior to bidding, by such methods as they may prefer, including their own borings with the Village's consent, as to the nature of the subsurface conditions, including any obstructions, which may be encountered during construction. Failure to make such borings shall not relieve him of the responsibility for carrying out to successful completion the work contemplated by the Project Documents for the price specified in the Bid.

Stability of the side walls and base of the excavation is the responsibility of the Contractor and shall be considered incidental to the contract. Similarly, dewatering and/or shoring shall be the responsibility of the Contractor and they shall be held responsible for any damage to nearby structures or utilities due to lateral movement of the supporting soils.

DEWATERING

The Contractor shall be responsible for dewatering the trench and maintaining the water level below the bottom of the pipe until the pipe has been backfilled in order to preserve the line and grade of the pipe. This dewatering shall include all surface water from rainfall, snowmelt, etc. All such dewatering expenses including pumps and additional drain rock shall not be compensated for separately but shall be considered incidental to the contract.

The Contractor shall have dewatering filter bags on-site to be used to pump out sewer trenches that become filled with water during construction activities. The dewatering filter bag, or approved equal, shall be used to capture sediment before it enters the storm sewers. The dewatering filter bag shall be sized appropriately for the size of pump(s) used by the Contractor. This work shall not be paid for separately but shall be considered incidental to the contract.

DUST CONTROL

The Contractor shall be responsible for controlling the dust and air-borne dirt generated by his/her construction activities.

The implementation of dust control procedures shall be required if wind and dry soil conditions reduce visibility on adjacent roads and property. Concerns for health and safety to the public using adjacent facilities will be grounds for the implementation of a dust control plan. When circumstances warrant, a specific dust control plan shall be developed. The Contractor and the Village or Authorized Representative shall review the nature and extent of dust generating activities and cooperatively develop specific types of control techniques appropriated to that specific situation. Sample techniques that may warrant consideration include such measures as:

1. Minimize track out of soil onto nearby publicly traveled roads.
2. Reduce vehicle speed on unpaved surfaces.
3. Cover haul vehicles.
4. Apply chemical dust suppressants or water to exposed surfaces, particularly to surfaces on which construction vehicles travel.

Dust control measures as indicated in the Dust Control Plan, or as directed by the Village or Authorized Representative shall be readily available for use on the project site. The cost of this work shall be considered incidental to the contract and no additional compensation will be allowed.

CONCRETE WASH OUT AREAS

The Contractor shall provide designated wash out facilities for the cleaning of concrete delivery trucks. Under no circumstances shall trucks be permitted to be washed out onto/into any public facility (i.e. street, sewer, parkway, etc.). Any instance of such occurrence shall result in a deduction of \$250 per occurrence from any monies due the Contractor. The cost for providing, maintaining, and disposing of designated concrete wash out areas shall not be paid for separately but shall be considered incidental to the contract. The location of these areas must be provided in writing to the Village before construction begins.

SAW CUT JOINTS

The removal and/or replacement of any driveways, pavement, curb, sidewalk, etc. shall be accomplished by means of a saw cut joint, at the direction of the Village or Authorized Representative. This work shall not be paid for separately, but shall be included in the unit price bid for the various items.

EXISTING SIGN RELOCATION

Existing signs that will interfere with construction and/or will be unable to be reinstalled at the existing location shall be relocated in accordance with applicable articles of Section 724 of the Standard Specifications. All sign relocations must be coordinated with the Village or Authorized Representative and new locations must be approved by the Village or Authorized Representative. The cost for materials, equipment, and labor necessary to meet these requirements shall be considered incidental to the contract.

AGGREGATE FOR DRIVEWAY AND STREET CROSSING MAINTENANCE

This item of work shall include the placement and compaction of Temporary Aggregate, Type B in locations where pavement removal and the trench is in the roadway and/or driveway and affects regular movement of vehicular and pedestrian traffic during construction. The Contractor shall at all times conduct the work in such a manner as to ensure the least amount of obstruction to vehicular and pedestrian traffic. All work shall be in accordance with Section 107.09 and 351 of the Standard Specifications. The cost for furnishing all materials, placing, removing and disposing of any excess aggregate will not be compensated for separately but shall be considered incidental to the contract.

TOPSOIL FURNISH AND PLACE, 4"

This work shall consist of the furnishing and placing of four inches (4") of pulverized topsoil at all areas disturbed by the construction other than the areas already specified in the Natural Area Landscape plans and/or details. All work shall be done in accordance with Sections 211 of the Standard Specifications.

If, in the opinion of the Village and/or Authorized Representative, more surface area than necessary has been damaged, it shall be replaced by the Contractor as specified herein without additional compensation. The maximum width for restoration will be three feet (3').

This work shall be paid for at the contract unit price per SQUARE YARD for TOPSOIL FURNISH AND PLACE, 4".

TRENCH BACKFILL

All materials used for trench backfill under and within three feet (3') of paved areas, including streets, curbs, sidewalks and driveways shall be per the detail drawings. CA-7 backfill is required for the trench backfill up to 1 foot from subgrade. The last foot of trench backfill shall be CA-6. The trench backfill shall be mechanically compacted in 12 inch lifts to a minimum of 95% Standard Proctor density. All trench backfill must meet the requirements of Section 1004 of the Standard Specifications.

All trench widths shall be kept to a minimum during construction operations. The Contractor shall take great care during backfilling operations to ensure proper compaction of materials, including areas under unpaved surfaces. All trenches shall be backfilled to the proper subgrade elevation in accordance with Section 208 of the Standard Specifications.

If trench settlement occurs, the Contractor shall, at his own expense, perform all additional work, including further mechanical compaction and/or placement of additional aggregate, necessary to ensure both proper compaction of the trench and proper safety for motorists and pedestrians. Should trench settlement occur after surface restoration, the Contractor shall, at his own expense, remove the newly constructed pavement, driveway, curb and/or sidewalk (by straight saw cut joint) and perform all work required to properly compact the trench and prevent further settling. Restoration of the parkway and additional sodding/hydroseeding shall also be performed.

Paved areas to be disturbed during the construction of storm sewers, water mains, structures, and other incidental construction are clearly indicated in the plans. See "AGGREGATE FOR STREET MAINTENANCE AND PROPERTY ACCESS" specification for cases where the trench is located in roadways/driveways.

The cost for furnishing, transporting, placing and compacting the trench backfill materials required as a part of this project shall be paid for at the contract unit price per CUBIC YARD of TRENCH BACKFILL. No additional consideration shall be given to over-excavation resulting from the use of trench boxes.

PORTLAND CEMENT CONCRETE DRIVEWAY PAVEMENT, 7 INCH

This item shall consist of the replacement of concrete driveways at locations as designated by the Village or Authorized Representative. Concrete driveways shall be constructed with a minimum of four inches (4") of Aggregate Base Course, Type B and seven inches (7") of Portland cement concrete. This work shall be done in conformance with Sections 423 and 440 of the Standard Specifications. In addition, the minimum form size shall be two (2) inches by eight (8) inches. Any saw cutting or excavation required to construct these driveways (including excavation to make driveway the required thickness) will be considered incidental to the DRIVEWAY PAVEMENT REMOVAL pay item.

The cost for furnishing all materials, equipment and labor required to complete the work as specified above shall be paid for at the contract unit price per SQUARE YARD for PORTLAND CEMENT CONCRETE DRIVEWAY PAVEMENT, 7 INCH. The aggregate shall be paid for at the contract unit price per SQUARE YARD of AGGREGATE BASE COURSE, TYPE B 4".

PORTLAND CEMENT CONCRETE SIDEWALK, 5 INCH

This item includes the complete replacement of existing Portland cement concrete (PCC) sidewalks at locations designated by the Village or Authorized Representative. Sidewalks shall be constructed in conformance with the Standard Specifications for PCC sidewalk and shall be five inches (5") thick with a minimum of four inches (4") of Aggregate Base Course, Type B. This work shall be in accordance with Sections 440, 424 and 1004 of the Standard Specifications.

The Contractor shall remove existing sidewalk by means of a saw cut joint to prevent damage to that portion which is to remain in place. Any tree roots within the aggregate base shall be removed prior to installation of the sidewalk and shall be considered incidental to the SIDEWALK REMOVAL pay item. Any additional excavation required to construct this sidewalk to the required thickness as specified above shall be considered incidental to the SIDEWALK REMOVAL pay item. Any voids that lie under the existing sidewalk shall be filled with aggregate and compacted prior to pouring the replaced walk.

All sidewalk construction/replacement shall be done with a minimum form size of 2 inches by 6 inches.

All aggregate base under removal and replacement sidewalk shall be 4 inches of Aggregate Base Course, Type B which shall be paid for as such.

This work shall be paid for at the contract unit price per SQUARE FOOT of PORTLAND CEMENT CONCRETE SIDEWALK 5 INCH which price will include all materials, equipment and labor required to complete the work as specified above for replacement of existing sidewalk in need of repairs. The aggregate shall be paid for at the contract unit price per SQUARE YARD of AGGREGATE BASE COURSE, TYPE B 4".

PAVEMENT REMOVAL

This item shall consist of the complete removal of the existing pavement in accordance with the applicable sections of Article 440 of the Standard Specifications, at locations as indicated on the plans and/or as directed by the Village or Authorized Representative.

This work shall also include the complete removal of any and all surface items within the removal limits (e.g. parking lot lights, concrete bases, concrete foundations, guard rail, concrete bollards, electrical conduit, electrical wiring...etc.). The Village, their Authorized Representative and the Contractor shall coordinate the de-energization of the electrical components in this area. Contact information to do such will be provided once the contract is awarded.

The cost for all labor and equipment required to complete this work shall be paid for at the contract unit price per SQUARE YARD of PAVEMENT REMOVAL.

CLASS D PATCHES, 6 INCH

This item shall consist of the removal and replacement of existing pavement in accordance with the applicable sections of Articles 406 and 442 of the Standard Specifications, at locations directed by the Village and/or Authorized Representative on the streets identified for roadway improvements.

The patch shall consist of four inches (4") of Hot-Mix Asphalt Binder Course, IL-19mm, N50 and two inches (2") of Hot-Mix Asphalt Surface Course, Mix "D", N50.

This work shall be paid for at the contract unit price per SQUARE YARD for CLASS D PATCHES, 6 INCH.

HOT MIX ASPHALT DRIVEWAY PAVEMENT, 6"

Where existing HMA driveways are to be restored, they shall be restored with a four inch (4") Hot-Mix Asphalt Binder Course, IL-19.0, N50, and two inches (2") of Hot-Mix Asphalt Surface Course, Mix D, N50. The saw cutting and any additional excavation required to construct these driveways will be considered incidental to the driveway removal.

The cost for the material and placement (Hot-Mix Asphalt Binder Course, II-19.0, N50, and Hot-Mix Asphalt Surface Course, Mix D, N50) will be paid for at the contract unit price per SQUARE YARD for HOT MIX ASPHALT DRIVEWAY PAVEMENT, 6".

CONFLICT MANHOLES

This work shall consist of the installation of manholes in accordance with Section 602 of the Standard Specifications. The item shall only be used where the existing sanitary sewer will be in conflict with the proposed storm sewer. Where conflicts exist, the existing section of sanitary sewer shall be replaced with (DIAMETER INDICATED) ductile iron pipe which shall extend through the new manhole and at least five feet (5') on either side of the outer diameter of the manhole. The new sanitary sewer pipe connection with the manhole shall be watertight conforming to ASTM-C923. The new sanitary sewer pipe shall be connected to the existing pipe(s) via non-shear mission coupling of the appropriate size and shall also be watertight. The size of the manhole shall be determined based on the size of pipes and angles of entry.

This work shall be paid for at the contract unit price per EACH for CONFLICT MANHOLES, which price shall include all work as specified herein.

PROPOSED STORM SEWER CONNECTION TO EXISTING STORM SEWER

This work shall consist of all labor, equipment and materials required to connect an existing storm sewer to a proposed storm sewer as shown on the plans or as directed by the Village or Authorized Representative. For lateral connections, this work shall also include coring into the existing storm sewer according to the core and boot connection detail as shown in the plans.

Any and all work and/or material required to connect and/or adjust pipe underdrains or drain tiles encountered in the field shall be considered incidental to the contract.

This work will be paid for at the contract unit price EACH for PROPOSED STORM SEWER CONNECTION TO EXISTING STORM SEWER.

BACKFLOW PREVENTER

This work shall consist of all labor, equipment and materials required to install a backflow preventer as shown on the plans or as directed by the Village or Authorized Representative. The backflow preventer shall be a Red Valve CheckMate Inline Valve or approved equal.

This work shall be paid for at the contract unit price per EACH for BACKFLOW PREVENTER, which price shall include all work as specified herein.

ADJUSTING WATER MAIN

This work shall consist of relocating water main under or around proposed sewers that are in conflict with the proposed sewer as encountered in the field.

The ductile iron pipe shall conform to ANSI Specifications A21.51 or AWWA C151, and be Class 52. All ductile iron fittings shall conform to the latest ANSI A21.10 and AWWA C110. The ductile iron pipe shall be cement lined in accordance with ANSI Specifications A21.4 and AWWA Specification C104. The water main shall be provided with Rubber Gasket Joints that shall be in compliance with ANSI A21.11 and AWWA C111. The water main shall be installed in steel casing pipe with a minimum clearance of 18" below the bottom of the sewer.

Pipe shall be installed in accordance with the manufacturer's specifications and instructions for the type of pipe used and applicable AWWA Standards, such as C600 and C503.

All work shall be done in accordance with Section 561 of the Standard Specifications.

The cost of the work to remove the existing water main, including any necessary materials and equipment, install the proposed water main, including all necessary fittings and bends, shall be paid for at the contract unit price per FOOT of ADJUSTING WATER MAIN 10".

WATER MAIN LINESTOPS

Under this item Contractor shall furnish all materials, labor and equipment to properly install and set linestops into the existing water mains, in parkway or pavement locations, where determined by the Village Authorized Representative as being necessary to facilitate the adjustment, removal and/or capping of the existing water main.

Description of procedure

The linestopping procedure is a means of temporarily plugging a water or sewer force main without disrupting pressure or service upstream of the linestop. A pressure tap is first made into the main, allowing insertion of the linestop-plugging device into the main under pressure. By using a special linestop fitting, the tapping valve can be recovered after the linestop-plugging head has been removed from the main. The suggested procedure consists of the following fourteen steps.

- 1 Excavate, expose, and clean the exterior of the main.
- 2 Assemble split linestop fitting around the main.
- 3 Mount temporary tapping valve to nozzle of fitting.
- 4 Pressure test.
- 5 Mount tapping machine; open valve; pressure tap; retract cutter; close temporary valve; remove tapping machine.
- 6 Mount linestop machine; open temporary valve; insert linestop plugging head into main.
- 7 Test for shutdown.
- 8 Cut downstream main. Perform required work.
- 9 Refill downstream piping. Pressure test.
- 10 Retract linestop plugging head. Close temporary valve. Remove linestop machine.
- 11 Install completion machine; open valve.
- 12 Insert completion plug into nozzle of linestop fitting.
- 13 Remove completion machine and temporary valve.
- 14 Install screwed pipe cap or blind flange onto nozzle of linestop fitting.

Interruption of flow

The existing water mains, upstream of the linestop(s), cannot be shut down or taken out of service.

To ensure that the entire operation shall be accomplished without interruption of upstream water service of flow, the installation shall be accomplished by Contractor personnel skilled and experienced in the procedures specified to linestops of this size on cast iron or ductile iron water main.

Linestop fittings:

The linestop fitting shall consist of a two (2) part, full encirclement stainless steel saddle with a stainless steel nozzle MIG welded to the upper saddle half. Accessories shall include all fasteners and gaskets noted below.

The stainless steel used in the saddle halves shall be Type 304, a minimum of 16 gauge (.0598") thick.

The linestop nozzle shall be machined from seamless pipe or tubing and shall have an external pipe thread to receive a screwed pipe cap at the end of the work. The interior shall be threaded to receive the completion plug.

The full encirclement saddle gasket shall be molded from an elastomer compound that will resist compression set and is compatible with drinking water in the temperature range of -40 to 150 degrees F.

The gasket shall have molded grid pattern on the surface that seals against the main. The longitudinal ends of the gasket shall be tapered to allow sealing at the lap joint.

Materials for bolts and nuts shall be Type 304 stainless steel.

If applicable, the linestop fittings shall be compatible with the end users existing Hydra-Stop equipment.

Diameter and condition of mains

Sizes of mains shown on plans have been taken from records, and were not verified in the field. The class of iron pipe is not known.

Before any excavation is started, the Contractor must have available at the job site linestop fittings that will fit both Class AB and Class CD pipe, and that he further has fittings on the job to fit pipe a nominal size larger and smaller than the proposed linestop.

Heavy tuberculation can be anticipated in the existing mains.

Material drawings

At request of the Village and/or Authorized Representative, the Contractor shall submit three (3) sets of drawings, furnished by the manufacturers, fully and distinctly illustrating and describing the linestop fitting proposed to be furnished.

Installation of linestop fitting

Contractor shall first wire brush and grind the exterior of the main to remove any debris, corrosion, or other surface irregularities that might interfere with the proper sealing of the linestop-fitting gasket.

Under no circumstances shall the Contractor attempt to reshape or bend a linestop saddle in order to obtain greater gasket compression.

All gasket-sealing surfaces shall be thoroughly coated with Permatex No. 2 sealing compound, or approved equal, prior to assembly around the main. Fasteners shall be tightened in accordance with manufacturer's instructions.

Pressure test

The assembled linestop fitting and valve assembly shall be pressure tested.

Thrust and support blocking

If the existing main is to be cut in the same excavation as the linestop, the Contractor will be responsible for bracing or restraining the water main clamp snugly against the linestop fitting and bracing with timbers against undisturbed soil in the excavation.

The Contractor will install any permanent concrete support or reaction blocking or other restraint as necessary.

Cutting operation

Drilling equipment shall be in good condition, and equipped with a power drive to insure smooth cutting and to minimize shock and vibration.

The shell cutter shall have carbide teeth to insure adequate performance if the existing main contains chill spots, sand inclusions or has cement lining.

Cutting equipment is to be chlorinated prior to starting the pressure tap.

Linestop operation

The resilient plugging (sealing) elements shall be free from cuts, nick or other surface defects that could prevent a satisfactory shutdown. The sealing elements shall be inserted into the main by self-contained hydraulic or jackscrew actuators.

Linestop Units are to be lightweight so they can be handled by manpower alone (no crane necessary).

The units furnished will be able to shut down heavily tuberculated lines through the expansion of the Stopper Rubber itself. Stationary (nonexpendable) stoppers needing a brushing technique are not acceptable.

No two holing (line-up), or knowledge of direction of flow will be necessary.

In the event that a satisfactory initial shutdown cannot be obtained by a linestop, Contractor shall repeatedly insert and remove the plugging head in an effort to break up tuberculation or other debris that interferes with a good shutdown.

If a satisfactory shutdown cannot be made at that location, the Contractor will, at his own expense, install a new linestop fitting upstream of the first, and continue repeating the process until a satisfactory shutdown is accomplished.

Linestop Equipment is to be chlorinated prior to inserting into the main.

Extent of shutdowns

Shutdowns will be accomplished using linestops alone, or in combination with existing valves. Because of the interior condition of the mains and/or the age of the valves, "bottle-tight" shutdowns are not anticipated. A satisfactory shutdown is one which allows the required work (i.e. valve replacements, etc.) using drainage pumps to de-water the excavation, with workmen wearing boots and rain gear, if necessary.

If leakage is excessive, Contractor and municipal personnel will cooperate in using "geophones" or other listening devices to determine where the leakage is occurring. If excessive leakage is flowing through the municipal water valves, the municipality will determine whether to close additional valves or to authorize a Contract Extra to install more linestops.

In the event that a linestop location is abandoned, through no fault of the Contractor, he shall be entitled to payment for that linestop.

Restoration

The linestop work will generally be performed in either a parkway or a pavement area. It is the intent of the contract to minimize any area disturbed by means of construction.

Basis of payment

This work will be paid for at the contract unit price EACH for [SPECIFIED SIZE] LINESTOP, which price shall include all materials, equipment and labor necessary to perform the work as herein specified.

CUT AND CAP

The Contractor shall remove the existing water main by cutting and capping the existing main at the locations indicated on the plans or as directed by the Village and/or Authorized Representative, assisted by the Water Department, performing appropriate valve closings as necessary. This work shall also include the complete replacement of all bolts associated with the existing valve where the cut and cap is taking place to all new stainless steel bolts and nuts. This shall include but not be limited to the bonnet, flange and stuffing box bolts and nuts. The cost for any caps or plugs installed as well as the replacement stainless steel bolts and nuts shall be paid for at the contract unit price bid per EACH for [SPECIFIED SIZE] CUT AND CAP.

FIRE HYDRANT WITH AUXILIARY VALVE, VALVE BOX AND TEE

This work shall consist of the installation of new hydrants, auxiliary valves, valve boxes, tees and associated pipe and fittings at the locations indicated in the plans or as directed by the Village and/or Authorized Representative. Hydrants shall be as manufactured by East Jordan Iron Works (model 5BR-250), or equal as approved by the Tinley Park Water Department and Tinley Park Fire Chief. The cost for connecting 6" water main pipe and/or fittings needed for offsetting the hydrant from the water main shall be incidental to the hydrant construction.

All hydrants shall be painted as directed by the Village of Tinley Park Water Department. All work shall be in accordance with the Division II Technical Specifications of this contract. The cost for this work will be paid for at the contract unit price bid per EACH for FIRE HYDRANT WITH AUXILIARY VALVE, VALVE BOX AND TEE.

REMOVE FIRE HYDRANT

This item of work where indicated on the plans shall be in accordance with Section 564 of the Standard Specifications.

Once the new main is in service, including satisfactorily pressure tested, chlorinated, and all service lines installed, existing hydrants and auxiliary valves shall be carefully disconnected from the existing water main, delivered to the public works garage, and remain the property of the Village of Tinley Park. This work will be paid for at the contract unit price per EACH for REMOVE FIRE HYDRANT.

WATER AND SANITARY SEWER ADJUSTMENTS

This item shall include the adjustments of any sanitary sewer and water main services encountered by the construction of the storm sewer. The Contractor shall make every attempt possible to avoid these facilities, and if in the opinion of the Village and/or Authorized Representative, the facilities are damaged due to carelessness by the Contractor, no compensation will be made for the replacement of same.

If adjustment of certain services is necessary, the work shall be done in a workmanlike fashion, minimizing the downtime of the residents' services, and shall include all necessary labor and materials to properly complete the adjustment. All sanitary services shall be replaced with ductile iron pipe for 10 feet on either side of the storm sewer. Non shear mission couplings shall be used. All water services shall be replaced with same size type - k copper for 10 feet on either side of the storm sewer.

Work on these items shall be paid for at the contract unit price per EACH for WATER MAIN SERVICE ADJUSTMENT and for SANITARY SEWER SERVICE ADJUSTMENT with the costs of each item as stated in the bidding schedule which price shall include the cost of all pipe, joint materials, trench backfill, labor and equipment needed to complete the work as stated.

RUBBER ADJUSTING RINGS

This work shall consist of the adjustment and/or reconstruction of drainage and utility structures at those locations as directed by the Village and/or Authorized Representative in the field using rubber fibrepolyurethane prepolymer composite adjusting rings as approved by the Village and/or Authorized Representative. This pay item reflects the cost of the material only. Installation shall be included in the pay item for the drainage and utility structures to be adjusted. Tapered adjusting rings shall be used where necessary to match the profile of the pavement. In order to minimize the number of rings used, thicker rings shall be used where practical (i.e. one 3-inch ring rather than three 1-inch rings). In the same manner, if three 1-inch rings are utilized, they will be paid for as one rubber adjusting ring. The Contractor shall examine all adjustments in the field prior to ordering materials.

This work will be paid for at the contract unit price EACH for RUBBER ADJUSTING RINGS.

EXPLORATORY EXCAVATION

As deemed necessary and approved by the Village and/or Authorized Representative or at the request of the Village and/or Authorized Representative, the Contractor shall conduct exploratory excavations. This work shall comply with the requirements set forth in Section 1.206 of Division II – Technical Specifications: Excavation and Clean-Up. The Contractor shall be paid at the contract unit price per EACH for EXPLORATORY EXCAVATION.

FENCE REMOVAL AND RELOCATION (SPECIAL)

At locations shown on the plans or as specified by the Village and/or Authorized Representative, the existing fence along the west and south sides of the proposed pond shall carefully be removed and replaced along the north and east sides of the proposed pond in the same condition as before removal. This work shall also include maintaining the connections to the existing fence posts at the northwest and southeast corners of the property. This pay item does not include the installation of new fence due to the Contractor's carelessness to remove the fence in good condition. The Contractor shall be paid at the contract unit price per FOOT for FENCE REMOVAL AND RELOCATION (SPECIAL).

Should it be determined by the Contractor and approved by the Village and/or Authorized Representative, that the existing fence cannot be salvaged in good condition for reuse, then the existing fence shall be completely removed and disposed of by the Contractor. This work shall be paid for at the contract unit price per FOOT for FENCE REMOVAL and the replacement fence shall be paid for at the contract unit price per FOOT for CHAIN LINK FENCE, 6' per the appropriate Sections of Article 664.

STEEL SLEEVE- OPEN CUT INSTALLATION

This work shall consist of furnishing spiral welded, steel casing of the thickness listed in the table below and of the outer diameter specified on the plans or as directed by the Village and/or Authorized Representative. The sleeve shall meet ASTM A139 and ANSI/AWWA C200 (AWWA Standard for Steel Water Pipe—6 in. (150 mm) and Larger), Grade B, minimum yield strength of 35,000 psi. Sleeves shall extend at least ten feet (10') beyond the outer edge of the existing pavement or sewer pipe, as indicated in the detail drawings, unless otherwise approved by the Engineer. All work shall be done in accordance with Section 552 of the Standard Specifications.

After installation of the steel sleeve is completed, the proposed water main shall be constructed in place within the sleeve. The water main shall be inserted and centered by use of model CCS stainless steel casing spacers as manufactured by Cascade Waterworks Mfg. Co. of Yorkville, IL or approved equal at a maximum spacing of 10 feet. Casing spacers shall be bolt on style with a two-piece shell made from T-304 stainless steel of a minimum 14-gauge thickness. Each shell section shall have bolt flanges formed with ribs for added strength. Each connecting flange shall have a minimum of three 5/16" T-304 bolts. The shell shall be lined with a ribbed PVC extrusion with a retaining section that overlaps the edge of the shell and prevents slippage. Bearing surfaces (runners) made from UHMW polymer with a static coefficient of friction of 0.11-0.13 shall be attached to support structures (risers) at appropriate positions to properly support the carrier within the casing and to ease installation. The runners shall be attached mechanically by T-304 threaded fasteners inserted through the punched riser section and TIG welded for strength. Risers shall be made of T-304 14 gauge stainless steel. All risers over two inches (2") in height shall be reinforced. Risers shall be MIG welded to the shell. All metal surfaces shall be fully passivated. The ends of the sleeve shall be sealed using a method approved by the Engineer.

The cost for casing spacers, filling of the annular space (if required), and furnishing and installing the steel sleeve shall be incidental to the contract unit price for the steel sleeve. Unless otherwise shown on the plans, steel sleeves [casings] shall be of the size and thickness shown in the table below:

Standard Sizes of Steel Sleeves Used As Casings*		
Carrier Pipe ID in Inches	Casing Wall Thickness in Inches	Casing Outside Diameter in Inches
6	0.344	16
8	0.344	20
12	0.375	24
16	0.469	30
20	0.563	36
24	0.625	42
30	0.719	48
36	0.781	54
42	0.875, 0.938	60, 66
48	1.000	72

The cost of furnishing and installation of the steel sleeve, and all incidental work necessary for its installation, including casing spacers, will be paid for at the contract unit price per FOOT for [SPECIFIED SIZE] DIAMETER STEEL SLEEVE, [SPECIFIED SIZE] WALL THICKNESS, OPEN CUT INSTALLATION. The cost for water main constructed within the sleeves will be paid for under its appropriate pay item.

METRA REQUIRED TRAINING

The Contractor and all employees on the job site must abide by all training requirements in order to work within 50 feet of Metra ROW. This work shall not be paid for separately but shall be considered incidental to the contract.

RAILROAD PROTECTIVE LIABILITY INSURANCE

The costs for providing insurance, as required by Metra and described herein on the enclosed Exhibit "C" to Metra's Right of Entry Agreement, shall be paid for at the contract unit price per LUMP SUM for RAILROAD PROTECTIVE LIABILITY INSURANCE.

METRA ALLOWANCE

The following shall be included in the METRA ALLOWANCE pay item:

Railroad Right-of-Entry Permit - The Contractor shall be responsible for entering into an agreement with Metra for proposed work within the railroad right-of-way. All costs associated with the Metra Right of Entry Agreement (sample copy enclosed, this may not be the most current version) including but not limited to the formulation, execution and filing of the Right of Entry agreement shall be the responsibility of the Contractor.

Railroad Flagger - The Contractor shall be responsible for coordination with Metra regarding the proper flagging services when work is being performed within the railroad right-of-way. The Contractor shall make every effort to minimize the number of days of work within the railroad right-of-way. No work shall be performed within the railroad right-of-way without flaggers present and no additional compensation will be granted for down time when the flaggers are not present when requested.

All costs associated with Metra for the railroad Right-of-Entry Permit as well as providing flagging services when required by Metra shall be reimbursed at actual cost. For bidding purposes, a \$25,000 METRA ALLOWANCE is included in the pay items for the Railroad Right-of-Entry Permit and for any flagging services the Contractor may accrue.

PRESSURE TEST OF WATER MAIN

The water main shall be pressure tested at 150 psi with zero loss for a period not less than 2 hours. This work will not be paid for separately but shall be considered incidental to the contract.

VILLAGE OF TINLEY PARK MINIMUM CHLORINATION STANDARDS

Chlorination must be in accordance with all appropriate local, state, federal and AWWA regulations as well as the requirements set forth by the Tinley Park Public Works Water Superintendent.

VILLAGE OF TINLEY PARK LOCAL VENDOR PURCHASING POLICY

The Village of Tinley Park believes it is important to provide local vendors with opportunities to provide goods and services to the Village of Tinley Park. This belief is based upon the fact that the active uses of commercial properties in Tinley Park benefits the community through stabilization of property tax, the creation of local sales tax and the provision of employment opportunities for citizens of the community and surrounding region. In an effort to promote the aforementioned benefits, the Village of Tinley Park wishes to provide local vendors with preferential treatment when competing for contracts with the Village. A local vendor is defined as a business that has an actual business location within the Village of Tinley Park and is licensed by the Village. The Village will not award a contract to a local vendor when the difference between the local vendors bid and the otherwise lowest responsive and responsible bid exceeds the applicable percentage indicated as follows. As such, when considering contracts, the Village of Tinley Park reserves the right to forego the lowest responsive and responsible bid exceeds the applicable percentage indicated as follows. As such, when considering contracts, the Village of Tinley Park reserves the right to forego the lowest responsive and responsible bid in favor of a local vendor under the following circumstances:

<u>Contract Value</u>	<u>Range (up to a maximum of)</u>
\$0 to \$250,000	5%
\$250,000 to \$500,000	4%
\$500,000 to \$750,000	3%
\$750,000 to \$1,000,000	2%
\$1,000,000 to \$2,000,000	1%

Under no circumstances will any contract be awarded to a local vendor when the local vendor's bid exceeds the lowest responsive and responsible bid by \$25,000 or more.

This policy shall ONLY apply if formal notice of the aforementioned criteria is provided as part of the bid specifications. In addition, it should be noted that the Village of Tinley Park shall not be obligated to forego the low bidder in favor of the local vendor under any circumstances. However, this policy simply provides the Village with the option of doing so when applicable. Furthermore, this policy shall not apply in any situation where any portion of the contract amount is being paid with funds other than Village monies. Specifically, this policy shall not apply in any situation where the Village has received a grant or otherwise received a source of funds other than its own funds.

RESPONSIBLE BIDDER

For any construction project undertaken by the Village to which the Illinois Prevailing Wage Act, 820 ILCS 130/0.01 et seq. is applicable, in order to be considered a "responsible bidder" on Village Public Works Projects, a bidder must comply with the following criteria, and submit acceptable evidence of such compliance, in addition to any other requirements as determined from time to time by the Village for the specific type of work to be performed:

- (a) Compliance with all applicable laws and Village Codes and Ordinances prerequisite to doing business in Illinois and in the Village;
- (b) Compliance with:
 - a. Submittal of Federal Employer Tax Identification Number or Social Security Number (for individual), and

- b. Provisions of Section 2000e of Chapter 21, Title 42 of the United States Code and Federal Executive Order No. 11246 as amended by Federal Executive Order No. 11375 (known as the Equal Employment Opportunity Provisions);
- (c) Furnishing certificates of insurance indicating at least the following coverages at minimum limits established by the Village: general liability, workers' compensation, completed operations, automobile, hazardous occupation, product liability, and professional liability;
- (d) Compliance with all provisions of the Illinois Prevailing Wage Act, including wages, medical and hospitalization insurance and retirement for those trades covered by the Act;
- (e) Participation in apprenticeship and training programs approved by and registered with the United States Department of Labor's Bureau of Apprenticeship and Training;
- (f) Compliance with the applicable provisions of the Illinois Human Rights Act and the rules of the Illinois Human Rights Commission, including the adoption of a written sexual harassment policy;
- (g) Furnishing of required performance and payment bonds;
- (h) Furnishing certification of no delinquency in the payment of any tax administered by the Illinois Department of Revenue;
- (i) Furnishing certification that the bidder is not barred from bidding or contracting as a result of a violation of either Section 33E or 33E-4 of Chapter 720, Article 5 of the Illinois Compiled Statutes; and
- (j) Furnishing evidence that the bidder has not only the financial responsibility but also the ability to respond to the needs of the Village by the discharge of the Contractor's obligations in accordance with what is expected or demanded under the terms of the contract.

AS-BUILT FIELD DRAWINGS

The Contractor shall provide the Village and/or Authorized Representative with as-built drawings and field notes detailing the work as the storm sewer was installed denoting any changes from the design as shown on the plan sheets. The cost for providing this information will be considered incidental to the project. Final payment will not be made to the Contractor until these drawings are reviewed and approved by the Village and/or Authorized Representative.

NATURAL AREA LANDSCAPING SPECIAL PROVISIONS

SECTION 12 93 00
SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes site furnishings as indicated.

1. Backed Bench

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each exposed finish, not less than 12-inch long tubular sections, or other samples indicating material finish and color.
- C. Maintenance Data: To include in maintenance manuals. Include manufacturer's recommended methods for repairing damage to the finish. Include cleaning procedures or products that may be detrimental to surface finish.

1.3 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Anchors: Furnish not less than five (5) percent of quantity installed of each type, but not less than five.

PART 2 - PRODUCTS

2.1 BACKED BENCH

- A. Design is based upon Model: Austin, backed bench, surface mount, aluminum, end arm rest. Manufactured by Landscape Forms, 431 Lawndale Ave. Kalamazoo, MI 49048, USA, 800-430-6209, specify@landscapeforms.com, and distributed locally by Jennifer Woods, 800-430-6206 x 1336, jenniferw@landscapeforms.com.
1. Or approved equal will be considered subject to meeting the performance criteria specified herein and as indicated on the drawings.
- B. Benches shall be supplied as 6' long.

- C. Bench shall be surface mounting on concrete footings as shown on the drawings and per manufacturer's specifications.
- D. Bench frame shall be aluminum, color: Titanium.
- E. Finish: Landscape Forms' Pangard II® polyester powder coat.
- F. Benches shall be supplied with ipe wood slats with matching end armrests and center armrest.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.
- B. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated.
- B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- C. Install site furnishings level, plumb, true, and securely anchored at locations indicated in the Drawings.
- D. Fit exposed connections accurately together to form tight, hairline joints.
- E. Perform cutting, drilling, and fitting required for installation of site furnishings.
- F. Set work accurately in location, alignment and elevation plumb, level, true, non-rocking and free of rack, measured from established lines and levels. Do not weld, cut, or abrade surfaces of components which have been coated or finished after fabrication, and are intended for field connection by mechanical means without further cutting or fitting.

3.3 ADJUSTMENT AND CLEANING

- A. Protect finishes of all items from damage during construction by use of temporary protective coverings approved by manufacturers. Remove protective covering immediately before Preliminary Acceptance / Substantial Completion.
 - 1. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units as required.

END OF SECTION

SECTION 32 15 00

STABILIZED PATHWAY MIX

PART 1 - GENERAL

1.1 WORK INCLUDES

B. Base Bid:

1. General Contractor Provide:
 - a. Stabilized Pathway Mix

1.2 RELATED WORK

- A. Specified Elsewhere: Requirements that relate to this section are included but not limited to the sections below.
- B. Division 1 section for:
 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
 2. General Requirements.
- C. Division 03 section for:
 1. Section 03 30 00 "Cast-in-Place Concrete" for general applications of concrete.
- D. Division 31 section for:
 1. Section 31 00 00 "Earthwork" for preparation of subgrade and base course.
- E. Divisions 32 section for:
 1. Section 32 13 00 "Portland Cement Concrete Paving" for cast-in-place concrete pavement with other finishes.

1.3 PERFORMANCE REQUIREMENTS

- A. Perform gradation of decomposed granite material or 3/8" or 1/4" minus crushed aggregate in accordance with ASTM C 136 – Method for Sieve Analysis for Fine and Course.

1.4 ACTION SUBMITTALS

- A. Products Data: For each product specified. Submit a 5 lb. sample and sieve analysis for grading of decomposed granite or crushed 3/8" or 1/4" minus aggregate to be sent to Stabilizer Solutions, Inc. prior to any construction – (allow 2 week turn around). Must be approved by Landscape Architect and owner.

- B. Shop Drawings: Show details of installation, including plans and sections.

1.5 PROJECT/SITE CONDITIONS

- A. Field Measurements: Each bidder is required to visit the site of the Work to verify the existing conditions. No adjustments will be made to the Contract Sum for variations in the existing conditions.

- 1. Where surfacing is indicated to fit with other construction, verify dimensions of other construction by field measurements before proceeding with the work.

- B. Environmental Limitations: Do not install decomposed granite or crushed 3/8" or 1/4" minus aggregate paving during rainy conditions or below 40 degrees Fahrenheit and falling.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Installer to provide evidence to indicate successful experience in providing decomposed granite or crushed 3/8" or 1/4" minus aggregate paving containing Stabilizer binder additive

- B. Mock-ups: Install 4 ft. wide x 10 ft. long mock-up of decomposed granite or 3/8" or 1/4" minus crushed aggregate paving with Stabilizer additive at location as directed by owner's representative.

1.7 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

- B. Special Warranty: Submit a written warranty executed by the installer agreeing to repair or replace components of stabilized surfacing that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:

- 1. Premature wear and tear, provided the material is maintained in accordance with manufacturer's written maintenance instructions.
 - 2. Failure of system to meet performance requirements.

- C. Warranty Period: Contractor shall provide warranty for performance of product. Contractor shall warranty installation of product for the time of one year from completion.

- D. Contractor shall provide, for a period of sixty days, unconditional maintenance and repairs as required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Stabilizer for crushed stone surfaces provided by the following manufacturers:

1. Kafka Granite. 550 East Highway 153, Mosinee, WI 54455. Phone (715) 687-2423; fax (715) 687-2395; Rep: Dan Steidl, Cell: 715-316-3956, email dan@kafkagranite.com
2. Envirobond Products Corporation. 1530 Drew Rd., Suite 17, Mississauga, ON Canada L5S 1W8. Phone 1-866-636-8476; email info@envirobond.com
3. Technisoil North America, LLC. Supplied locally by Lafarge Fox River Stone. 1300 Route 31, South Elgin, IL 60177. phone (847) 888-6133; fax (847) 742-6282.

2.2 MATERIALS

A. Decomposed Granite or 3/8" or 1/4" crushed aggregate screenings

1. Crushed Stone Sieve Analysis Percentage of Weight Passing a Square Mesh Sieve AASHTO T11-82 and T27-82.

1/4" MINUS AGGREGATE GRADATION

U.S. Sieve No.	Percent Passing by Weight
# 3/8"	100
# 4	90 – 100
# 8	75 – 80
# 16	55 – 65
# 30	40 – 50
# 50	25 – 35
# 100	15 – 20
# 200 to	10 – 15

2. Color: Cherry Creek Granite

B. Stabilized Binder

1. Non-toxic, organic binder that is a colorless and odorless concentrated powder that binds decomposed granite or crushed 3/8" or 1/4" minus aggregate.

2.3 METAL EDGING

A. Metal Edge Restraint

1. Product: Border King, 1/4" thick, 5" high with stakes 3/16" thick 15" long, finish: galvanized or approved equal
2. Submittals: Submit 3 - 12" long samples of the edging with finish coat.

3. Installation: Edge restraint must be located according to the plans. Install per Manufacturers recommendations.

2.4 EXCESS MATERIALS

- A. Provide owner's authorized representative with the following excess materials for use in future decomposed granite or 3/8" or 1/4" minus crushed aggregate paving repair: 40 to 50 lb. Bags of the aggregate paving blended with proper amount of Stabilizer.

PART 3 - EXECUTION

3.1 BLENDING STABILIZER

- A. Blend 12 to 16 lbs OrganicLock Stabilizer per 1-ton of decomposed granite or crushed 3/8" or 1/4" minus aggregate screenings. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed granite or crushed 1/4" or 3/8" minus aggregate screenings.
- B. Using a moisture-reader, pre-hydrate the aggregate/binder mix to achieve a moisture content of 10-12% after hydration. Do not over-water.

3.2 PLACEMENT

- A. After pre-blending, place the Stabilized decomposed aggregate or 3/8" or 1/4" crushed aggregate screenings on prepared sub-grade. Level to desired grade and cross section.
- B. Place in (2) two equal 2" lifts.
- C. Depth of pathways - 4" for heavy foot traffic and light vehicles.

3.3 WATERING

- A. Water heavily to achieve full depth moisture penetration of the Stabilized pathway Profile. Water activates Stabilizer. To achieve saturation of Stabilized pathway Profile, 25 to 45 gallons of water per 1-ton must be applied. During water application randomly test for depth using a probing device to the final depth.

3.4 COMPACTION

- A. Upon thorough moisture penetration, compact aggregate screenings to 85% relative compaction by compaction equipment such as; a 2 to 4-ton double drum roller. Do not begin compaction for 6 hours after placement and up to 48 hours.
- B. Take care in compacting decomposed granite or crushed 3/8" or 1/4" minus aggregate screenings when adjacent to planting and irrigation systems. Hand tamping with 8" or 10" hand tamp recommended.

3.5 INSPECTION

- A. Finished surface of pathway shall be smooth, uniform and solid. There shall be no evidence of chipping or cracking. Cured and compacted pathway shall be firm throughout profile with no

spongy areas. Loose material shall not be present on the surface. Any significant irregularities in path surface shall be repaired to the uniformity of entire installation.

3.6 MAINTENANCE

- A. Remove debris, such as paper, grass clippings, leaves or other organic material by mechanically blowing or hand raking the surface as needed. Any plowing program required during winter months shall involve the use of a rubber baffle on the plow blade or wheels on the plow that lifts the blade 1/4" off the paving surface.
- B. During the first year, a minor amount of loose aggregate will appear on the paving surface (1/16" to 1/4"). If this material exceeds a 1/4", redistribute the material over the entire surface. Water thoroughly to the depth of 1". This process should be repeated as needed.
- C. If cracking occurs, simply sweep fines into the cracks, water thoroughly and hand tamp with an 8" – 10" hand tamp plate.

3.7 REPAIRS

- A. Excavate damaged area to the depth of the Stabilized aggregate and square off sidewalls.
- B. If area is dry, moisten damaged portion lightly.
- C. Pre-bend the dry required amount of Stabilizer powder with the proper amount of aggregate in a concrete mixer.
- D. Add water to the pre-blended aggregate and Stabilizer. Thoroughly moisten mix with 25 to 45 gallons per 1-ton of pre-blended material or to approximately 10% moisture content.
- E. Apply moistened pre-blended aggregate to excavated area to finish grade.
- F. Compact with an 8" to 10" hand tamp or 250 to 300 pound roller. Keep traffic off areas for 12 to 48 hours after repair has been completed.

3.8 CLEANING

- A. Construction Waste Management
 - 1. At the end of each work day, recycle or dispose of unused material, debris and containers in accordance with Division 1 Section "Construction Waste Management and Disposal".

END OF SECTION

SECTION 32 30 00

NATURAL STONE

PART 1 - GENERAL

1.01 SUMMARY

- A. The work in this section includes fabrication and installation of the following items as shown on the drawings and specified herein:

- 1. Outcropping Stone

1.02 REFERENCES

- A. C 136 Method for Sieve Analysis for Fine and Coarse Aggregate.
- B. D 698 Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5 lb (24.4 N) Rammer and 12 in. (305 mm) drop.
- C. D 1557 Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 10-lb (44.5 N) Rammer and 18 in. (457 mm) drop.
- D. D 2940 Graded Aggregate Material for Bases or Subbases for Highways or Airports.

1.03 QUALITY ASSURANCE

- A. Installation shall be by a contractor and crew with at least ten years of experience in placing natural stone on projects of similar nature or dollar cost.
- B. The Contractor shall conform to all local, state/provincial licensing and bonding requirements.
- C. Stone Testing:
 - 1. Test each variety of stone to show compliance with physical characteristics specified.
 - 2. Test each variety of stone to verify physical characteristics required by structural design.
 - a. Test specimens selected at random from actual materials to be used in the work.
 - b. Testing of actual materials to be used in the work may be waived at the sole discretion of the Engineer if existing test reports are available and if quarry can demonstrate that the quarry product is consistent within an acceptable range of variation.
 - c. Test stone in accordance with ASTM C 568.
 - 3. Test stone in both wet and dry conditions.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Stone bedding and joint material shall be covered with a secure waterproof covering to prevent exposure to rainfall or removal by wind.
- B. Deliver, store, and handle materials in a manner to prevent damage and deterioration.
- C. Use only nonstaining materials in contact with stone.

- D. Handle stone in a manner to prevent damage; use appropriate tools and lifting devices; do not use materials that could stain stone.
- E. Store stone off the ground on wood supports, arranged to avoid breakage.
- F. Protect stored stone from weather with waterproof membrane allowing air circulation.

1.05 PROJECT CONDITIONS

- A. Protect stonework from precipitation.
 - 1. Cover stonework with waterproof membrane at end of work each day. Cover whenever work is not in progress. Cover at least 24 inches down each side; fasten in place.
 - 2. At 40 degrees F and below: Cover stonework completely.
- B. Prevent staining of stone from all sources; immediately remove materials which could cause stains, without damaging stone.
- C. Protect stone from mud spatter.
- D. Remove snow and ice; do not install stonework until substrate surfaces are dry.
- E. Remove frozen stonework and work damaged by freezing.
- F. Stone shall not be installed during heavy rain or snowfall.
- G. Stone shall not be installed over frozen base materials.

1.06 SUBMITTALS

- A. See Section 01300 - Submittals, for submittal procedures.
- B. Product Data: Provide characteristics of stone, dimensions, and special shapes.
- C. Samples: Submit two or more pieces 12 inches or larger, showing complete range of color and natural variations to be provided.
- D. Qualification Data for Installer: Installer shall have minimum ten (10) years experience installing natural stone and mortar on projects of similar nature and cost, including water feature elements. References shall be submitted for approval by AOR.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide stone free of defects which would impair strength, durability, or appearance.
 - 1. Provide stone of uniform coloration, within the range specified or approved.
 - 2. Obtain each type of stone from one quarry.
- B. The granular subbase material shall consist of granular material graded in accordance with ASTM D 2940.

2.02 OUTCROPPING STONE

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide "Fond Du Lac" outcropping stone as supplied by Lurvey Landscape Supply, 2550 East Dempster Street, Des Plaines, IL 60016, 847-299-8333 or approved equal:

- a. Other manufacturer's products will be considered subject to meeting the performance criteria specified herein and indicated on the Drawings. Other acceptable manufacturers are:
 - 1) Schwake Stone
 - 2) Aspen Valley Landscape Supply
 - 3) Lake Street Supply
 - 2. Stones shall be tagged and approved by Architect.
 - 3. Outcropping decorative stones shall vary in size:
 - a. Stones shall be:
 - 1) Thickness: 18" - 48"
 - 2) Depth: 36" - 48"
 - 3) Length: 48" - 96"
- B. Sand Cement Mortar Base Materials
- 1. Portland Cement: ASTM C 150, Type I or Type II.
 - 2. Hydrated Lime: ASTM C 207, Type S.
 - 3. Sand: ASTM C 144.
 - 4. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 5. Water: Potable.
- C. See drawings for additional information.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrate is level or to correct gradient, smooth, capable of supporting stones and imposed loads, and ready to receive work of this Section.
- B. Verify gradients and elevations of substrate are correct.
- C. Subgrade preparation, compacted density and elevations shall conform to the specifications.
- D. Geotextiles shall be placed according to specifications.
- E. Aggregate base materials, thickness, compaction, surface tolerances, and elevations shall conform to the specifications.
- F. The location, type, installation and elevations of edge restraints around the perimeter area to be paved shall be verified.
- G. The base shall be dry, uniform, even, and ready to support bedding stone, stone, and imposed loads.
- H. Beginning of bedding stone and stone installation shall signify acceptance of base.

3.02 PREPARATION

- A. The site must be stripped of all topsoil and other objectionable materials to the grades specified.
- B. All subdrainage of underground services within the pavement area must be completed in conjunction with subgrade preparation and before the commencement of subbase construction.
- C. After trimming to the grades specified, the pavement is to be proof rolled to 100 percent Standard Proctor Maximum Dry Density in the presence of the Consultant, with soft spots or localized pockets of objectionable material excavated and properly replaced with approved granular material.
- D. The subgrade shall be trimmed to within 0 to ½ in. (0 to 10mm) of the specified grades. The surface of the prepared subgrade shall not deviate by more than ½ in. (10mm) from the bottom edge of a 1m straight edge laid in any direction. A soil sterilant to inhibit weed growth may be applied at the direction of the Consultant.
- E. The Contractor shall ensure that the prepared subgrade is protected from damage from inundation by surface water. No traffic shall be allowed to cross the prepared subgrade. Repair of any damage resulting shall be the responsibility of the Contractor and shall be repaired.
- F. Under no circumstances shall further pavement construction proceed until the subgrade has been inspected by the Owner or the Consultant.
- G. Treat soil with herbicide to retard plant growth.

3.03 BEDDING STONE INSTALLATION

- A. Spread stone evenly over prepared substrate surface.
- B. Dampen and roller compact stone to level and even surface.

3.04 GRANULAR SUBBASE AND BASE INSTALLATION

- A. The subbase shall be placed in uniform lifts not exceeding 3 in., (150 mm) loose thickness and compacted to at least 100 percent Standard Proctor Maximum Dry Density as per ASTM 698.
- B. After proper construction of the edge restraints for the flagstone pavers, and upon approval by the Consultant, aggregate base shall be placed in uniform lifts not exceeding 3 in. (150 mm) loose thickness. Each lift shall be compacted to at least 100 percent Standard Proctor Maximum Dry Density.
- C. The granular base shall be trimmed to within 0 to 1/2 in. (0 to 10 mm) of the specified grade. The surface of the prepared base shall not deviate by more than ½ in. (10 mm) from the bottom edge of a 2 m long straight edge laid in any direction.
- D. The upper surface of the base shall be sufficiently well graded and compacted to prevent infiltration of the joint filler sand into the base both during construction and throughout its service life. Segregated areas of the granular base shall be blended by the application of crushed fines that have been watered and compacted into the surface.
- E. Before commencing the placing of the stones, the base shall be inspected by the Owner or the Consultant.

3.05 EDGE RESTRAINTS

- A. Adequate edge restraint shall be provided along the perimeter of all paving as specified. The face of the edge restraint, where it abuts pavers, shall be vertical down to the subbase.
- B. All edge restraints shall be constructed to dimensions and levels specified and shall be supported on a compacted subbase not less than 6 in. (150 mm) thick.

3.06 STONE INSTALLATION

- A. Install sand and cement mortar base as indicated on drawings.
- B. Stones shall be free of foreign material before installation.
- C. Stones shall be inspected for color distribution and all chipped, damaged or discolored stones shall be replaced.
- D. Joints between the stones on average shall be 1/2" wide.
- E. Gaps at the edges of the paved area shall be filled with cut stones or edge units.
- F. Stones to be placed along the edge shall be cut with a double blade paver splitter or masonry saw.
- G. The stone surface shall be swept clean of all debris before compacting, in order to avoid damage from point loads.
- H. A low amplitude, high frequency plate compactor shall be used to compact the stones into the stone setting bed. The stones shall be compacted and if indicated on plans, joint filler shall be swept into the joints until the joints are full. This will require at least two or three passes with the compactor. Do not compact within 3 ft. (1 m) of the unrestrained edges of the paving units.
- I. If indicated on plans, sweep joint fill in between the natural stone joints as indicated on the drawings. Hit the natural stone with a rubber hammer to ensure joint fill will settle firmly into the joints by removing air pockets. Sweep off all excess joint fill on the natural stone surface. All work to within 3 ft. (1 m) of the laying face must be left fully compacted with filled joints at the completion of each day.
- J. The final surface elevations shall not deviate more than 3.8 in. (10 mm) under a 10 ft. (3 m) long straightedge.
- K. The surface elevation of pavers shall be 1/8 to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.

3.07 FIELD QUALITY CONTROL

- A. Final elevations shall be checked for conformance to the drawings after removal of excess joint filler.

3.08 CLEANING

- A. Construction Waste Management:
 - 1. At the end of each work day, recycle or dispose of unused material, debris and containers in accordance with Division 1.

END OF SECTION

SECTION 32 31 38
INTERPRETIVE SIGN

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. High Pressure Laminate signs.
- B. Support posts made from heavy gauge aluminum.
- C. Fasteners and accessories.

1.2 RELATED SECTIONS

- A. Section 33000: Cast-in-place concrete
- B. Section 55000 – Metal Fabrications
- C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 REFERENCES

- A. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics; 1997.
- B. ASTM D 746 - Standard Test method for Brittleness Temperature of Plastics and Elastomers by Impact; 1998.
- C. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 1997.
- D. ASTM D 1505 - Standard Test Method for Density of Plastics by the Density-Gradient Technique; 1998.
- E. ASTM D 1822 - Standard Test Method for Tensile-Impact Energy to Break Plastics and Electrical Insulating Materials; 1993.
- F. ASTM D 2240 - Standard Test Method for Rubber Property -- Durometer Hardness; 1997.
- G. ASTM D 6108 - Standard Test Method for Compressive Properties of Unreinforced and Reinforced Plastic Lumber; 1997.
- H. ASTM D 6109 - Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastic Lumber; 1997.
- I. ASTM D 6111 - Test Method for Bulk Density and Specific Gravity of Plastic Lumber and Shapes by Displacement; 1997.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on signage and mounting materials, including installation methods.
- B. Shop Drawings: Submit shop drawings for custom architectural signs, precise dimensions, and installation details.
- C. Selection Samples: For each sign type specified, one catalog showing manufacturer's full range of available color combinations.
- D. Certification: Manufacturer's certification that products furnished comply with specified requirements.

1.5 QUALITY ASSURANCE

- A. Artwork: Architect will furnish camera-ready artwork for use in fabricating signs. Artwork will consist of clean full color images with maximum image area of 8 by 10, either in paper originals or in IBM-compatible electronic files in .eps, .tif, or .jpg format.
- B. Artwork: To be developed by sign manufacturer from copy provided by Architect.
- C. Mock-Up: Provide one complete sign of type required.
 - 1. Do not proceed with fabrication of remaining signage until workmanship, colors, and installation are approved by Architect.
 - 2. Approved mockup may be incorporated into the finished work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store materials protection from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer. Prevent contact with materials that may cause corrosion, discoloration, or staining. Store off the ground in a safe, dry place.
- C. Handle signs in manner not to damage or mar sign surfaces.

1.7 WARRANTY

- A. 10 year

1.8 SEQUENCING

- A. Comply with manufacturer's ordering instructions and lead time requirements to avoid delays.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Genesis Graphics, Inc. 1823 7th Av. N. Escanaba, Michigan 49829 ph. 800-659-7734 fax. 906-786-0614 Locally Represented by Joan Ball, Genesis Graphics, Inc. 1823 7th Avenue North Escanaba, MI 49829 tel. 1-800-659-7734
- B. Acceptable others
 - 1. KVO Industries, Inc. | 1825 Empire Industrial Ct. Suite A | Santa Rosa CA 95403 · P 707 573 6868 | F 707 573 6888
 - 2. The Plastic Lumber Company, Inc.; 540 South Main Street, Building 7; Akron, Ohio 44311-1023. Telephone: 330-762-8989. Fax: 330-762-1613. Email: sales@plasticlumber.com. Websites: www.plasticlumber.com and www.simplesigns.com.

2.2 MATERIALS

- A. High Pressure Laminate (dHPL)
 - 1. Graphic imaging surface paper impregnated with melamine resins and combined with kraft paper core sheets impregnated with phenolic resins. These sheets are then bonded under high pressure and temperature. Finished sheets are then cut and edge finished.
 - 2. Maximum sheet size is 5X12 ft. with maximum image size of 58X142 in.
 - a. Thicknesses: 1/2 in.
 - b. Sign Size: 17" x 14" x 1/2" with threaded inserts for mounting.
 - c. Corners: Radius of 1/2"
- B. Heavy Gauged Aluminum Post
 - 1. 3" x 3" x 36" aluminum post with 8" x 8" base plate and 10" x 10" mounting plate shall be mounted at 45 deg angle to post.
 - 2. Powdercoated black.
 - 3. Prior to finish coating, plates shall be drilled in shop with holes properly sized and located to accept fasteners as specified.
- C. Fasteners
 - 1. Bolts shall be black, tamper resistant.

2.3 CONCRETE FOOTING

- A. Provide 3000 PSI air entrained ready-mixed concrete conforming to ASTM C-94-, maximum 3" slump.

2.4 FABRICATION

- A. Custom Architectural Signs: Fabricate to design provided by AOR
 - 1. Digital files shall be supplied from AOR that indicate: Size, Sign Message, Letter Height and color.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that areas to receive signage are properly prepared.

3.2 INSTALLATION

- A. Install signs at locations indicated and in accordance with manufacturer's instructions and approved shop drawings.
- B. In undisturbed or compacted soil, drill or hand excavate holes using post hole digger to dimensions required.
- C. Set posts in proper position, plumb and not less than 3 inches (75 mm) above bottom of excavation, and place concrete around posts, vibrating or tamping for consolidation.
- D. Attach signs to support posts as recommended by manufacturer. Install signs plumb, level, at proper angle to landmarks, and at heights indicated, with surfaces free from distortion.

3.3 CLEANING AND PROTECTION

- A. Clean surfaces of signs that have become soiled during installation process.
- B. Protect installed signs from damage until completion of project.
- C. Touch-up, repair or replace damaged signs after Substantial Completion.

END OF SECTION

SECTION 32 93 11

PLANTINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes landscaping work as shown and specified.

1.2 SUBMITTALS

- A. Submit list of sources for plant material to be provided.
- B. Submit photographs of proposed plant material taken in the nursery where they are grown prior to requesting inspection and tagging.
- C. Submit two copies of written maintenance instructions for care of installed plants.
- D. Samples:
 - 1. Submit samples and certified analyses by recognized laboratory for humus, fertilizer. Manufacturer's analysis for standard products will be acceptable.
 - 2. For environmental analysis, submit representative soil samples (no composite samples) to a laboratory certified by the Illinois Environmental Protection Agency and provide analysis results to the Boards Authorized Representative for approval in accordance with Division 31 Section "Acceptance of Backfill, Topsoil and CU Structural Soil."
 - 3. Review shall not be construed as final acceptance. Architect may take samples of materials delivered to site and analyze them for compliance with specifications.
- E. Soil Test Analysis:
 - 1. Submit copies of test analysis indicating pH, percentages of gravel, sand, silt, clay, organic matter, and major micronutrient groups in the analysis for imported topsoil and topsoil from site (if any).
 - 2. Provide environmental analysis of representative soil samples (no composite samples) in accordance with Division 31 Section "Acceptance of Backfill, Topsoil and CU Structural Soil" and submit analytical results to the Boards Authorized Representative for approval 10 working days prior to start of project. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 1,000 tons of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The date of the topsoil analysis shall be within 60 days of importing such material to the site.
 - 3. Include in the analysis recommended amounts of fertilizer and other soil amendments needed to bring the topsoil into compliance with the requirements of this Section.
 - 4. Furnish Architect with 5 copies of test analysis report.
- F. Percolation Test results:

1. Perform percolation tests in tree pits as required by the Chicago Landscape Ordinance. Submit 5 copies of test results to Architect.
- G. Comply with State of Illinois and federal laws with respect to inspection of all plants for plant diseases and insect infestation. Submit an inspection certificate, required by law to this effect, with each shipment.
- H. Preinstallation Conference: Conduct preinstallation conference at the Site in compliance with requirements of Division 01 Section "Project Management and Coordination":
 1. Review maintenance procedures for surrounding streets, walks, paving and site amenities.
 2. Review procedures for work on public property.
 3. Review plant locations and procedures for adjustment.

1.3 QUALITY ASSURANCE

A. Ability to Deliver:

1. Investigate sources of supply and confirm they can supply plants specified on plant list in sizes, variety, and quality noted and specified before submitting bid. Failure to take this precaution will not relieve responsibility for furnishing and installing plant material in accordance with Contract requirements.
2. Substitutions may be permitted only upon submission of written proof that specified plant is not obtainable locally. Such substitution may be made upon written authorization by Architect.
3. Furnish and install plants shown on drawings in quantity and size designated.

B. Inspection:

1. Submit photos of plant material as grown in the nursery for preliminary review by Architect. Select and tag plant material before requesting inspection by Architect.
2. In addition to review of plant material photographs, Architect may inspect plant material at nursery. Such inspection shall be in addition to inspection at job site.
 - a. If plants and materials required to be inspected are located outside radius of 25 miles from Project site, Architect's direct and indirect cost including normal profit shall be borne and paid by Contractor.
3. Upon delivery and before planting request inspection of plants by Architect.
4. Inspection and approval is for quality, size, and variety only, and in no way impairs right of rejection for failure to meet other requirements during progress of Work.
5. Contractor shall be present during required inspection or as may be required by Architect.

C. Qualifications of installer: Work under this Section is to be performed by a Landscape Contracting firm which has a minimum of 5 years experience successfully completing projects of a similar size and value.

D. Perform planting by personnel familiar with accepted landscape planting procedures. A qualified foreman, with a minimum of 5 years experience installing plant material is to be on-site during planting procedures.

E. Reference Standards

1. Provide analyses and tests of topsoil, fertilizer and humus in accordance with requirements of Association of Official Agricultural Chemists.
2. Provide environmental analysis of topsoil to the Boards Authorized Representative 10 days before depositing any soil on site. Soil sample analysis shall not be composite samples, and shall be collected and analyzed in accordance with Division 31 Section "Acceptance of Backfill, Topsoil and CU Structural Soil." The date of the topsoil analysis report shall be within 60 days of the importing such material to the site.
3. Plant names used in plant list are in accordance with "Standardized Plant Names," published by American Joint Committee on Horticulture Nomenclature (current edition).
4. Size grading standards of plant materials shall be in accordance with American Association of Nurseryman, Inc., (AAN) Code of Standards ANSI Z60.1.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Preparation for Delivery:

1. Balled and Burlapped (B&B) Plants:
 - a. Dig and prepare for shipment in manner that will not damage roots, branches, shape, and future development of plant.
 - b. Originate from soil which will hold good ball when wrapped with burlap or similar material, bound with twine or cord so as to hold balls firm and intact.
 - c. Ball Sizes: Not less than standard established by AAN.
 - d. Drumlace plants 2 inches in caliper and over.
2. Potted or Container Plants
 - a. Provide container to hold ball shape protecting root mass during delivery and handling.

B. Delivery:

1. Plant Material: Take precautions in accordance with best trade practices to ensure arrival of plant material at job site in good condition and without injury. Cover plants to prevent drying, transit disease or injury.
2. Fertilizer: Deliver fertilizer to site in original, unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark, and conformance to state law.
3. Notify Architect, a minimum of 24 hours before delivery of plant material.
 - a. Failure to notify Architect in advance, in order to arrange proper scheduling may result in loss of time or removal of plant or plants not installed as specified or directed.
4. Each shipment shall be accompanied by invoice showing sizes and varieties of plants included in each shipment.
 - a. Provide copy of invoice to Architect upon delivery of plant material.

C. Storage:

1. Plant Material:

- a. Set plants which are not to be planted within 4 hours, on ground and heal in with peat, soil, mulch or other media.
- b. Protect roots of plant material from drying or other possible injury.
- c. Water plants as necessary until planted.
- d. Plants shall not remain unplanted for longer than 3 days.

2. Store fertilizer, humus, and spray materials in weatherproof storage areas and in such manner that their effectiveness will not be impaired.

1.5 JOB CONDITIONS

A. Planting Seasons:

1. Spring Planting: From time soil becomes workable to June 15. Fall Planting: September 1 to November 15. Plant evergreen shrub plantings no later than November 1, and evergreen tree plantings no later than October 15.
2. Summer Season: June 2 through August 31. Planting shall be considered unseasonable and shall require approval by Architect. Approval to plant under such conditions shall in no way relieve Contractor from guarantee provisions of these specifications.
3. Container Plants: Planting season designated above may be extended for container grown plants when approved by Architect.

- B. Plant only when weather and soil conditions are suitable in accordance with best practices of industry.

C. Protection:

1. Protect seeded and planted areas against damage by other work.
2. Replace, repair, restake or replant sod or plantings which are damaged.
3. Protect lawn areas, and repair damage resulting from planting operations.

- D. Wherever landscape work is executed in conjunction with other work, arrange schedule that will permit execution of landscape work as specified.

PART 2 - PRODUCTS

2.1 PLANT

A. General:

1. Provide nursery grown plant material. Provide plants grown within same hardiness zone as project site or have been acclimated to conditions of same hardiness zone for minimum of two growing seasons. Hardiness zones shall conform to "Zones of Plant Hardiness" as provided by U.S. Department of Agriculture.

2. Unless specifically noted otherwise, provide plants of selected specimen quality, have normal habit of growth and be sound, healthy, vigorous plants with well developed root systems, free of disease, insect pests, their eggs or larvae, and injuries.
3. Do not prune before delivery. Prune only at time of planting.
4. Trees that have damaged or crooked leader, or multiple leaders, are not acceptable unless specifically specified. Trees with abrasion of bark, sun scalds, disfiguring knots, or fresh cuts of limbs over 1-1/4 inches, which have not completely calloused, are not acceptable.
5. Plants shall be freshly dug or container-grown. No heeled-in plants or plants for cold storage will be accepted, except as otherwise specified, unless Contractor makes such request in writing and plants are inspected and approved.

B. Plant Name and Size:

1. Measure plants when branches are in their normal position. Height and spread refer to plant's main body and not from branch tip to branch tip.
2. Take caliper measurement at point on trunk 6 inches above natural ground line for trees up to 4 inches in caliper and at point 12 inches above natural ground line for trees 4 inches and over in caliper.
3. If range of size is given, no plant shall be less than minimum size and not less than 50% of plants shall be as large as upper half of range specified.
4. Measurements specified are minimum size acceptable and are measurements after pruning, where pruning is required. Plants meeting measurements specified, but not producing normal balance between height and spread, are not acceptable.
5. Shrubs shall be matched specimens from single block source.
6. Plants shall be true to species and variety and shall conform to measurement specified in Plant List except that plants larger than specified may be used if approved by Architect. Use of such plants shall not result in increase in Contract price. If larger plants are approved, increase ball of earth in proportion to size of plant.
7. Where plants larger than specified have been submitted in writing for approval and approved in writing by Architect, Contractor shall assume responsibility of guarantee for plant in size as planted.

C. Balled and Burlapped Plants (Designated B&B):

1. Dig plants with firm natural balls of earth of diameter indicated below and of sufficient depth to encompass fibrous and feeding root system necessary for full recovery of plant.
2. Plants having balls broken or cracked during delivery or at time of planting will be rejected.
3. For Evergreen trees, trunk diameter shall be used to determine minimum required ball dimensions. Minimum ball dimensions shall be those as specified for single stem trees.
4. Diameter at top of each ball shall be diameter specified above and diameter at bottom of each ball shall not be less than 70% of specified top diameter. Top and bottom sources shall be parallel.
5. Ball shall be of specified depth at points perpendicular to bottom of ball.
6. Balls greater than 30 inches diameter shall be drum-laced.
7. Architect may reject any plant specified as balled and burlapped which fails to conform, in the Architect's opinion, to baling requirements set forth herein.

D. Container or Pot Grown Plants:

1. Container grown plants shall have heavy fibrous root system, or well developed taproot, that has been developed by proper horticultural practice including transplanting and root pruning.
2. Root system shall have developed sufficiently long for new fibrous roots to develop so root mass will retain its shape and hold together when removed from container.
3. In no case should container strangle or girdle natural growth of plant.
4. Groundcovers in containers pots shall have the minimum number of runners and length of runners in accordance with American Association of Nurserymen, Inc., ANSI Z60.1.
5. Diameter of spread shall determine inside diameter of pot in which they shall be grown for at least 3 months prior to delivery.
6. Plant container sizes shall conform to American Association of Nurseryman, Inc., ANSI Z60.1.

E. Deciduous (Shade and Ornamental Trees):

1. Street tree plantings shall be free of branches equivalent to 1/2 of tree height or so that crown of tree is in proportion to trunk as tree grows.
 - a. Trees with ascending branches may be branched 1 foot or more below branch heights as listed.
2. Provide trees of specimen quality.

F. Evergreen Trees/Shrubs:

1. Provide evergreen trees of specimen quality.
2. Provide evergreen shrubs of specimen quality.
3. Columnar plants:
 - a. Provide columnar plants of specimen quality.

G. Deciduous Shrubs:

1. Provide deciduous shrubs of specimen quality.

H. Perennial, Biennials, Prairie Forbes, and Grasses:

1. Perennial, biennials, prairie forbes, and grasses specified as "container" or "pot" shall be provided as container grown plants, or shall be provided with firm natural balls of earth with diameter and depth in accordance with American Standard for Nursery Stock for size specified on Plant List.
2. Ship balled plants in open-air boxes or crates that will minimize handling of each plant prior to installation. Do not plant balled plants if ball is cracked or broken either before or during process of planting.

2.2 PLANTING MATERIALS

A. Water:

1. Existing water supply from hose bibs at the project building may be used for all planting operations. Provide hose and equipment necessary for proper watering of plant material. Provide water at no extra cost if it is not available at the project site.

B. Topsoil:

1. Topsoil shall be loamy soil from the A horizon of soil profiles of local soils. It shall be relatively free from large roots, sticks, weeds, brush, or stones larger than 25 mm (1 inch) in diameter, or other litter and waste products. At least 90 percent must pass the 2.00 mm (No. 10) sieve and the pH must be between 5.0 and 8.0.
2. Composition: 45-77 percent silt, 0-25 percent clay, 25-33 percent sand.
3. Acidity: pH 6.0 to 7.0; amend soil as indicated by tests to achieve this pH range.
4. Organic content: Three to five percent.
5. Environmental analysis requirements shall be in accordance with Division 31 Section "Acceptance of Backfill, Topsoil and CU Structural Soil."
6. Import topsoil conforming to above requirements from off-site sources as required to complete the work. Do not obtain from bogs or marshes.
7. Perform test analysis on each source of topsoil to demonstrate compliance with the above and submit reports as specified.

C. Mulch:

1. Shredded Hardwood Bark:
 - a. From mixed hardwood species and free of sticks leaves, and wood chips, 60% shall range between 1 inch and 3 inches in length; remaining 40% shall not exceed 1-1/2 inches.
 - b. Maximum of 5% content by weight of shredded wood particles.

D. Fertilizer:

1. Commercial type, uniform in composition, free flowing, conforming to state and federal laws, and suitable for application with equipment designed for that purpose.
2. Fertilizer to contain minimum basis percentage by weight of following:
 - a. Nitrogen: 6%, 1/4 of nitrogen shall be in form of nitrates, 1/4 in form of ammonia salts, and 1/2 in form of organic nitrogen.
 - b. Phosphorus: 24%, available phosphoric acid shall be derived from super phosphate having minimum analysis of 20% available phosphate.
 - c. Potash: 24%, potash shall be in form of sulphate of potash.
 - d. Balance of fertilizer shall be materials usually present in such products, free from dust, sticks, sand, stone, and other debris.
3. Coordination N-P-K requirements with those recommended by soils consultant, if applicable.

E. Drainage material:

1. Free draining aggregate meeting the requirements of IDOT CA7 and having a pH of 5.5 - 7. Comply with the requirements of Division 31 Section "Acceptance of Backfill, Topsoil and CU Structural Soil."

F. Aeration/drainage pipe:

1. Perforated or slotted agricultural drainage pipe capable of withstanding required backfill compaction.
2. Rigid riser pipe for vertical installation where indicated. Install slotted use compatible pipe and fittings such as tees and caps for horizontal and vertical installations.
3. Cover aeration/drainage pipe with a geotextile sock.

G. Filter fabric:

1. Nonbiodegradable, needle-punched, non-woven, water permeable, 100% continuous polypropylene or polyester fabric, 3 oz. per sq. yd. minimum, designed for drainage applications without clogging or piping.
2. Capable of withstanding backfilling and compacting operations without tearing or deforming.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Do not install plantings where depth of soil over underground construction, obstructions or rock is insufficient to accommodate roots or where pockets in rock or impervious soil will require drainage. Where such conditions encountered in excavation planting areas and where stone, boulders or other obstruction cannot be broke or removed by hand methods and where trees to be planted found under overhead wires, bring to the attention of the Architect. Alternate locations for planting may be designated by Architect.
- B. Remove rock or other underground construction and drain planting areas only when approved by Architect. Payment of extra shall be based on in-place volume required to provide normal requirements for plantings.
- C. Verify location of underground utilities with appropriate sources prior to construction. Contact JULIE at least 48 hours before commencing with construction operations.
- D. Conflicts with utilities shall be called to the Architect's attention before proceeding with work. Alternate locations may be designated by Architect.

3.2 INSTALLATION

A. Topsoil/Finish Grading:

1. Do not place or work topsoil in frozen or muddy condition.

2. Establish final grade as shown on drawings. Grades not otherwise indicated are uniform levels or slopes between points where elevations are given or between such points and existing finished grades.
 3. Where drawings show existing grades of landscaped areas not to be changed remove enough material to allow placement of 18in. of new topsoil and 6 inches of drainage material beneath shrub plantings and 24 inches of topsoil minimum beneath tree plantings, unless existing topsoil to required depth is undisturbed and of equal or better quality than specified herein. In latter case, existing topsoil may be left in place and use only enough new topsoil to bring these areas up to grade.
- B. Preparation:
1. Planting Season: Conform to planting seasons defined herein.
 2. Preparation of Planting Areas: Cover surrounding turf (if existing) in manner to protect turfed areas that are to be trucked or hauled over and upon which soil is to be temporarily stocked.
 3. Maintain at least one stockpile of topsoil for backfilling plants during planting operations.
 4. Stake or paint locations of plants and bed lines. Architect must approve locations before excavation is started. Provide 48 hours notice for approval. Contractor to be present during approval. Make adjustments in locations and outlines as required. In event that pits or areas for planting are prepared and backfilled with topsoil to grade prior to commencement of lawn operations, mark so they can be readily located when work of planting proceeds.
 5. Remove weed growth prior to planting installation.
- C. Excavation for Planting:
1. Excavate circular pits with vertical side for plants. Except for ground cover or other bedding type plant material.
 - a. Diameter of pits for trees shall be at least 2 feet greater than diameter of ball, or container.
 2. Depth of pits for trees shall be as indicated, or as required by Ordinance, which ever is more beneficial to the growth of plants. Excavate to greater depth as suitable to accommodate ball, container or bare roots when plant is set to finish grade allowing for 6 in. of compacted, prepared soil in bottom of pit.
 3. All planting areas must have adequate drainage. Install under drainage pipes in all planting areas and connect to storm sewer. Where percolation tests indicate adequate percolation of 1 inch per hour minimum, sump drainage may be used. Auger an 8-inch diameter by 6-foot deep drainage passage beneath individual tree pits. Fill passage with drainage material and cover with filter fabric. Utilize continuous trench for rows of trees. Excavate a drainage sump of indicated dimensions adjacent to each tree. Fill sump with drainage material and cover with filter fabric.
 4. Utilize continuous trench for shrub masses and hedges instead of separate round pits. Auger an 8-inch diameter by 6-foot deep drainage sump every 8 ft along length of plant pit. Fill passage with drainage material and cover with filter fabric.
 5. Install aeration/drainage pipe system in tree planting trenches as indicated.

D. Testing of Plant Pits and Trenches:

1. Perform percolation tests for all plant pits.
2. Where obstructions below or above ground are encountered, alternate locations may be selected as approved by Architect.
3. Where locations cannot be changed as determined by Architect, submit cost required to remove obstructions to depth of not less than 6 in. below required pit depth. Proceed with work after approval of Architect.
4. Dispose of excavated material not suitable for backfilling offsite in legal manner.

E. Preparation of Planting Pits:

1. Loosen soil at bottom of pit to minimum depth of 4 inches by spading or other effective methods.
2. Scarify walls of plant pits.
3. Backfill pit with 6-inch layer of compacted, topsoil.
4. If drainage problems are encountered notify AOR immediately for review and direction.

F. Setting and Backfilling Plants:

1. Balled and Burlapped (B&B) Plants:

- a. Place plants being planted in pits or trenches in center of pit or trench on compacted, topsoil. Adjust compacted soil so that top of root ball bears same relationship to finish grade as it bore to its previous finish grade in nursery.
- b. Remove twine tied around tree trunk. Remove or roll down burlap or plastic wrap around ball. Remove wire and other nondecomposable materials. Untreated burlap need not be removed, but shall be loosened around tree trunk.
- c. Backfill planting pits with topsoil in 12-inch layers and tamp each layer to fill voids until planting mixture is at final grade.
- d. Remove nursery plant identification tags.

2. Container Grown Plants:

- a. Open and remove potted plants from containers.
- b. If growing medium is comprised of 75% or more of peat, perlite, sand or like material other than soil, pull visible roots away from container medium so as to leave roots partially exposed.
- c. Place plants in plant pit or trench and carefully backfill with topsoil among exposed roots. Continue backfilling and tamping in 6-inch layers until topsoil is at final grade.
- d. Remove nursery plant identification tags.

G. Saucer Formation:

1. Form shallow saucer around each isolated plant pit with topsoil.
2. Water plants immediately after planting. Incorporate required fertilizer into prepared planting mixture at rate specified.

H. Bed Edging:

1. Spade edge all planting beds and tree rings 2 inches deep.
2. Ragged edges and edging will not be accepted.

3.3 PRUNING

- A. Prune trees and shrubs at time of or after planting. Prune and repair existing trees designated to remain.
- B. Prune in accordance with standard horticultural practices to retain natural habit and shape of plant.
 1. Shearing of plants will not be accepted, unless instructed by Architect.
 2. Preserve leader(s) promoting symmetrical growth on multiple leader plants.
- C. Prune and trim dead wood, suckers, and injured twigs and branches.
- D. Use only clean, sharp tools.
- E. Make cuts flush and clean avoiding injury to branch bark ridge or branch collar leaving no stubs.
- F. For cuts greater than 3/4 in. in diameter and bruises or scars on bark, trace injured cambium back to living tissue and remove. Smooth and shape wounds so as not to retain water.
- G. Prune flowering trees only to remove dead or damaged branches. Do not remove leader.

3.4 PROTECTION AND MAINTENANCE

A. Fertilizer:

1. First Application (Ratio 1-4-4): Prior to installation of mulch to plant beds and saucers, apply commercial fertilizer to plant bed or saucer area at rate of 1/2 lb. of active ingredient per 100 sq. ft.
2. Second Application (Ratio 5-3-2): Applied in 60 days after planting at rate of 1/2 lb. of active ingredient per 100 sq. ft.

B. Mulching:

1. Mulch shade trees, ornamental trees, singularly planted shrubs, hedge plantings, and massed plantings. Cover entire planting pit or trench with minimum 3-inch depth of shredded hardwood bark.
2. Mulch within five days after installation.

C. Watering:

1. Thoroughly water immediately after installation.
2. Water during period of temporary maintenance.

3.5 CLEAN UP

- A. Remove soil or similar material brought onto paved areas, keeping these areas clean.
- B. Upon completion of planting, remove excess soil, stones, and debris and dispose of off-site in legal manner.

3.6 MAINTENANCE

- A. Maintain plant material until landscape operations have received substantial completion of the project. (This includes not only plant material but also installation completion (preliminary acceptance) of sodded areas as described in Division 32 Section "Sodding").
- B. Maintenance begins immediately after each plant is installed and shall include watering, necessary cultivation, weeding, pruning, disease and insect pest control, protective spraying, resetting of plants to proper grades or upright position, restoration of damaged planting saucers, and any other procedure consistent with good horticultural practice necessary to ensure normal, vigorous, and healthy growth of work.

3.7 ACCEPTANCE

- A. Planting Acceptance: At Preliminary Acceptance / Substantial Completion of the project, the Architect will inspect landscape work for acceptance.
 - 1. Acceptance requires:
 - a. Plant material shall conform to drawings with respect to quantity, quality, size, species, and location, except those items accepted or revised in field by Architect.
 - b. Plant material shall be in healthy condition as defined under guarantee requirements below.
 - c. Items shall appear to be in general conformance with specifications.

3.8 GUARANTEE

- A. Contractor shall guarantee for period of one year from the date of Preliminary Acceptance / Substantial Completion, replacement of plants which have died, or are in distressed/dying condition, or which have failed to flourish in such manner that their usefulness or appearance has been impaired. Replace any tree with dead main leader or crown that is 25% or more dead.
 - 1. Exclusions:
 - a. Contractor shall not be liable for replacement cost of plants damaged by deicing compounds, fertilizers, pesticides or other materials not specified in Contract Documents or not applied by the landscaper, by relocating or removal by others, by acts of God, or by vandalism, and losses due to curtailment of water by local authorities.
 - 2. Inspection of Maintenance:
 - a. During guarantee period, Contractor shall, from time to time, inspect watering, cultivation, and other maintenance operations carried on by Owner with respect to

such work, and promptly report to Owner any methods, practices or operations considered unsatisfactory and not in accord with interests or good horticultural practices.

- b. Failure of Contractor to so inspect or report shall be construed as an acceptance of Owner's maintenance operations, and Contractor shall not thereafter claim or assert that any defects which may later develop are result of such methods or practices or operations.

3.9 REPLACEMENTS

- A. Plants which die or require replacement for other reasons during one-year guarantee period shall be replaced as soon as possible during following acceptable planting seasons:

- 1. Spring Replacement Season: All plants - when ground becomes workable to June 15.
- 2. Fall Replacement Season:
 - a. Deciduous plants - September 1 to November 15.
 - b. Evergreen plants - September 1 to November 1.

- B. Topsoil that does not conform to the environmental standards as detailed in specification Division 31 Section "Acceptance of Backfill, Topsoil and CU Structural Soil" shall be excavated and replaced with topsoil that does at Contractor's expense.

- C. Procedure:

- 1. Dispose of plants off-site in legal manner.
- 2. Replacements shall be of same size and species as original plant unless otherwise approved by Landscape Architect.
- 3. Replacements shall be supplied and installed in accordance with specifications.
 - a. Additional one-year guarantee for replacement plants shall begin on date of final acceptance of plant material by Architect as documented in field report.
- 4. Replacement and Damages:
 - a. Decisions of Architect for required replacements shall be conclusive and binding upon Contractor.
 - b. Contractor shall be responsible for repairing damage to property also caused by defective workmanship and materials.

END OF SECTION

NATURAL AREAS ESTABLISHMENT PROVISIONS

PART 1 GENERAL

1.01 DESCRIPTION AND INTENT OF WORK

- A. The Natural Areas Contractor shall perform all work to the complete satisfaction of the Owner and in accordance with all municipal, county, state and other laws, ordinances applicable to such work.
- B. The Natural Areas Contractor's personnel shall at all times present a neat and professional appearance and all work shall be done and all complaints handled by the Contractor with due regard to the Owner's public relations.
- C. Native Herbaceous Planting priorities are to prepare planting areas for good seed-to-soil contact, install an even coverage of high-quality native seed/plants and protect planting areas from erosion. The intent is to develop a dense stand of native seedlings with minimal weed content.
- D. Natural Areas Stewardship's priority is to approach eradication of invasive herbaceous species, establish and encourage the healthy growth of native species, and increase overall site biodiversity. This document describes the standards for Acceptance, Monitoring, Reporting, Performance, and Remediation for a successful stewardship program. The intent is to develop a dense stand of desirable native species with minimal weed content and no threat from invasive species or aggressive native species prior to hand-off to the Owner.
- E. Prescribed Fire priorities are to achieve specific ecological and/or aesthetic outcomes through the safe application of fire under a comprehensive prescription. The intent is to clear standing dormant herbaceous biomass and/or leaf litter to allow significant sunlight to penetrate the soil surface and allow easy application of herbicide to emerging plant material without causing damage to structures, property, cultural resources, desirable woody vegetation, desirable deadwood, desirable fire-negative herbaceous species or other desirable features.

1.02 WORK INCLUDED

- A. Native Herbaceous Planting work shall include all labor, material, equipment, and transport necessary for, and incidental to, site preparation (includes minor grading), identification of invasive/weedy species, eradication of invasive/weedy species, planting, seeding, and erosion control as related to the installation of native plant species.
- B. Natural Areas Stewardship work shall include all labor, material, equipment, and transport necessary for, and incidental to, short-term stewardship of the natural areas including, but not limited to the control of invasive woody and herbaceous flora through cultural methods, physical removal, biological control, or the application of appropriate herbicides.
- C. Prescribed Fire shall include all labor, material, equipment, and transport necessary for, and incidental to, permit acquisition, coordination with local jurisdictions, notifications, site preparation (may include the disposal of brush, vegetation, downed logs, stumps, sod, limited rubbish, surface debris, or other material occurring within the natural area which will interfere with the work), creation of required burn breaks, ignition, containment, smoke monitoring & management, and mop-up activities. Mop-up activities include, but are not limited to, suppression of all smoldering material, ensuring burn crew members are on-call and remain within 2-hours of the burn site for 24 hours after burn completion, etc.

NATURAL AREAS ESTABLISHMENT PROVISIONS

1.03 CONTRACTOR QUALIFICATIONS

- A. All work shall be performed by a Natural Areas Contractor with at least seven (7) years of documented experience in site preparation, planting of native species, natural areas management, prescribed fire, monitoring and reporting for the purposes of ecological restoration, and shall be able to demonstrate their knowledge in the field. Natural Areas Contractor shall submit a statement of qualifications with their bid containing the following information:
- Name, address, and telephone number of firm.
 - Brief business history of the firm, including year founded.
 - List of equipment anticipated to be utilized for this project, specify whether the equipment is owned by the Natural Areas Contractor or not.
 - List of personnel anticipated to be assigned to this project. Specify total number years of experience, number years with submitting firm and which tasks they are expected to perform under this contract.
 - Descriptions and references to five (5) successful natural areas projects similar in scope and size to the Owner's project. At a minimum references shall include the client's name, address, and telephone number.
 - a. A minimum of three (3) of the projects referenced shall meet the following:
 - i. Completed within the past five (5) years.
 - ii. Include before and after photos.
 - iii. Be located less than fifty (50) miles from the project site(s). These sites **will** be field inspected for quality of work prior to contractor selection.
 - iv. Be naturalized stormwater basins with a minimum natural area size of one (1) acre, not including open water.
 - v. The work shall have been performed for a local government municipality.
 - vi. Tasks performed shall include site preparation, native seed/plant installation, management (including herbicide application) and prescription burning.
 - References to fifteen (15) successfully completed burns within natural areas similar in scope and size to the Owner's project. At a minimum references shall include the client's name, address and telephone number. If applicable, prescribed fire references can be the same as project references.
 - Only tasks self-performed shall meet the above criteria, subcontracted tasks **must** be identified within the qualification submittal.
- B. **Project Manager:** The Natural Areas Contractor shall designate an employee to be the Project Manager (PM). This person shall be the sole representative of the Natural Areas Contractor and shall be the contact person for the Owner/Owner's Representative. The PM must speak fluent English and at a minimum must have a bachelor's degree in natural resources, ecology, biology, or a related field, three (3) years of documented experience with Midwestern ecosystems/habitat types and one (1) year of field experience in ecosystem restoration. PM must also demonstrate the following:
- Experience with public speaking in general and the ability to verbally communicate complicated processes or techniques and technical data or information in a simplified, clear and concise manner
 - Experience working with municipal government staff, elected officials and community residents.
 - Working knowledge and understanding of basic ecology and restoration principles.
 - The skills to competently identify invasive and native species.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- Working knowledge of the latest most effective and selective methods/materials/herbicides for providing quality ecological restoration.
- Understanding of effective timing for successful target species herbicide application methods.
- Hold a current and valid State of Illinois Pesticide Applicator or Operator License
- Successful completion of NWCG s130/s190 wildland fire training.

C. **On-Site Crew Foreman (Supervisor):** The Natural Areas Contractor shall provide at least one foreman who will be present at all times during execution of the work. The foreman must speak fluent English and shall possess a minimum two (2) year degree or five (5) years of documented experience in natural resources, biology, or a related field. They shall have a minimum of three (3) years of documented field experience in ecological restoration. Foreman must also demonstrate the following:

- Experience working on municipal government projects and an ability to communicate technical information clearly to the Contractor's crew, the Owner/Owner's Representative and community residents.
- Experience working on naturalized stormwater basin projects.
- Working knowledge and understanding of basic ecology and restoration principles.
- Working knowledge of the latest most effective and selective methods/materials/herbicides for providing quality ecological restoration.
- Understanding of effective timing for successful target species herbicide application methods.
- Hold a current and valid State of Illinois Pesticide Applicator License.
- Successful completion of NWCG s130/s190 wildland fire training.
- Successful completion of OSHA 30 hour safety training
- Be current in CPR/First Aid

D. **Crew Members:** Contractor's field staff shall demonstrate the following:

- Employed full-time directly by the submitting firm. Subcontractors, interns and seasonal employees are not acceptable crew members.
- Working knowledge and understanding of basic ecology and restoration principles.
- Working knowledge of the type and operation of equipment being used.
- The skills to competently identify most common invasive species.
- Hold a current and valid State of Illinois Pesticide Applicator or Operator License.
- Successful completion of OSHA 10 hour safety training
- Be current in CPR/First Aid

E. **Burn Boss:** The burn boss shall have met the requirements of Illinois Law and Regulations (17 Illinois Admin. Code 1565.70) and shall be recognized as a Certified Prescribed Burn Manager in compliance with the Illinois Prescribed Burning Act (525 ILCS 37); the certificate number and date of issue shall be provided on submitted resume. The burn boss must also demonstrate the following:

- Employed full-time directly by the submitting firm. Subcontractors, interns and seasonal employees are not acceptable.
- Working knowledge and understanding of basic ecology and restoration principles.
- A minimum of five (5) years conducting prescribed fire in the Midwest, in the fuel types present, and in projects of similar scope and size.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- Documented experience writing burn plans and shall have led the execution of a minimum fifteen (15) prescribed fires.
- Successful completion of the following National Wildfire Coordinating Group (NWCG) Wildland Fire Training Courses:
 - Intermediate Wildland fire Behavior (s290)
 - Basic Incident Command Systems (i100)
 - Fire Fighter Training (s130)
 - Wildland Fire Behavior (s190)
- Successful completion of OSHA 30 hour safety training
- Be current in CPR/First Aid

F. **Burn Crew:** All burn crew members must also demonstrate the following:

- Employed full-time directly by the submitting firm. Subcontractors, interns and seasonal employees are not acceptable.
- Working knowledge and understanding of basic ecology and restoration principles.
- A minimum of one (1) year documented experience conducting prescribed fire.
- Documented experience working the line of a minimum three (3) prescribed fires.
- Successful completion of the following National Wildfire Coordinating Group (NWCG) Wildland Fire Training Courses:
 - Fire Fighter Training (s130)
 - Wildland Fire Behavior (s190) or Chicago Wilderness Midwest Ecological Burn Crew Member Basic Training
- Successful completion of OSHA 10 hour safety training
- Be current in CPR/First Aid

- G. **Project Ecologist:** The Natural Areas Contractor shall designate an employee to be the Project Ecologist (PE). This person shall be responsible for timely completion of all vegetative monitoring and preparation/submittal of annual monitoring reports to the Owner/Owner's Representative. At a minimum the PE must have a bachelor's degree in natural resources, ecology, biology, or a related field, five (5) years of documented experience with Midwestern ecosystems/habitat types and three (3) years of field experience in vegetation monitoring. PE must also demonstrate the following:
- The skills to competently identify invasive and native species, including grasses, forbs, shrubs and trees during the dormant and growing seasons.
 - Working knowledge of vegetation sampling protocol, including both meander and transect sampling methodologies.

- H. Prior to commencement of Natural Areas work, the Owner/Owner's Representative reserves the right to request a field test of the PM, PE, foreman and crew members assigned to the project to ensure adequate plant identification skills for the proposed restoration activities.
- I. The PM, PE, foreman and burn boss may be the same individual if the individual meets all requirements for all positions.
- J. Once Natural Areas Contractor personnel are assigned, any changes in personnel shall be reported within ten (10) calendar days of the change occurring.

NATURAL AREAS ESTABLISHMENT PROVISIONS

1.04 COMMUNICATION

- A. The Natural Areas Contractor shall make the PM, foreman, and burn boss (or any other staff assigned the project) available for phone calls or meetings as requested by the Owner/Owner's Representative.
- B. The Natural Areas Contractor shall respond to questions or fulfill requests by the Owner/Owner's representative within twenty-four (24) hours unless an extension is granted in writing by the Owner/Owner's Representative. Contractors not responding within this timeframe will be considered unresponsive and corrective action may be taken, up to and including enacting the performance bond.

1.05 PERMITS AND FEES

- A. Natural Areas Contractor shall obtain any necessary permits for the required work and pay any fees required for permits.

1.06 SAFETY

- A. Minimum crew size for any work on this project shall be two (2) crew members. Crew members shall have the ability to communicate with one another at all times (cell phones, two-way radios, etc.) and shall have the ability to communicate with emergency personnel.
- B. The Owner/Owner's Representative shall be notified at least twenty-four (24) hours before the start of any work.
- C. It shall be the responsibility of the Contractor to adhere to all safety regulations and guidelines of local jurisdictions, all applicable OSHA safety regulations and guidelines, as well as Federal Construction Safety and Health Standards while carrying out activities related to this project.
- D. In the event of pesticide spillage, fuel or other chemical spillage, any personal injury or death related to the project, or damage of any kind, the Owner/Owner's Representative shall be notified immediately.
- E. Any trails and/or roads within two-hundred (200) feet of the daily work area shall be posted with Caution-Work Area, Tree Work Ahead, or Construction Area signs to warn the public. Signs or pin flags shall be posted along trails, roads or other public access points upon application of herbicides. Signs on public roadways shall conform to all applicable DOT and local jurisdictional signage specifications.
- F. Appropriate caution shall be taken when work is performed near trails, utilities, and roads. This shall include the posting of look-out observers if there is the possibility of debris or brush from project activities landing in trail or road areas.
- G. Traffic: Conduct construction operations to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without written permission from the Owner/Owner's Representative and other authorities having jurisdiction.
- H. The Contractor shall ensure that the following safety equipment is available at the project site at all times for personnel involved in this project:

NATURAL AREAS ESTABLISHMENT PROVISIONS

1. First Aid Kit
2. Portable emergency eye wash station
3. Chemical spill kit

1.07 ACCESS AND STAGING

- A. The Owner/Owner's Representative shall designate all access and staging points on the Plan(s) and/or in the field prior to work beginning. Whenever possible, access points shall be off paths and roadways to minimize potential damage to desirable vegetation.
- B. Any damage incurred during the project (e.g. pitting, rutting, compaction, erosion, etc.) shall be repaired immediately by the Natural Areas Contractor at no additional cost to the Owner. Areas shall be repaired to a finished state as determined by the Owner/Owner's Representative and may include, but is not limited to, re-grading, re-seeding/re-planting with appropriate species, and appropriate erosion control.
- C. When not in use, the Contractor's vehicles, equipment, materials and supplies shall be removed from the Owner's property and/or stored at staging points as identified on the Plan(s) and/or as directed in the field by the Owner/Owner's Representative. Designated staging points shall be located to limit the movement of equipment on site and for safety of the equipment. Prior to work beginning, designated staging points shall be agreed upon in writing by the Contractor. Any damage or theft of vehicles, equipment, materials and/or supplies during movement and storage shall be the responsibility of the Contractor.
- D. All equipment and personnel clothing shall be thoroughly washed prior to entering the work site. Prior to entering the work site equipment, personnel and materials shall be free of mud, dirt, stone, vegetation, seeds or seed parts, roots, and all other debris having the ability of transferring weeds or invasive species to the project site. Contractor's equipment and personnel shall be subject to inspection for the risk of such weed transfer by the Owner/Owner's Representative each day prior to commencing work.
- E. Fuels and herbicides shall be handled in OSHA/NIOSH approved containers only. Refueling of equipment performed on site shall be performed over a catch basin on a tarpaulin. Additionally, a chemical absorbent for spilled fuels and other chemicals must be kept at the project site by the Contractor throughout the duration of this project. Any spills shall immediately be reported to the Owner/Owner's Representative.

1.08 SUBMITTALS

- A. With Bid:
 1. Qualification Data: Submit statement of qualifications for the selected Natural Areas Contractor including name, address, phone number(s), business history, and a list of similar projects completed by selected Contractor with descriptions, references and photos that demonstrate capabilities and experience. Include a resume for the selected Natural Areas Contractor's Project Manager, Foreman, Burn Boss and Project Ecologist.
- B. After Award, Prior to Seed/Plant Installation:



NATURAL AREAS ESTABLISHMENT PROVISIONS

1. Seed Supply Matrix: No later than sixty (60) days prior to the specified seeding timeframe, submit a completed seed supply matrix (Appendix E) for each seed mix to be installed and copies of the original seed test certificate for each seed lot referenced in the matrix. Each seed supply matrix must be approved in writing by the Owner/Owner's Representative prior to seed inspection.
 - a. Seed testing certificates shall include the species being tested, unique lot number, date of testing, seed origin, % purity, % germination + % dormant (or %TZ test), % weed seed, and name of weeds.
2. Plant Suppliers: Submit copies of the quotations from your native plant suppliers with name, address and phone number(s) that list: species by scientific name, quantities quoted and native origin.
3. Inoculant Suppliers: Submit copies of the quotations from your inoculant suppliers with name, address and phone number(s) that list: species by scientific name, quantities quoted, test date, and test results.
4. Erosion Control Blanket: Submit product information for proposed erosion control blanket applications, including proposed anchoring products & methods as specified herein.
5. Soil Test Reports: From a qualified independent testing agency indicating and interpreting test results for existing and/or imported topsoil including any recommendations for amendments.
6. Site Preparation, Installation & Stewardship Schedule: Submit a proposed planting schedule to the Owner/Owner's Representative showing dates for site preparation, each type of planting and proposed stewardship activities. Include proposed personnel, methods and equipment to be utilized for each task.
7. Soil Compaction Testing Log: GPS locations of points tested and recorded compaction data for each location.
8. Monitoring/Reporting Protocol: Submit a proposed monitoring and reporting protocol including proposed method of assessing live plant survival.
9. Irrigation Plan: Submit a proposed watering or irrigation plan that outlines methods for maintaining plant/seed bed moisture as specified herein.
10. Access & Staging Points: Contractor shall agree in writing to designated access and staging points prior to beginning work.
11. Certifications:
 - a. Herbicide – Submit copies of current certificates for the State of Illinois pesticide applicators and operators working on this project.
 - b. Prescribed Fire – Submit copies of the burn boss's Prescribed Burn Manager Certification through the State of Illinois and training certifications required for all burn crew members.

NATURAL AREAS ESTABLISHMENT PROVISIONS

C. Prior to Final Acceptance

1. Final Monitoring Report and Long-Term Management Plan – Submit the final monitoring report and a long-term management plan to the Owner/Owner's Representative that contains detailed methodology and schedules for management beyond the extent of this contract, including irrigation, weed control and species diversification.

1.09 BACKGROUND INFORMATION

- A. Review underground utility location maps and plans; Notify J.U.L.I.E.; demonstrate an awareness of utility locations; and certify acceptance of liability for the protection of utilities during course of work. Natural Areas Contractor shall be responsible for repairing any damage to utilities or property at no additional cost to the Owner.
- B. Review existing landscape and natural areas present at the project site. Natural Areas Contractor shall be responsible for repairing any damage to existing landscape features and/or existing natural areas that are not slated for removal/alteration as part of this project at no additional cost to the Owner, including but not limited to mitigation fees and/or fines for unauthorized wetland/floodplain impacts.
- C. It is the responsibility of the Natural Areas Contractor to locate, identify, and eradicate any species that may endanger the successful establishment and long-term health of the specified native plant communities within the project area/site. See Appendix-A for a list of common Exotic/Invasive Species.
- D. Because Natural Areas are dynamic systems that constantly change and adapt to current conditions, the stewardship plan must be flexible. This document shall be considered a starting point, a foundation on which the Natural Areas Contractor must build upon using practical experience and knowledge to achieve the specified intent.

PART 2 PRODUCTS

2.01 GENERAL

- A. See Appendix-B for approved Native Seed & Native Plant lists. In the event of any discrepancy between quantities listed in Appendix-B and the Plan Drawing showing the plants, the Plan Drawing shall govern.
- B. All materials, products or equipment described and specified herein are subject to inspection and approval by Owner/Owner's Representative.
- C. Native trees, shrubs, vines, plugs and seed may be inspected by the Owner/Owner's Representative at source of supply or the Owner/Owner's Representative may require the Natural Areas Contractor to submit color photographs which illustrate the specified plant material at the source of supply.
- D. Materials, products and equipment shall be inspected by the Owner/Owner's Representative at time of delivery to the project site. This inspection does not waive the right to reject any material or product after it has been installed.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- E. The specified species and quantities in this document may be modified by the Owner/Owner's Representative as a result of site conditions and/or availability.

2.02 PLANTING MEDIUM/SOIL TESTING

- A. Soils within the bottom of stormwater facilities (detention basin bottoms, naturalized swales, etc.) that have been exposed to over-winter road salt drainage prior to native seed installation shall be tested by an independent laboratory regarding its suitability for native seed germination.
- B. If a soil condition is discovered that will inhibit native seed germination, the Native Landscape Contractor shall submit a soils mitigation plan to the Owner/Owner's Representative approval prior to installation of native seed. The soil mitigation plan may include soil amendments to correct soil structure, nitrification and/or chemistry, or it may include the importation of suitable topsoil approved by the Owner/Owner's Representative.
- C. Soil Testing
 - 1. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
 - 2. Soil Analysis: For each un-amended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt and clay content; cation exchange capacity; pH; Sodium and Soluble Salts; and mineral and plant-nutrient content of the soil.
 - a. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 - b. Soil samples to be taken from varied locations to sufficiently document each soil to be used or amended for planting purposes.
 - c. Payment for soil testing and analysis is the responsibility of the Natural Areas Contractor.
 - d. Report suitability of tested soil for native plant establishment:
 - 1) Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per acre for nitrogen, phosphorus, and potash nutrients and any limestone, sand or other inorganic/organic soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants. Implementation of test result recommendations may be implemented at an additional cost to the Owner upon written approval by the Owner/Owner's Representative.
 - 2) Report presence of problem salts, minerals, or heavy metals, including aluminum arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action. Should existing soils require extensive incorporation of amendments to correct existing deficiencies or are unsuitable for growth of applicable native plant species, such soils shall be removed and replaced with suitable topsoil at an additional cost to the Owner upon written approval by the Owner/Owner's Representative.

NATURAL AREAS ESTABLISHMENT PROVISIONS

D. Topsoil

1. ASTM D 5268, pH range of 6 to 7, minimum 5 percent organic material content, fertile, friable, free of stones ½ inch or larger in any dimension, roots, plants, sod, clods, clay lumps, pockets of coarse sand, construction debris, paint & concrete products, petroleum products and other extraneous materials harmful to plant growth; free of noxious weeds, invasive plants and their seed; free of nematodes, grubs, or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aerations. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity.
2. Whenever possible, topsoil for Natural Area operations shall be re-used from material stockpiled on site. Utilize soil-testing to verify suitability of on-site soil to produce topsoil meeting requirements and amend accordingly. If necessary, supplement and/or replace existing on-site soils with imported topsoil when quantities are insufficient. Imported topsoil shall be obtained from a local site where topsoil occurs at least 4 inches deep and mimics as closely as possible the project site's native soils; do not obtain topsoil from bogs or marshes.

2.03 FERTILIZERS AND SOIL AMENDMENTS

- A. The application of fertilizers and/or soil amendments shall be as specified in the Plan(s) or based upon approved soil testing results.
- B. Uniform in composition, dry, and free-flowing. Fertilizer which becomes caked or otherwise damaged making it not suitable for use will not be accepted.
- C. Inorganic Fertilizers and Soil Amendments – Based on recommendations of the soil analysis, the following amendments may or may not be required. If required, the following shall apply:
 1. Aluminum Sulfate: Commercial grade, unadulterated.
 2. Gypsum: Agricultural grade, minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.
 3. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
 4. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - a. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve.
 - b. Provide lime in form of ground dolomitic limestone.
 5. Monoammonium Phosphate (MAP) 11-52-0
 6. Perlite: Horticultural perlite, soil amendment grade.
 7. Sand: Clean, washed, FA2 (Course Sand) or as specified in the Plan(s) and free of toxic materials.
 8. Sulphate of Potash (SOP) 0-0-50
 9. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.
- D. Organic Fertilizers and Soil Amendments – Based on recommendations of the soil analysis, the following amendments may or may not be required. If required, the following shall apply:

NATURAL AREAS ESTABLISHMENT PROVISIONS

1. Compost: Compost shall be well decomposed, stable, weed free organic matter produced at a facility operating in compliance with, and permitted and regulated in the State of Illinois and meeting the requirements of the Illinois EPA standards for "general use compost" (analogous to part 503 regulations for Class A compost). The product will contain no substances toxic to plants and shall be reasonably free (< 1% by dry weight) of manmade foreign matter. The compost or soil amendment will possess no objectionable odors and shall not resemble the raw material from which it was derived. The product shall be certified through the U.S. Composting Council's (USCC) Seal of Testing Assurance (STA) program. Proof of registration and good standing within the program will be provided by the manufacturer of the product.
 2. Composted Leaf Mulch – Shall consist of organic compost comprised of leaves and brush that has been produced in an Illinois Environmental Protection Agency (IEPA) regulated facility in accordance with the IEPA requirements. Mulch shall be ground to a medium to fine texture, placed in windrows for composting and shall be naturally heated to ensure that harmful pathogens and weed seeds present have been rendered inert. Prior to shipping the mulch shall be screened to ensure a high quality end product. Mulch shall be free of undesirable seeds, large chunks of debris, soil, and moldy chunks. Upon request, the Natural Areas Contractor shall submit mulch samples to the Owner/Owner's Representative prior to purchase/installation. Mulch shall conform to the following:
 - a. Free of any materials which pose a definite hazard to human health due to physical characteristics, such as glass or metal shards
 - b. <1% inert materials
 - c. pH between 6.5 and 8.5
 - d. Does not contain fecal coliform populations exceeding 1000 MPN per gram of total solids (dry weight basis)
 3. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed and material harmful to plant growth.
 4. Milogranite: Milogranite 6-2-0 Classic (4Fe) Slow-Release Organic Nitrogen fertilizer rich in Iron. Nutrients derived from biosolids.
 5. Mycorrhizal Inoculants:
 - a. Granular form of endomycorrhizal inoculum that are prepared for direct soil application.
 - b. Granular form of ectomycorrhizal inoculum that are prepared for direct soil application.
 6. Peat: Domestic peat composed of not less than 90% of decomposed organic matter by weight on oven-dried basis. Peat shall be delivered in a workable condition, with uniform texture and free from lumps.
 7. Rhizobial Inoculants: Solid, peat-based inoculants (granular or powder form) that are prepared for seed or direct soil application. Each legume species requires a specific species and strain of rhizobia inoculum.
- E. With adequate documentation of efficacy and appropriateness, alternate fertilizers and/or soil amendments may be utilized *only* with written approval by the Owner/Owner's Representative.

2.04 SOURCES OF SUPPLY FOR NATIVE SEED & PLANT MATERIAL

- A. Seed and live plugs shall be purchased from sources specializing in native species. When available and economical, seed and live plug stock shall be obtained from sources within the same EPA Level III Ecoregion as the project site. If the specified species are not available from the same Ecoregion or are

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not economical to obtain, seed and live plugs shall be obtained from an adjacent Ecoregion, preferably to the south, west, or east, but no further than 350 miles from the project site. Proposed nursery(s) shall be approved by the Owner/Owner's Representative **prior to bidding**. See Appendix-C for a list of pre-approved nurseries.

1. Sources of supply for native seed and live plugs shall be a company with a minimum of five (5) years documented experience specializing in the lawful harvest, processing and shipping/storage of native species.
2. Seed supplier's facility shall have the capacity to maintain optimal conditions for seed viability and freshness, including but not limited to the ability to control temperature and humidity in each work area, from receiving through seed cleaning, processing, stock shelves and long-term storage.
3. Seed not grown by the vendor must be clearly indicated and accompanied by the name and address of the company which grew the seed.
4. Proposed nursery(s) shall be approved by the Owner/Owner's Representative **prior to commencing work**.

2.05 NATIVE SEED

- A. Nomenclature: The names of plants required under this Contract conform to those given in the "Standardized Plant Names", 1942 Edition, prepared by the American Joint Committee on Horticultural Nomenclature. Names of varieties not included therein conform generally with names accepted in the nursery trade.
- B. Standards:
 1. All seeds shall comply with the Federal Seed Act.
 2. All seeds shall be of straight species, no horticultural varieties shall be acceptable.
- C. Natural Areas Contractor shall provide a fresh clean crop of the specified seed species. All native seed supplied shall be from seed lots tested by a qualified seed testing laboratory, certificates for each lot of each species tested must be supplied to the Owner/Owner's Representative directly from the testing laboratory. Seed test results shall be dated no more than 12 months prior to the anticipated seed installation date.
- D. "Bearded" forb species seed (*Aster*, *Solidago*, *Liatris*, etc.) shall be provided as defluffed/debearded seed. Legumes (*Dalea*, *Lepedeza*, *Desmodium*, etc.) shall be provided as de-hulled seed.
- E. All native seed shall be provided on a pure live seed (PLS) basis. Actual seed amounts used on the project will vary with the actual percent of PLS in the seed lot. Seed supplied to the site shall contain documentation of PLS testing and, if required, adjustment of the seed weights to provide 100% PLS standards. If rounding is required during PLS adjustment calculations, the adjustment shall always be rounded up. PLS adjustment must be based on seed test results dated no more than 12 months prior to the anticipated seed installation date. Minimum PLS percentage for any species shall be 70%.

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- F. Seed containing noxious weeds will not be accepted. Seed containing weed seed in excess of 0.5% will not be accepted. Seed collected from the wild will not be accepted. It is a violation of the law to disturb, injure, or collect any plant on a national wildlife refuge or state nature preserve.
- G. When required, seed shall be appropriately stratified prior to installation, specifically species requiring scarification. If the project has been designed for a Dormant seed installation using a "Stratification Seed Mix" and the Natural Areas Contractor misses the optimal installation timeframe, they shall artificially stratify any seed species identified as requiring stratification prior to installation at no additional cost to the Owner.
- H. **All seed shall be shipped in single species containers directly from the supplier and shall be mixed at the time of planting by the Natural Areas Contractor. At no time shall seed species be mixed by the supplier unless approved in writing by the Owner/Owner's Representative.**
- I. All seed shall be furnished in sealed containers. Seed that has become wet (unless as a result of stratification), moldy, or otherwise damaged in transit or storage will not be acceptable.
- J. Seed packaging shall be legibly tagged as to supplier name & address, project name, seed mix name, species scientific name, species common name, lot number, specified quantity (adjusted for acreage), and PLS adjusted quantity (adjusted for acreage). Seed stock shall be true to species as specified in this document, or as approved in writing by the Owner/Owner's Representative.
- K. All Native Seed mixes will be accompanied by a cover crop consisting of *Avena sativa* (Seed Oats) at a rate of forty (40) pounds per acre with Spring planting or ReGreen™ (Wheat x Wheatgrass hybrid) cover crop at a rate of fifty (50) pounds per acre for Fall plantings. **The cover crop shall be the only non-native species planted!** The Owner/Owner's Representative may approve the deletion of the cover crop as a result of site conditions.
- L. All Native Seed mixes will be accompanied by a granular form of endomycorrhizal inoculum at a minimum rate of forty (40) pounds per acre and rhizobia inoculum for the appropriate plant species at rates recommended by the native plant nursery. Natural Areas Contractor shall provide proof that the Mycorrhizal inoculum utilized contains a majority of live spores.

2.06 NATIVE LIVE PLUGS

- A. Nomenclature: The names of plants required under this Contract conform to those given in the "Standardized Plant Names", 1942 Edition, prepared by the American Joint Committee on Horticultural Nomenclature. Names of varieties not included therein conform generally with names accepted in the nursery trade.
- B. Standards:
 - 1. All plant materials, methods, etc. are to conform to the Standards of the American Association for Nursery Stock (ANSI Z60.1-2004). In the event there is a discrepancy between these standards and this Document, the most restrictive requirement shall govern.
 - 2. All plants shall be of straight species, no horticultural varieties shall be acceptable unless otherwise specified.

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- C. All live plugs will be provided in single-form factor plug trays that are configured to grow plugs at least 2" in diameter by 4-1/2" deep (minimum 11.5 in³), unless otherwise noted in this document.
- D. Live plug containers shall be legibly tagged as to name and size of container and shall be true to species as specified in this document.
- E. All live plugs shall be alive, healthy, hydrated, and in a vigorous growing condition at the time of delivery.
- F. All live plugs will be inoculated with a broad-spectrum mycorrhizal fungi mix. All leguminous species must be inoculated with the proper strain of rhizobia inoculum as well.
- G. For ephemeral or other specific types of native species, Bare Root stock may be utilized upon written approval by the Owner/Owner's Representative.
- H. For emergent & aquatic native species, Bare Root stock may be utilized upon written approval by the Owner/Owner's Representative.
- I. Contractor shall provide written documentation to the Owner/Owner's Representative as to the source of supply, quantities, and species by scientific & common name of the Live Plugs ordered prior to installation (e.g. supplier's invoice).

2.07 EROSION CONTROL

- A. Standard Erosion Control Blanket shall be:
 - 1. Single Net Straw with natural fiber netting, such as:
 - a. S-75BN
North American Green
Evansville, IN 47725
PH: 800-772-2040
www.nagreen.com
-or approved substitution
 - 2. Double Net Straw with natural fiber netting, such as:
 - a. S-150BN
North American Green
Evansville, IN 47725
PH: 800-772-2040
www.nagreen.com
-or approved substitution
- B. Heavier blanket may be required as part of the SWPPP, see SWPPP and engineering plans for additional blanket requirements.

2.08 HERBICIDE

- A. General requirements:



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1. All herbicide product labels must be strictly followed and shall supersede any of the information contained in this document.
2. All herbicide use shall be in strict compliance with manufacturers label specifications, application rates, procedures, warning labels, and all applicable codes, standards, and best management practices.
3. The Natural Areas Contractor shall have on site at all times the appropriate Materials Safety Data Sheets (MSDS) and labels for all substances utilized in the fulfillment of this project.
4. Herbicide(s) shall contain 0.25% v/v surfactant. If selected herbicide does not contain surfactant, the Natural Areas Contractor shall add appropriate surfactant(s) at the specified rate of the manufacturer and in accordance with all applicable regulations.
5. Herbicide(s) shall be mixed with water, oils, fuels, anti-foaming agents, and/or tackifiers in order to achieve the appropriate potency and/or to increase water resistance and persistence at the specified rate of the manufacturer and in accordance with all applicable regulations.
6. All herbicide(s) shall contain colored dye, such as "The Turfmark", "Signal", or "Spimax" mixed at a ratio of one-ounce to one-gallon applied to herbaceous plant material or "Bas-oil" mixed at a ratio of four-ounces to five-gallons applied to woody plant material, to aid in identification of areas or objects that have received herbicide treatment.
7. Natural Areas Contractor shall conduct herbicide applications so that over-application/overspray is minimized or eliminated. Herbicide shall be applied to treat only those species targeted. Damage caused by mistreatment or over-application/overspray shall be quantified and calculated by the Owner/Owner's Representative and repaired by the Natural Areas Contractor at no cost to the Owner or adjacent Land Owners.
8. No herbicide(s) shall be mixed or loaded on the project site unless approved in writing by the Owner/Owner's Representative.
9. A supply of chemical absorbent shall be maintained at the project site. Any chemical spills shall be cleaned up and reported to the Owner/Owner's Representative immediately.
10. Herbicide(s) shall not be applied within two (2) hours of anticipated precipitation or if heavy rains have resulted in an extremely wet soil or stump surface. Applications shall be postponed until the next expected dry two (2) hour period.
11. Natural Areas Contractor shall not apply herbicide during periods of excessive wind.
12. Only personnel who are a State of Illinois certified pesticide applicator or certified pesticide operator working under a certified pesticide applicator and is trained in plant identification shall perform the application of herbicides. All certifications must be current. The Contractor shall submit a copy of herbicide licenses for all applicators and operators to the Owner/Owner's Representative prior to beginning work on the project.
13. Approved non-selective herbicides (Active Ingredient):
 - a. Razor Pro or Equivalent (Glyphosate 41.0%)
 - b. Aquaneat or Equivalent (Glyphosate 53.8%, Aquatic Labeled)
14. Approved selective herbicides (Active Ingredient):
 - a. Weeder 64 or Equivalent (2, 4-DAmine 46.8%)
 - b. Clethodim 2E or Equivalent (Clethodim 26.4%)
 - c. Revolver or Equivalent (Foramsulfuron 2.34%)
 - d. Transline or Equivalent (clopyralid 40.9%)
 - e. Tahoe 3A or Equivalent (Triclopyr Amine 44.4%)
 - f. Tahoe 4E or Equivalent (Triclopyr Ester 61.6%)

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15. With adequate documentation of efficacy and appropriateness, alternate herbicides may be utilized *only* with written approval by the Owner/Owner's Representative. Under no circumstances are persistent herbicides such as Atrazine to be used.

2.09 WATERFOWL EXCLOSURE

- A. Waterfowl exclosures shall consist of:
 1. Rail steel T-Posts 5.5' high w/fin
 2. Black UV stabilized poultry netting
 3. Nylon zip-ties, 7" – 8"
 4. Nylon rope

2.10 WATER

- A. Water shall be free of substances harmful to the growth of vegetation.
- B. An acceptable water source is not available on-site for Contractor's use.

PART 3 NATIVE HERBACEOUS PLANTING

3.01 INSTALLATION TIMEFRAME

- A. NON-STRATIFICATION SEED MIXES:
 1. Non-Stratification seed mixes are those consisting of 60% or more species by seed count that do not require cold moist stratification periods of 30 days or more.
 2. Optimal Installation Timeframe
 - a. Spring: March 1st – June 30th
 - b. Dormant: September 15th – October 31st
 3. Alternative Installation Timeframe
 - a. November 1st – February 28th: Cover crops will not germinate during this seeding time and may be eliminated upon written authorization by the Owner/Owner's Representative at a cost saving to the Owner.
 - b. June 30th – September 15th: Installation of native seed shall be suspended unless irrigation can be provided or unseasonably cool and wet conditions persist. Any annual forbs specified in the seed mixes may germinate during this time, however they may not have sufficient time to flower and set seed before fall senescence, essentially removing them from the plant community. If this seeding time is chosen, annual forbs shall be removed from the seed matrix and planted at a subsequent, more appropriate time as determined by the Owner/Owner's Representative.

NATURAL AREAS ESTABLISHMENT PROVISIONS

B. STRATIFICATION SEED MIXES:

1. Stratification seed mixes are those consisting of 60% or more species by seed count that require cold moist stratification periods of 30 days or more.
2. Optimal Installation Timeframe
 - a. Dormant: November 1st – December 31st
3. Alternative Installation Timeframe
 - a. March 1st – June 30th: Installation of native seed shall be suspended unless the Natural Areas Contractor can provide artificially stratified seed and consistent irrigation for 6-8 weeks as described herein.
 - b. Owner/Owner's Representative must be notified when the seed has entered refrigeration for artificial stratification and reserves the right to inspect said seed at any time throughout the stratification period.

C. GRASS MONOCULTURE SEED MIXES:

1. Grass Monoculture seed mixes are typically comprised of warm season grass species requiring 60-70° soil temperatures to germinate.
2. Optimal Installation Timeframe
 - a. June 1st – July 15th: Seeding during this period is required for germination and appropriate establishment, consistent irrigation shall be provided as described herein.
3. Alternative Installation Timeframe
 - a. **NO ALTERNATE SEEDING TIMES WILL BE ACCEPTABLE FOR NATIVE GRASS MONOCULTURES** (Buffalo Grass Lawn, Transitional Buffer Seed Mix, Seed/Plug Hybrid Seed Mix, etc.). If seeding cannot be completed during the optimal seeding times, seeding areas shall be temporarily seeded until the next optimal seeding time at which time the Natural Areas Contractor shall prepare and seed the Native Grass

D. LIVE PLUGS

1. Optimal Installation Timeframe
 - a. April 1st – May 31st
2. Alternative Installation Timeframe
 - a. June 1st – September 30th: Planting of live plugs during this period can only be conducted if consistent irrigation is provided.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- b. October 1st – March 31st: Planting of live plugs during this period can only be conducted if the shrink-swell potential of the soil is low.

- E. Alternate seeding and live plug planting times must be approved in writing at the discretion of the Owner/Owner's Representative prior to installation.
- F. The approval of an alternate seeding and/or live plug planting time shall not relieve the Natural Areas Contractor from their performance obligations as outlined in the performance section of this document. All performance criteria shall be enforced.

3.02 DELIVERY, HANDLING, AND TEMPORARY STORAGE

- A. Seed containers are to be stored off the ground and indoors.
- B. Seed packaging is to be protected from moisture and extreme heat. Seed shall be stored in a temperature controlled environment.
- C. On-site storage of seed and/or live plants shall be at the Natural Areas Contractor's own risk. Any damage incurred to plant or seed stock while stored on-site shall not relieve the Natural Areas Contractor from his/her responsibility for furnishing and installing all plant materials in strict accordance with this document.
- D. Live plants shall be protected from grazing animals (e.g. geese).
- E. Live plants may require regular watering and supplemental nutrition while in temporary storage. Consult the native plant nursery for recommendations. Natural Areas Contractor is to ensure that live plants are in a healthy, vigorous state upon installation.
- F. Protect live plants from frost.

3.03 LAYOUT

- A. All seeding and planting zones/locations shall be laid out and marked on the project site according to the plan by the Natural Areas Contractor. No seeds or plants shall be installed until the seeding and planting zones/locations has been approved in writing by the Owner/Owner's Representative.
- B. Wherever site conditions require it, the Owner/Owner's Representative reserves the right to adjust the limits of seeding/planting areas without adjusting total seed quantities at no additional cost to the Owner.

3.04 GRADED SITE PREPARATION

- A. The Natural Areas Contractor shall coordinate with the Grading Contractor to ensure proper handling within planting areas. A preconstruction meeting and at least one (1) meeting during construction shall be held in order to coordinate equipment movement within planting areas to avoid/reduce soil compaction and to review underground utility location maps and plans. This meeting shall be coordinated by the Natural Areas Contractor. The following tasks may be performed by the Grading Contractor with proper coordination; however it is the responsibility of the Natural Areas Contractor to ensure that the native planting areas are prepared according to this document.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- B. After the completion of subgrade preparation the Natural Areas Contractor shall rip or disc soil to a depth of four (4) inches within areas designated for native seed mixes. When conditions are such that, by reason of drought, frost, excessive moisture, or other factors satisfactory results are not likely to be obtained, the work will be suspended and shall resume only when conditions are appropriate. Undulation or irregularities in the surface that would interfere with the Natural Areas Contractor's operations or maintenance shall be leveled before the next operation.
- C. Spread topsoil to a minimum depth of 6" meeting thickness, grades and elevations shown on engineering plans after light rolling and natural settlement. When conditions are such that, by reason of drought, frost, excessive moisture, or other factors satisfactory results are not likely to be obtained, the work will be suspended and shall resume only when conditions are appropriate. Add any necessary soil amendments and mix thoroughly into upper four (4) inches of topsoil. Delay mixing amendments with topsoil if planting will not proceed within 72 hours of spreading. If required, mix lime with dry soil before mixing fertilizer.
1. Spread approximately $\frac{1}{4}$ the thickness of topsoil over loosened subgrade. Work into top of loosened subgrade to create a transition layer. Spread remainder of planning soil.
- D. Prior to beginning seeding/planting operations the Natural Areas Contractor shall:
1. Confirm topsoil placement by the Grading Contractor within all planting zones.
 2. Request copies of soil test results for review. If soil test results are not available, Natural Areas Contractor shall conduct soil testing as per the products section of this document. If soils do not meet specification it shall be amended or replaced by the Natural Areas Contractor prior to beginning seeding/planting operations.
 3. Confirm that the Grading Contractor has removed all foreign matter and/or soil clods larger than two (2) inches in any dimension within the areas to be seeded. Natural Areas Contractor shall be responsible for removing all foreign matter prior to beginning seeding/planting operations.
 4. Check compaction of topsoil (0-6" depth) and normal subsoil depth (6-12" depth) utilizing a penetrometer with $\frac{3}{8}$ " tip:
 - a. Topsoil shall be loose, friable and measure less than 200 psi.
 - b. Subsoils shall be firm and measure less than 300 psi.
 - c. Natural Areas Contractor shall test for compaction in random locations throughout the planting area, at a minimum the number of testing locations shall be 0.1% of the planting area unless otherwise agreed to by the Owner/Owner's Representative (i.e. 5,000 square feet of planting areas would require a minimum of 5 testing locations).
 - d. Record compaction test locations utilizing a GPS unit and document the results of each test location. Submit compaction test data and compaction remediation plan to Owner/Owner's Representative for approval prior to planting.
- E. Natural Areas Contractor shall utilize equipment having low unit pressure ground contact within planting areas. They shall take precautions to ensure that equipment and vehicles do not damage the grading, utilities, structures, or existing trees and shrubs during planting operations. Any damage shall be repaired by the Natural Areas Contractor at no additional cost to the Owner.
- F. Non-native perennial species may require control with a low toxicity (2% mixture), non-persistent glyphosate based herbicide. Apply herbicides as needed after grading operations.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- G. Allow 10-14 days after spraying herbicides prior to cultivating for seed bed preparation. Check for weed growth. Reapply herbicide when the weeds are 2-3 inches tall. Wait 10 days and rake smooth, do not compact.

3.05 VEGETATED/NON-GRADED SITE PREPARATION

- A. Planting areas that contain solid stands of existing non-native/weedy herbaceous vegetation and are not to be disturbed by grading operations, or have been graded and now have established non-native/weedy herbaceous vegetation, shall be treated with applications of a Glyphosate herbicide resulting in a complete kill of all existing vegetation. Broadcast or "Boom" spraying of herbicide is acceptable under these conditions; precautions shall be taken to eliminate damage from overspray.
- B. Planting areas that contain existing desirable native herbaceous vegetation and are not to be disturbed by grading operations shall be treated with applications of an appropriate selective herbicide, resulting in a 99% kill (brown-out) of non-native/weedy herbaceous vegetation and the survival of existing desirable native herbaceous vegetation. Limited spot applications of herbicide shall be utilized if conservative native plant species within the planting are to be preserved.
- C. Planting areas that are heavily vegetated with persistent species such as Quackgrass (*Elymus repens*), Fescues (*Festuca spp.*), Reed Canary Grass (*Phalaris arundinacea*) or Canada Thistle (*Cirsium arvense*) often require two or more herbicide applications at 2-3 week intervals to kill resprouts and seedlings from the existing seed bank.
- D. Herbicide applications in or adjacent to shorelines or open water shall utilize an herbicide approved for aquatic use.
- E. Mowing, Raking and/or Prescribed Fire may be required to eliminate standing biomass prior to seeding, including leaf litter in Savanna or Woodland project areas. Conduct mowing, raking and/or Prescribed Fire as shown on the Plan(s) or as deemed necessary to achieve good seed-to-soil contact and to meet the performance criteria.
- F. Native Areas Contractor **shall not** disc or roto-till the soils within vegetated planting areas prior to planting, unless the area(s) have been heavily trafficked/compacted or as otherwise directed by the Owner/Owner's Representative. Whenever vegetated planting areas are disturbed, they shall be prepared for planting as per the "GRADED SITE PREPARATION" section of this specification.
- G. Natural Areas Contractor shall utilize equipment having low unit pressure ground contact within planting areas. They shall take precautions to ensure that equipment and vehicles do not damage the grading, utilities, structures, or existing trees and shrubs during planting operations. Any damage shall be repaired by the Natural Areas Contractor at no additional cost to the Owner.

3.06 INSTALLATION

- A. The Natural Areas Contractor shall be responsible for dewatering the basin in preparation for seeding or planting operations and shall maintain appropriate water levels for successful seed germination and plant establishment within areas designated as floating aquatic, deep emergent, emergent wetland and wetland.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- B. Seed shall be drop-seeded by a rangeland type dropseeder **designed to plant native grass and forb seed** (such as the Trillion or Belco seeder). Seed shall be installed in two (2) separate runs where each application of seed shall overlap the previous application by one half (1/2) the weight to insure double coverage of seeded areas (example: seed in a north to south direction @ ten pounds per acre, then overlap by seeding in an east to west direction @ ten pounds per acre, resulting in a total coverage of twenty pounds per acre [twenty pounds per acre is an example only, see Appendix-B for actual project seeding rates].) Each planting run shall overlap by a minimum of six (6) inches. Some seed species require exposure to sunlight for germination, these species shall be planted separately, after dropseeding, utilizing the broadcasting method.
- C. If site conditions prohibit the use of mechanized seeding equipment, broadcasting of seed is acceptable on **exposed soil only**. If seed is broadcast, it shall be mixed with an equal amount of inert filter (such as sand, vermiculite, rice hulls, etc.) to enable an even distribution of seed. A mechanical broadcast seeder may also be utilized, such as Cyclone or Truax Seed Slinger. Seed shall be broadcast in three (3) separate applications:
1. Broadcast half (1/2) of the specified native grass seed first. Drag the seeding area utilizing a rake or similar equipment, work native grass seed into the soil achieving a final planting depth between 0.25" (1/4") – 0.5" (1/2").
 2. Broadcast remaining native grass seed, cover crop and one-third (1/3) of the remaining seed mixture (sedges/rushes/forbs), reserving 100% of any species indicated as "surface sown" in Appendix-B. Lightly drag the seeding area utilizing a rake or similar equipment, working the native seed into the soil achieving a final planting depth between 0.0625" (1/16") – 0.25" (1/4").
 3. Broadcast remaining seed directly atop prepared seedbed. Do not drag or rake.
 4. Where site conditions allow it, roll broadcast seeded areas immediately after installation to ensure good seed-to-soil contact.
- D. Do not sow seed in areas where standing water is present, during adverse weather or when wind speeds exceed ten (10) miles per hour unless approved in writing by Owner/Owner's Representative.
- E. Hydroseeding of Native Seed is not acceptable. Hydromulch may be utilized as an erosion control method upon written approval by the Owner/Owner's Representative.
- F. The Natural Areas Contractor shall rake, roll or drag broadcast seeded areas perpendicular to the slope within 24 hours after seeding, or as soon as site conditions permit. The use of compaction wheels on the seed drill or cultipacker on the dropseeder is acceptable.
- G. Erosion control measures shall be implemented immediately upon seeding completion. The Owner/Owner's Representative may reduce erosion control requirements based on site conditions and/or planting.
1. All seeded areas on newly graded sites shall include the installation of a single-net straw temporary erosion control blanket, unless otherwise stated on the Plan(s). Install erosion control blanket as per the manufacturer's recommendation or as shown on Plan(s), at a minimum the Natural Areas Contractor shall:
 - a. Apply blanket materials without stretching, allowing the blanket to lie smoothly but loosely on the soil surface.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- b. Minimize walking directly on the seed or topsoil bed either before or after the blanket is applied.
 - c. Bury all upslope blanket ends a minimum of four (4) inches deep, staple at twelve (12) inch intervals and firmly tamp trench backfill after closing.
 - d. Restore all disturbed edges immediately following blanket installation utilizing the same seed mixes installed with the blanket, ensure seed becomes incorporated.
 2. All shorelines from a minimum of three (3) feet above normal water level (NWL) to a minimum of one (1) foot below NWL shall at a minimum include the installation of a double-net straw temporary erosion control blanket, heavier blankets may be required depending upon the application.
 3. Alternate blanket types may be required as part of the SWPPP, see SWPPP and engineering plans for additional blanket requirements. For any conflicts between this document and an existing SWPPP, the more restrictive document shall prevail.
- H. Live plug and bare root planting densities will vary according to project budget and project goals.
1. Floating aquatic species shall be installed as shown on Plan(s).
 2. Shorelines shall include planting along the Normal Water Level (NWL) a minimum of one (1) live native plug per linear foot of shoreline and shall be distributed from 6" above Normal Water Level (NWL) to 6" out from NWL.
 3. Live plugs and bare root plants shall be installed in full or half flats, creating drifts or groupings of the same species rather than planting all species intermixed randomly across the site. Plant spacing within each grouping will depend upon the species being planted, see Appendix B.
 4. Live plugs and bare root plants shall be installed in holes drilled with an auger with the same diameter and depth as the live plug's or bare root/tuber root massing (within $\pm .75"/-.25"$). In wetland & shoreline plantings where soil is soft and moist enough, a dibble bar or trowel may be used to create planting holes. Avoid severely damaging erosion control mat during plug planting operations.
 5. Insert live plugs or bare root plants into hole so that the final position of the root crown following planting, soil settlement, and initial watering is slightly below the soil surface ($1/8 - 1/4$ inch). All crowns shall be covered with soil.
 6. Ensure that live plugs and bare root plants are not loose after planting. In wetland or shoreline areas with the potential for high wave action, or highly fluctuating water levels that may dislodge newly planted live plugs, plugs shall be secured with 6 – 8 inch "U"-shaped wire erosion control blanket staples. Staple length shall be determined by the density of the planting substrate; softer substrates require longer length to hold plugs adequately.
 7. Each live plug or bare root plant shall be flooded with approximately 200 ml of water after insertion into the ground.
- I. Waterfowl exclosures shall be erected around all live plugs that have been planted in areas where there is a potential for waterfowl (especially geese) depredation, such as retention basins or other planting areas adjacent to open water. Install live plugs and goose exclosure fencing in 100' – 200' lengths, leaving 4-6' wide openings between exclosure ends to allow access to the water for people and wildlife during the establishment period.

NATURAL AREAS ESTABLISHMENT PROVISIONS

1. Install steel T-posts @ twelve (12) feet on-center (maximum). Drive posts into the ground so that the enclosure will extend at least two (2) feet in height above the tops of planted live plugs.
 2. Attach black UV stabilized poultry netting securely to the steel T-posts with plastic zip-ties.
 3. Attach nylon rope to the top of steel T-posts in a zigzag pattern to prevent aerial landings by waterfowl.
 4. Natural Areas Contractor shall disassemble and remove all waterfowl enclosures from the project site after two (2) complete growing seasons. The Owner/Owner's Representative may request removal of the enclosure prior to the two (2) year term ending.
 5. Natural Areas Contractor shall maintain the enclosure in a functional and aesthetic condition. The Natural Areas Contractor shall make all required, reasonable repairs and/or replacements in a timely manner.
- J. Additional protection measures may be required to protect shoreline & wetland plantings from predation, particularly by Muskrats. Waterfowl enclosures are typically not effective against other types of predation. If Muskrats present a problem they need to be trapped prior to causing severe damage. Predation of plant material shall not relieve the Native Landscape Contractor from meeting the performance criteria, unless approved in writing by the Owner/Owner's Representative.

3.07 WATERING

- A. Natural Areas Contractor shall supply the Owner/Owner's Representative with an hourly rate to supply and apply water to all seeded and planted areas. Natural Areas Contractor shall also supply an estimate of coverage per hour to meet these specifications (i.e. 1 acre/hour).
- B. All seed types shall need ample moisture continuously to germinate and to develop into healthy seedlings. Normal rainfall shall be adequate moisture for germination and growth, however if drought conditions exist (typically less than .25" of water after two (2) weeks, or as indicated by the Drought Mitigation Center [drought.unl.edu/dm]) the Natural Areas Contractor may be directed by the Owner/Owner's Representative to maintain **consistent moisture** during periods of drought at the hourly rates supplied, gradually reducing waterings, depending on the climate and rainfall. Watering operations shall be conducted overnight or in the morning hours ending no later than 10:00 a.m., and each area of water coverage shall receive a 15-minute watering minimum. If planting operations are conducted in the fall, watering applications may need to be extended or delayed until spring. The Owner/Owner's Representative may opt to conduct watering at a cost savings to the Owner.
- C. Live plugs shall need ample moisture continuously to develop into vigorous mature plants. The Natural Areas Contractor shall be responsible for **maintaining consistent moisture for a minimum of 6-8 weeks** after planting and then gradually reduce watering, depending on the climate and rainfall. Watering operations shall be conducted overnight or in the morning hours ending no later than 10:00 a.m., and each area of water coverage shall receive a 15-minute watering minimum. If planting operations are conducted in the fall, watering applications may need to be extended or delayed until spring. After the initial 6-8 week period, normal rainfall shall be adequate moisture for continued healthy growth. However if drought conditions exist (typically less than .25" of water after two (2) weeks, or as indicated by the Drought Mitigation Center [drought.unl.edu/dm]) the Natural Areas Contractor shall be responsible for maintaining consistent moisture for the remainder of the growing season or until drought conditions subside. The Owner/Owner's Representative may opt to conduct watering at a cost savings to the Owner.

NATURAL AREAS ESTABLISHMENT PROVISIONS

3.08 CLEAN-UP

- A. During natural areas work, the Natural Areas Contractor shall store materials and equipment where directed by the Owner/Owner's Representative. Pavements shall be kept clean and work areas shall be kept in an orderly condition.
- B. The Natural Areas Contractor shall protect natural areas work and materials from damage due to landscape operations or operations by other trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed by the Owner/Owner's Representative.
- C. Remove all debris from the site resulting from planting operations in accordance with site construction rules (e.g. LEED requirements) and/or local jurisdiction.

3.09 INTERIM STEWARDSHIP

- A. The Natural Areas Contractor shall conduct stewardship tasks as described herein until Substantial Completion, including mowing, herbicide applications and watering as necessary. Interim stewardship shall be a requirement of the contract regardless of the award of Alternate Bid #1.

PART 4 STEWARDSHIP (ALTERNATE #1)

4.01 GENERAL

- A. Begin Stewardship immediately after planting and continue for three (3) full growing seasons until Final Acceptance by the Owner/Owner's Representative.
- B. The Natural Areas Contractor shall keep a log of all restoration activities performed during contract period, installation through stewardship, and shall submit it to the Owner/Owner's Representative on a monthly basis.
- C. Chemicals used will have the lowest environmental impact for the task at hand. Organic or cultural practices will be used whenever practical.

4.02 NATURAL AREAS MOWING

- A. All mowing shall be conducted in accordance with all applicable codes and by personnel with appropriate training in safety and in the use of the machinery being utilized.
- B. REGULAR MOWING
 - 1. Regular mowing shall be conducted with a conventional rotary mower, sickle type mower, or a flail type mower, however in order to reduce thatch, at no time shall more than six (6) inches (height) of vegetation be cut in a pass.
 - a. If mowing results in excessive thatch being produced after mowing, the Contractor shall rake, collect and dispose of excessive cut vegetation off-site at no additional cost to the Owner.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- b. If mowing results in "knock-down" rather than severed vegetation, the Contractor shall re-mow all areas at no additional cost to the Owner, ensuring that vegetation is severed.
2. On slopes that are too steep to mow, around structures (trees, fencing, buildings, etc.), and in areas that are too wet to mow, mowing shall be conducted with the use of a hand-held gas powered brush cutter or walk-behind brush cutter (such as Brush Hog, etc.) only.
3. Damage caused to landscape material or other structures shall be repaired/replaced by the Natural Areas Contractor at no additional cost to the Owner.

C. SPOT MOWING

1. Spot mowing shall be conducted with the use of a hand-held gas powered brush cutter and/or walk-behind brush cutters (such as Brush Hog, etc.) targeting areas containing a mix of weed species **and** mature/flowering desirable native species. Spot mowing shall be utilized to eliminate the reproduction of non-native and non-desirable native species by not allowing the dispersal of seed from those targeted species.
2. Species targeted for spot mowing shall include removal of plant reproductive parts (e.g. flower stalks, un-developed seed heads, etc.). Spot mowing of perennial species shall be conducted in concert with, or shall be followed up with herbicide applications.
3. Spot-mown vegetative materials shall be left on-site in a manner that will not allow regeneration or seed set of the mown species.
4. Damage caused to landscape material or other structures shall be repaired/replaced by the Natural Areas Contractor at no additional cost to the Owner.

D. MOWING TIMING

1. Mowing is a key aspect in achieving positive results. Mowing must be conducted by the Natural Areas Contractor on a consistent basis and must respond to seasonal weather. Vegetation shall be high-mown as follows:
 - a. First Growing Season: Kept under twelve (12) inches. A **minimum** of five (5) mowings will be required.
 - b. Second Growing Season: Areas with high annual/biennial weed content shall be kept under twenty-four (24) inches. Areas with scattered annual/biennial weed content **and** high desirable native content shall be spot mown, ensuring that non-native/weedy species are not allowed to develop viable seed.
 - c. Third Growing Season & Beyond: Spot mow and observe, if non-native/weedy species are dominant mowing shall continue as needed at the Second Year rate.
2. Mowing shall commence during late May/early June and subsequently two-four weeks apart or any time a large number of weed species begin to flower. Mowing shall be conducted prior to weed species developing viable seed.

NATURAL AREAS ESTABLISHMENT PROVISIONS

4.03 HERBICIDE APPLICATION

A. SPOT HERBICIDE APPLICATIONS

1. Small scattered populations or individual specimens of undesirable species shall be controlled with spot herbicide applications. Large scale colonization shall not be allowed.
 - a. Backpack Spray Treatments – Natural Areas Contractor shall utilize a 3-5 gallon backpack style sprayer, such as Solo, SP3, Field King or acceptable substitution.
 - b. Hand Wicking – In areas of high quality native vegetation where desirable species are directly adjacent to targeted plants, or where the growth habit of the target plant makes it impossible to avoid off-target damage, the appropriate herbicide shall be selectively hand wiped onto the target plant utilizing a sponge-wicking applicator or a saturated cloth glove.
2. Spot herbicide application areas will require supplemental seed and/or plants. Site preparation and planting after herbicide applications shall be as per the Native Herbaceous Planting section of this document.

B. BROADCAST HERBICIDE APPLICATIONS

1. On larger sites where a broad-scale application is needed because large colonies of the target species have become established, broadcast applications by large tank-equipped spray-gun, all terrain vehicle (ATV) or tractor may be utilized to treat undesirable species. The following methods are appropriate:
 - c. Broad-Spectrum Herbicide Broadcast Application – This method utilizes a large tank-equipped spray-gun and/or an ATV or tractor equipped with a boom-sprayer to apply large amounts of glyphosate, which will result in complete kill of all vegetation.
 - d. Selective Herbicide Broadcast Application – This method utilizes a large tank-equipped spray-gun and/or an ATV or tractor equipped with a boom-sprayer to apply large amounts of a selective herbicide, such as Clethodim, resulting in a complete kill of only those targeted species.
2. A "large colony of target species" shall be defined as a target plant population whose aerial coverage is such that a broad-spectrum chemical can be broadcast without inflicting any damage to adjacent native vegetation.
3. Broadcast herbicide application areas will require supplemental seed and/or plants. Site preparation and planting after herbicide applications shall be as per the Native Herbaceous Planting section of this document.

B. HERBICIDE APPLICATION TIMING

1. Herbicide applications must be conducted by the Natural Areas Contractor on a consistent basis and must respond to seasonal weather and to the life-cycle of each target species. Non-native vegetation shall be herbicided as follows:
 - a. A *minimum* of seven (7) herbicide applications will be required.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- b. As stated above, herbicide application timing must be flexible and respond to seasonal weather and to the life-cycle of each target species, however at a minimum the following schedule shall be followed for the first three (3) years:

Target Species	Approved Herbicide	Initial Herbicide Application	Follow-up Herbicide Application (if necessary)**
Wild Parsnip (<i>Pastinaca sativa</i>)	2, 4-D Anamine*	March 1 st – May 31 st	August 1 st – October 31 st
Reed Canary Grass (<i>Phalaris arundinacea</i>)	Sethoxydim*, Aquatic Glyphosate	April 1 st – May 31 st	October 1 st – Dormancy/Frost
Teasel Species (<i>Dipsacus</i> spp.)	Triclopyr 3a*, Glyphosate	April 1 st – May 31 st	October 1 st – Dormancy/Frost
Sweet Clover Species (<i>Melilotus</i> spp.)	2, 4-D*, Clopyralid	April 1 st – May 31 st	Use Clopyralid as needed throughout growing season
Cattail Species (<i>Typha</i> spp.)	Aquatic Imazapyr	July 1 st – August 1 st	August 1 st – September 1 st
Purple Loosestrife (<i>Lythrum salicaria</i>)	Triclopyr 3a*, Aquatic Glyphosate	May 15 th – July 15 th	July 15 th – August 15 th
Non-native Thistle Species (<i>Carduus</i> , <i>Cirsium</i> , & <i>Onopordum</i> spp.)	Clopyralid	May 15 th – July 15 th	July 15 th – August 15 th
Bird's Foot Trefoil (<i>Lotus corniculatus</i>)	Triclopyr 3a	May 15 th – July 15 th	July 15 th – August 15 th
Crown Vetch (<i>Coronilla varia</i>)	Triclopyr 3a	May 15 th – July 15 th	July 15 th – August 15 th
Common Reed (<i>Phragmites australis</i>)	Aquatic Imazapyr	August 1 st – September 1 st	September 1 st – September 30 th
Honeysuckle Species (<i>Lonicera</i> spp.)	Triclopyr 3a (Foliar Application)	May 15 th – July 15 th	July 15 th – August 15 th
	Glyphosate (Cut-Stump/Basal Bark Application)	November 15 th – March 15 th (During Dormancy)	Follow-up should be Foliar
Other Woody Species (includes <i>Rhamnus</i> spp.)	Triclopyr 3a (Foliar Application)	May 15 th – July 15 th	July 15 th – August 15 th
	Triclopyr 4e (Cut-Stump/Basal Bark Application)	November 15 th – March 15 th (During Dormancy)	Follow-up should be Foliar

*Herbicide preferred when selectivity is needed and hydrology is appropriate.

**Do not allow species to produce and/or disperse viable seed in between treatment times.

4.04 HAND WEEDING

- A. In the event that herbicide applications cannot, or should not, be performed due to social, cultural, environmental, or other verified reasons, target weed species shall be removed by hand.
- Species targeted for complete hand weeding shall include removal of all plant parts from the soil, including the above ground growth and all roots or rhizomes present in the ground.

NATURAL AREAS ESTABLISHMENT PROVISIONS

2. Species targeted for partial hand weeding shall include removal of plant reproductive parts (e.g. seed heads). Partial hand weeding shall be conducted in concert with, or shall be followed up with herbicide applications.
- B. Removed vegetative materials shall be discarded off-site or left on-site in a manner that will not allow regeneration or seed set of the removed species. Transportation of removed vegetative materials shall meet Department of Agriculture standards/requirements. Hand weeding shall never result in excessive soil disturbance. Due to the public nature of this site the Owner/Owner's Representative reserves the right to direct the Contractor to collect and discard all hand-pulled vegetation.

4.05 TREATMENT OF WOODY SPECIES

- A. The Natural Areas Contractor shall conduct woody species herbicide treatments to all re-sprouts, re-growth, or other remaining live plants of all non-native or aggressive native woody species throughout stewardship operations until performance criteria have been achieved. (See Appendix-A).
- B. Woody species treatment methods during the growing season may be a foliar application using an appropriate herbicide, such as Garlon 3A. Damage to surrounding vegetation due to re-sprout treatments shall be repaired by the Natural Areas Contractor.
- C. Woody species herbicide treatments during the dormant season may be applied with cut-stem and/or basal bark application using an appropriate herbicide, such as Garlon 4E. Damage to surrounding vegetation due to re-sprout treatments shall be repaired by the Natural Areas Contractor.
 1. Hand Cutting/Cut-Stump Treatment: Chain saws, brush clearing saws, handsaws and loppers may be used. Upon written approval by the Owner/Owner's Representative, small walk behind mower-type brush cutters may be utilized provided that their use does not result in rutting or pitting of the soil while in operation.
 - a. Cut woody target species shall be treated with an herbicide mixture. After cutting down the target species apply herbicide, such as Garlon 4E in a 20-30% (or as stated on the product label) solution in basal oil, to the stump. *Lonicera spp.* shall be treated with RoundUp in a 25-50% solution, to the stump. Treat the cut area around the edge with herbicide so the **cambium** layer will take up the active ingredient. Herbicide shall be applied immediately after cutting.
 2. Basal Bark: Involves herbicide application directly to the trunk of the woody target species that are one inch or less at the base. Apply herbicide directly to the tree trunk, around the entire circumference, at 6" above the soil until thoroughly wet near the ground plane, but not to the point of runoff. Apply during dormancy, except when snow or water prevents spraying to the ground plane. Optimal results are achieved when applications are made to young stems which have not developed the thicker bark characteristic of slower growing older trees.
- D. Wherever possible herbicide applications shall be accomplished by utilizing wick or sponge-type applicators.
- E. Disposal of cuttings and other materials shall be completed simultaneously with the initial woody species herbicide treatment(s).

NATURAL AREAS ESTABLISHMENT PROVISIONS

- F. All cuttings longer than two (2) feet in length and/or larger than one (1) inch in diameter shall be removed from the project site. Smaller cuttings and cutting debris that has been shredded or chipped by the use of hand-held mechanical equipment may be left on site to decompose or be consumed by prescribed fire (if applicable). Cuttings and cutting debris shall not be allowed to accumulate to a depth that will smother existing desirable native species, prevent existing desirable native species from emerging or prevent good seed-to-soil contact in newly seeded areas (approximately one-half inch maximum depth).

4.06 OVERSEEDING AND RE-PLANTING

- A. Overseeding or re-planting in areas of herbicide application and/or in under-performing areas will be necessary for compliance with the performance section of this document.
- B. See Native Herbaceous Planting section. Site preparation and planting after herbicide applications shall be as per the Native Herbaceous Planting section of this document.

4.07 STEWARDSHIP SCHEDULE

- A. The recommended stewardship schedule is summarized in the table below. The table indicates what activities are *likely* to be necessary in a given month; the table is not meant to require that the activity *must* be conducted. Actual stewardship scheduling will be site driven.
- B. As stated above, a stewardship plan must be flexible, however at a minimum the following schedule* shall be followed for the first three (3) years**:

Month	Visits by Crew	Herbicide	Brush Clearing	Mow	Collect & Disperse	Burn Prep	Burn**
April	0-1	X	X			X	X
May	1-2	X	X	X	X	X	X
June	1-2	X		X	X		
July	1-2	X		X			
August	1-2	X		X			
September	0-1	X		X			
October	1-2	X	X	X	X	X	
November	0-1	X	X		X	X	X
December - March	0-1	X	X		X	X	X

* This schedule should be considered a guideline and may be varied from to react to current site Conditions.

NATURAL AREAS ESTABLISHMENT PROVISIONS

**In newly planted natural areas, the execution of a prescribed fire may not be possible until the second or third growing season.

PART 5 PRESCRIBED FIRE (ALTERNATE #2)

5.01 PRIORITIES

- A. To restore fire to its natural role and to reduce hazardous fuels through the application of prescribed fire. The Owner/Owner's Representative and Natural Areas Contractor shall strategically focus activities by placing priority on:
1. Areas where actions will mitigate threats to the safety of employees and the public (SAFETY FIRST!).
 2. Areas where actions will protect, enhance, restore and/or maintain plant and animal communities that are critical for endangered, threatened, or sensitive plant and animal species.
 3. Areas where actions will suppress invasive species and recycle valuable nutrients into the native soil matrix.
 4. Areas that will reduce the risks of wildfire. This includes the reintroduction of fire into fire-dependent ecosystems to maintain and enhance those ecosystems and the modification of vegetation to achieve specific land management objectives.

5.02 GUIDING PRINCIPALS

- A. The following guiding principles are fundamental to the success of the Owner/Owner's Representative's Prescribed Fire and Fuels Management Program.
1. Fire crew and public safety is the first priority in every prescribed fire and fuels management activity.
 2. Only qualified and experienced personnel using safe working standards and guidelines will participate in the implementation of prescribed fire and fuels management projects.
 3. Whenever possible, the role of prescribed fire as an essential ecological process and natural change agent will be incorporated into the land use planning process and the fire management program.
 4. Develop an education plan and an education strategy with internal and external audiences to increase awareness of, and the need for, prescribed fire and other fuels management.
 5. Encourage research, monitoring and program development to advance the understanding of fire science.

5.03 PERSONNEL/TRAINING

- A. It is required that the National Wildfire Coordinating Group (NWCG) standards be followed for this prescribed fire.
- B. It is required to have highly trained and experienced employees working on a prescribed fire. The Natural Areas Contractor must meet the requirements under the "Contractor Qualifications" section of this document; documentation of fully trained and experienced personnel shall be submitted to the Owner/Owner's Representative at the time of bidding.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- C. Refresher courses for NWCG levels are required annually. To maintain certification individuals need to have completed the s130/s190 courses (once), pass at least a moderate level pack test (carry forty-five pounds [45 lbs.] three [3] miles in forty-five [45] minutes), and attend a yearly one-day refresher course; documentation that certification maintenance training for all proposed burn crew members has been completed shall be submitted to the Owner/Owner's Representative at the time of bidding. Refresher courses for other NWCG positions vary.

5.04 EQUIPMENT

- A. The Natural Areas Contractor shall have in their possession at the time of bidding the following equipment:
1. Two Type 6 Engines
 2. Two Type 7, 6 Wheel Drive ATV Engines
 3. One 500 Gallon Water Tender
 4. One Fire Pump capable of delivering sufficient water pressure at 1000 feet to suppress an escaped fire
 5. 1000 feet of collapsible 1" fire hose with nozzles
 6. Two-way radios for all personnel involved in the fire, whether on the line or not
 7. All necessary personal protective equipment for all personnel to meet NWCG guidelines

5.05 INSURANCE

- A. "A" insurance rating with coverage for at least \$5,000,000.00 (five million) dollars of general liability insurance and **excess general liability for "Prescribed Fire Operations" with a minimum \$2,000,000.00 (two million) per occurrence limit.**
- B. The Natural Areas Contractor shall provide the Owner/Owner's Representative with a certificate of insurance and name them as additional insured.
- C. **The Natural Areas Contractor shall list prescribed fire on the certificate as the activity covered.**

5.06 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- A. It is required that all fire personnel wear/carry the following:
1. Nomex clothing (shirt and pants)
 2. Nomex face and neck protection
 3. 8" high top leather boots with 1" logging heels
 4. Leather gloves
 5. Fire rated hardhat
 6. Faceshield
 7. Safety glasses
 8. Cigarette lighter or matches
 9. Compass
 10. Pre-tested, fully charged two-way radio with radio harness
 11. Canteen (2 each) filled with water
 12. Food, such as granola bars or other snacks
 13. Burn unit map

NATURAL AREAS ESTABLISHMENT PROVISIONS

14. All underclothing of natural fiber – The danger of wearing polyester or other synthetic materials should be emphasized with anyone attending a burn.
- B. For prescribed fires where the Safety Zone cannot be reached in 15 seconds, all personnel shall carry a fire shelter (for protection from flames and superheated gasses in the event of entrapment) and fussees (as a means to light a separate fire in order to burn out a safety zone ahead of the threatening fire front). A fussee shall not be considered an alternative to a fire shelter.
- C. In addition to the equipment listed in 3.01.A-B, a fully stocked first aid kit shall be readily available to all burn crew members.
- D. In addition to the equipment listed in 3.01.A-B, Burn Bosses shall carry a fully charged, fully operational cellular phone.
- E. In addition to the equipment listed in 3.01.A-B, Crew Bosses (or their qualified designee on the crew) shall carry a fully functional weather kit.

5.07 ROADSIDE VISIBILITY MATERIALS

- A. Roadside visibility materials are essential if the fire is near a roadway. Natural Areas Contractor shall provide and install temporary warning signage along all roadways bordering the burn unit. Warning signage shall be visible by road traffic and shall display the Natural Areas Contractor's contact information. All signage on public roadways shall conform to all applicable local and Illinois DOT signage specifications.
 1. Stop/Go Paddle
 2. Construction Cones
- B. All fire personnel participating in a prescribed fire within close proximity of a roadway shall wear appropriate reflective work vests.

5.08 FIRELINE TOOLS

- A. Every fire crew member shall have one hand tool in their possession at all times while on or near the fire line. The tools needed for a safe prescribed fire will vary with each fire and should be specified in the burn plan. Recommended tools:
 1. Drip Torch
 2. Flappers
 3. Pulaski
 4. McLeod
 5. Leaf Rakes
 6. Fire Rakes
 7. Backpack pumps

NATURAL AREAS ESTABLISHMENT PROVISIONS

5.09 BURN PLAN

- A. The Natural Areas Contractor shall complete and submit a burn plan for approval by the Owner/Owner's Representative and local officials prior to burning. It is required that burn plans are written/reviewed and approved by the burn boss.
- B. The burn plan shall be prepared in accordance with the Illinois Prescribed Burning Act (525 ILCS 37).

PART 6 NATURAL AREAS MONITORING (ALTERNATE #3)

6.01 MONITORING

- A. Biannual monitoring shall occur in the time periods of May/June & September/October and shall be conducted for a minimum of three (3) growing seasons or until final acceptance. Monitoring activities shall be conducted annually thereafter under separate Contract. Owner/Owner's Representative reserves the right to review and select monitoring contractors based upon the best interest of the project and the Owner.
- B. Baseline Data
 - 1. For newly planted areas without existing baseline data a meander survey shall be conducted during the first growing season as described herein. The resulting data collected shall be considered as baseline.
- C. Meander Survey
 - 1. The initial post-planting meander survey shall begin at the end of the first full growing season after planting. For instance, if the planting is installed in April, monitoring shall begin in September or October of that same year. If the planting is installed in October, monitoring shall begin in September or October of the following year.
 - 2. Meander each plant community so that at least twenty percent (20%) of the planted area is included in the survey. The Owner/Owner's Representative may require separate meander surveys for each planting area at no additional cost to the Owner.
 - 3. Record **every** species that is observed, including native, non-native, woody, herbaceous, etc.
 - 4. Make qualitative observations such as species composition and distribution, herbivory, presence of weedy species, erosion problems, etc.
- D. Live Plant Material Assessment
 - 1. Herbaceous perennial plant material shall be inspected to ensure that it will meet the performance criteria.
 - a. At least twenty-five percent (25%) of each planted area of live perennials shall be evaluated to estimate the percent survival of the installed plants.
 - b. Survivorship assessment methods shall be approved by the Owner/Owner's Representative prior to planting.
- E. Data Entry

NATURAL AREAS ESTABLISHMENT PROVISIONS

1. Data collected from the Meander Survey shall be entered into the Floristic Quality Assessment (FQA) computer program (Masters 1996) or equivalent and shall utilize the most current and relevant database available.

F. Photographic Documentation

1. Representative photographs of the stewardship area(s) shall be collected to document site conditions and progress. Photographs shall be collected using the following methods:
 - a. General
 - 1) Photos shall be taken in the same manner during each visit. Photos shall be in digital format at the highest megapixel setting (minimum 7 megapixel) setting that the camera will allow. The photos shall be taken at eye level at the widest angle a standard point-and-shoot camera will allow.
 - 2) Photos shall be legible. Whenever possible, photos shall be taken so that the photographer is not facing directly into the sun.
 - b. Permanent Photo Points
 - 1) Photo points shall be physically field marked in a permanent manner on the ground, either through the use of T-Posts or Rebar. Each photo point shall be recorded using a GPS device. Photo points shall be sufficiently marked so they can be easily found in the field with or without the use of a GPS device.
 - 2) A minimum of three photo points shall be set up per acre, per planting zone, or as directed by the Owner/Owner's Representative.
 - 3) Photos shall be taken with the photographer's back against the post in each of the four cardinal directions: North, South, East, and West.

6.02 REPORTING

- A. Annual Monitoring Reports shall be submitted to the Owner and Owner's Representative in duplicate by February 15th, or by the date required by the permitting agency.
- B. At a minimum, Annual Monitoring Reports shall include the following information:
 1. Introduction
 - a. Site history leading up to the current project.
 - b. Site description, including a street address (if applicable), County, Section, Township, and Range.
 - c. A site location map.
 - d. Permit numbers & Department/County of issue (if applicable).
 2. Methods
 - a. Summarize the methods used for monitoring, include the survey dates.
 3. Results
 - a. Floristic Quality Assessment Data for the Baseline Survey.
 - b. Floristic Quality Assessment Data for the Meander Survey:
 - 1) Native Mean Coefficient of Conservatism Value (C).
 - 2) Native Floristic Quality Index (FQI).
 - 3) Native Wetness Coefficient (W).
 - 4) A comparison table that lists previous years' data with current year's data.
 - c. Live Plant Material:

NATURAL AREAS ESTABLISHMENT PROVISIONS

- 1) Report on the condition of any native herbaceous live plant material installation areas.
4. Discussion
 - a. Discuss in detail the work performed as part of on-going stewardship during the previous calendar year.
 - b. Compare the current year's data with data from the previous year(s).
 - c. Compare current year's results against the performance criteria.
 - d. Describe any deficiencies in the current year's stewardship activities that are hindering the sites ability to meet the performance criteria and propose detailed corrective actions.
 - e. Discuss in detail the stewardship activities that will occur in the upcoming year.
5. Appendices
 - a. Species lists for installation and/or enhancement seeding/planting.
 - b. Site Photographs.
 - c. Floristic Quality Assessment data tables.
 - d. Original Site Planting Plan
 - e. Site Plan detailing deficiencies and/or recommendations

PART 7 NATURAL AREAS PERFORMANCE

7.01 PERFORMANCE CRITERIA – NATIVE HERBACEOUS PLANTING

- A. General:
 1. Final determinations of species dominance, richness, coverage and/or distribution are subject to verification by Owner/Owner's Representative.
 2. Final determinations of plant vigor are subject to verification by Owner/Owner's Representative.
- B. Throughout stewardship activities:
 1. Zero (0) aggressive native species, non-native species, nor invasive species shall be allowed to become established on the site and/or be allowed to colonize.
 2. With the exception of planted cover crops, none of the top five (5) dominant species within any planting area shall be aggressive native, non-native or invasive species (See Appendix-A). Dominance shall be determined by ocular assessment using meander methodology.
- C. Within three (3) months of seed installation or by June 1st of the following year if seed installation is completed in the fall:
 1. Total vegetative aerial cover in all areas seeded with cover crop shall be greater to or equal than seventy-five percent (75%) as measured using meander methodology.
- D. By the end of the first (1st) growing season, in addition to fulfilling the above:
 1. Native Seed Planting Areas:
 - a. Total vegetative aerial cover in all Native Seed areas shall be greater to or equal to ninety percent (90%) as measured using meander methodology.

NATURAL AREAS ESTABLISHMENT PROVISIONS

- b. Twenty-five percent (25%) of the Native Seed species installed within each plant community shall be alive and apparent. This standard does not apply to emergent wetland, deep emergent or floating aquatic plant communities.
- 2. Native Live Plug Planting Areas:
 - a. No less than ninety percent (90%) of any Native Live Plug plant material installed shall be alive and in vigorous condition, this standard shall apply to each planting area where Native Live Plugs are installed. If less than ninety percent (90%) of any Native Live Plug plant material installed survive the first full growing season, the plants shall be replaced so that the ninety percent (90%) criteria is achieved within each applicable planting area.
- E. By the end of the second (2nd) growing season, in addition to fulfilling the above:
 - 1. Native Seed Planting Areas:
 - a. Fifty percent (50%) of the Native Seed species installed within each plant community shall be alive and apparent. This standard does not apply to emergent or streamside communities.
 - b. Native vegetative aerial cover within Native Seed planting areas shall be at least forty percent (40%) as measured using meander methodology.
 - 2. Native Live Plug Planting Areas:
 - a. Eighty percent (80%) of the Native Live Plug species installed within each plant community shall be alive and apparent.
 - b. Native vegetative aerial cover within Native Live Plug planting areas shall be at least twenty-five percent (25%) as measured using meander methodology.
- F. By the end of the third (3rd) growing season, in addition to fulfilling the above:
 - 1. General:
 - a. Based on the results of the meander survey, the Native Mean C-Value and the Native FQI shall increase each successive year after planting.
 - a. There shall be no area(s) greater than 0.25 m² that is devoid of vegetation. This standard does not apply to emergent, deep emergent, floating aquatic or streamside communities.
 - b. There shall be no rills, gullies or other evidence of significant or on-going erosion or areas of high erosion potential present throughout the project area.
 - 2. Native vegetative aerial cover within Native Seed planting areas shall be at least eighty-five percent (85%) as measured using meander methodology.
 - 3. To ensure species richness at the local level, any given square meter (1.0 m²) within Native Seed planting areas shall contain a minimum of three (3) different acceptable species and shall include at least one (1) species seeded as specified.
 - 4. The following standards shall be achieved for each plant community:
 - a. Mesic Prairie Seed Mix
 - 1) Total FQI – 20.8
 - 2) Total Mean C Value – 2.5
 - 3) Native FQI – 27.7
 - 4) Native Mean C Value – 4.1
 - b. Wet-Mesic Prairie Seed Mix
 - 1) Total FQI – 19.6

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- 2) Total Mean C Value – 2.2
 - 3) Native FQI – 26.1
 - 4) Native Mean C Value – 3.7
 - c. Wetland Seed and Plug Mix
 - 1) Total FQI – 12.5
 - 2) Total Mean C Value – 2.3
 - 3) Native FQI – 16.6
 - 4) Native Mean C Value – 3.9
 - d. Emergent Wetland Seed & Plug Mix
 - 1) Total FQI – 17.5
 - 2) Total Mean C Value – 2.4
 - 3) Native FQI – 23.3
 - 4) Native Mean C Value – 4.1
 - 5) Total vegetative aerial cover within emergent wetland plant communities shall be greater to or equal than sixty percent (60%) as measured using meander methodology.
 - e. Deep Emergent Plug Mix
 - 1) Total FQI – 15.2
 - 2) Total Mean C Value – 3.5
 - 3) Native FQI – 20.2
 - 4) Native Mean C Value – 5.8
 - 5) Total vegetative aerial cover within deep emergent plant communities shall be greater to or equal than forty percent (40%) as measured using meander methodology.
 - f. Floating Aquatic Plug Mix
 - 1) Total FQI – 9.4
 - 2) Total Mean C Value – 3.8
 - 3) Native FQI – 12.5
 - 4) Native Mean C Value – 6.3
 - 5) Total vegetative aerial cover within floating aquatic **planting areas** shall be greater to or equal than twenty-five percent (25%) as measured using meander methodology.
- G. **REMEDIATION** – If native planting areas fail to meet the terms of the performance criteria described above, the Natural Areas Contractor shall develop and submit to the Owner/Owner's Representative, a remedial action plan that takes into consideration the site goals and specific deficiencies causing the remedial action. The Natural Areas Contractor will implement the approved remedial action plan and submit a report that describes the remedial action taken. If remedial seeding or planting is required, the Natural Areas Contractor will not be required to perform additional remedial seeding or planting in the same area for a minimum of one growing season. After one full growing season following the remedial planting, the performance criteria must be met or additional remedial action must be taken. Final acceptance shall not be granted until all planting areas meet performance criteria and/or meet the stated intent of the project to the satisfaction of the Owner/Owner's Representative.

7.02 ACCEPTANCE – NATIVE HERBACEOUS PLANTING

- A. Five (5) days prior to the anticipated date of inspection, submit written notice requesting inspection to Owner/Owner's Representative.



NATURAL AREAS ESTABLISHMENT PROVISIONS

B. Substantial Acceptance:

1. Field inspections will be conducted by the Owner/Owner's Representative 7-14 days after receiving written request for Substantial Completion inspection from the Contractor.
2. The work shall be considered substantially complete after all native seed, plugs, goose exclosure and erosion control structures have been installed (excludes stewardship, prescribed fire and monitoring/reporting); completion of Substantial Completion Punch-list items; and cover crop germination has begun to the satisfaction of the Owner/Owner's Representative.

C. Final Acceptance:

1. Field inspections will be conducted by the Owner/Owner's Representative at the end of the first full growing season or 7-14 days after receiving written request for Final Acceptance inspection from the Contractor, but no later than October 1st.
2. The work shall be considered 100% complete after goose exclosure fencing has been removed and the third (3rd) growing season performance criteria have been satisfied.
 - a. Final Acceptance criteria shall only apply to this contract if Alternate #1 (Natural Areas Stewardship) is awarded to the Natural Areas Contractor. If Alternate #1 is not awarded, Substantial Acceptance shall constitute Final Acceptance.

END OF NATURAL AREAS ESTABLISHMENT PROVISIONS

NATURAL AREAS ESTABLISHMENT PROVISIONS

INVASIVE SPECIES LIST

APPENDIX - A



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Last Updated 01/22/2017

NATURAL AREAS ESTABLISHMENT PROVISIONS

- A. It is the responsibility of the Natural Areas Contractor to locate, identify, and eradicate any species that may endanger the successful establishment and long-term health of the specified native plant communities within the project area/site. Following is a list of common invasive, weedy and aggressive native species typically encountered during ecological restoration efforts that can inhibit the successful establishment of desirable native species. This list is not representative of the site and should not be considered an inventory. The listed species shall at no time be allowed to dominate any portion of the project site.

B. Aggressive Weed/Invasive Species List:

<i>Acer negundo</i>	BOXELDER ³
<i>Acer platanoides</i>	NORWAY MAPLE
<i>Achillea</i> spp.	YARROW ³
<i>Aegopodium podagraria</i>	GOUTWEED
<i>Agrostis gigantea</i>	REDTOP
<i>Agrostis stolonifera</i>	CREeping BENTGRASS ³
<i>Ailanthus altissima</i>	TREE OF HEAVEN
<i>Alliaria petiolata</i>	GARLIC MUSTARD
<i>Alnus glutinosa</i>	EUROPEAN BLACK ALDER
<i>Ambrosia artemisiifolia</i>	COMMON RAGWEED ^{1, 3}
<i>Ambrosia trifida</i>	GIANT RAGWEED ^{1, 3}
<i>Anthriscus sylvestris</i>	WILD CHERVIL
<i>Arctium minus</i>	COMMON BURDOCK
<i>Berberis thunbergii</i>	JAPANESE BARBERRY
<i>Brassica nigra</i>	BLACK MUSTARD ²
<i>Bromus inermis</i>	SMOOTH BROME
<i>Bromus tectorum</i>	DOWNY BROME
<i>Butomus umbellatus</i>	FLOWERING RUSH
<i>Cannabis sativa</i>	MARIJUANA ¹
<i>Carduus nutans</i>	MUSK THISTLE ¹
<i>Celastrus orbiculatus</i>	ASIAN BITTERSWEET ¹
<i>Centaurea maculosa</i>	SPOTTED KNAPWEED
<i>Chenopodium album</i>	LAMB'S QUARTERS ²
<i>Cirsium arvense</i>	CANADA THISTLE ¹
<i>Cirsium vulgare</i>	BULL THISTLE
<i>Conium maculatum</i>	POISON HEMLOCK ¹
<i>Cornus racemosa</i>	GRAY DOGWOOD ³
<i>Cynanchum louiseae</i>	BLACK SWALLOW-WORT
<i>Cynanchum rossicum</i>	PALE SWALLOW-WORT
<i>Cyperus esculentus</i>	YELLOW NUTSEdge ³
<i>Dactylis glomerata</i>	ORCHARDGRASS
<i>Daucus carota</i>	QUEEN ANNE'S LACE ²
<i>Dioscorea oppositifolia</i>	CHINESE YAM
<i>Dipsacus</i> spp.	TEASEL ¹
<i>Echinochloa crus-galli</i>	BARNYARD GRASS
<i>Egeria densa</i>	BRAZILIAN WATERWEED
<i>Eichhornia crassipes</i>	WATER HYACINTH
<i>Elaeagnus angustifolia</i>	RUSSIAN OLIVE ¹

NATURAL AREAS ESTABLISHMENT PROVISIONS

<i>Elaeagnus pungens</i>	THORNY OLIVE ¹
<i>Elaeagnus umbellata</i>	AUTUMN OLIVE ¹
<i>Elymus repens</i>	QUACKGRASS
<i>Erigeron canadensis</i>	MARE'S TAIL ³
<i>Erigeron annuus</i>	ANNUAL FLEABANE ³
<i>Erigeron strigosus</i>	DAISY FLEABANE ³
<i>Euonymus alatus</i>	BURNING BUSH
<i>Euonymus fortunei</i>	WINTERCREEPER
<i>Euphorbia esula</i>	LEAFY SPURGE
<i>Fallopia japonica</i>	JAPANESE KNOTWEED ¹
<i>Fallopia sachalinensis</i>	GIANT KNOTWEED ¹
<i>Fallopia x bohemica</i>	BOHEMIAN KNOTWEED ¹
<i>Frangula alnus</i>	GLOSSY BUCKTHORN
<i>Hedera helix</i>	ENGLISH IVY
<i>Hemerocallis fulva</i>	ORANGE DAYLILY
<i>Heracleum mantegazzianum</i>	GIANT HOGWEED ¹
<i>Hesperis matronalis</i>	DAMES ROCKET
<i>Humulus japonicus</i>	JAPANESE HOPS
<i>Hydrilla verticillata</i>	HYDRILLA
<i>Hydrocharis morsus-ranae</i>	EUROPEAN FROGBIT
<i>Hypericum perforatum</i>	COMMON ST. JOHN'S WORT
<i>Ipomoea purpurea</i>	MORNING GLORY ²
<i>Iris pseudacorus</i>	YELLOW IRIS
<i>Lespedeza cuneata</i>	SERICEA LESPEDEZA
<i>Ligustrum spp.</i> (non-native)	PRIVET (non-native)
<i>Lolium multiflorum</i>	ANNUAL RYE/ITALIAN RYEGRASS
<i>Lonicera spp.</i>	HONEYSUCKLE (non-native) ¹
<i>Lotus corniculatus</i>	BIRDS FOOT TREFOIL
<i>Lysimachia nummularia</i>	MONEYWORT
<i>Lythrum salicaria</i>	PURPLE LOOSESTRIFE
<i>Marsilea quadrifolia</i>	EUROPEAN WATERCLOVER
<i>Medicago lupulina</i>	BLACK MEDIC
<i>Medicago sativa</i>	ALFALFA
<i>Melilotus albus</i>	WHITE SWEET CLOVER
<i>Melilotus officinalis</i>	YELLOW SWEET CLOVER
<i>Microstegium vimineum</i>	JAPANESE STILTGRASS
<i>Morus alba</i>	WHITE MULBERRY
<i>Myosotis sylvatica</i>	GARDEN FORGET-ME-NOT
<i>Myriophyllum aquaticum</i>	PARROT FEATHER
<i>Myriophyllum spicatum</i>	EURASIAN WATERMILFOIL
<i>Myosotis scorpioides</i>	WATER FORGET-ME-NOT
<i>Najas minor</i>	BRITTLE WATERNYMPH
<i>Nepeta cataria</i>	CATNIP
<i>Nymphoides peltata</i>	YELLOW FLOATING HEART
<i>Oenothera biennis</i>	EVENING PRIMROSE ³
<i>Onopordum acanthium</i>	SCOTCH THISTLE
<i>Pastinaca sativa</i>	WILD PARSNIP
<i>Phalaris arundinacea</i>	REED CANARY GRASS
<i>Phragmites australis</i> (non-native)	COMMON REED (non-native)

NATURAL AREAS ESTABLISHMENT PROVISIONS

<i>Pistia stratiotes</i>	WATER LETTUCE
<i>Poa pratensis</i>	KENTUCKY BLUEGRASS
<i>Populus alba</i>	WHITE POPLAR
<i>Populus deltoides</i>	COTTONWOOD ³
<i>Potamogeton crispus</i>	CURLY-LEAF PONDWEED
<i>Pueraria montana var. lobata</i>	KUDZU ¹
<i>Ranunculus ficaria</i>	LESSER CELANDINE ¹
<i>Rhamnus cathartica</i>	COMMON BUCKTHORN
<i>Robinia pseudoacacia</i>	BLACK LOCUST
<i>Rorippa nasturtium</i>	WATERCRESS
<i>Rumex acetosella</i>	SHEEP SORREL
<i>Rumex crispus</i>	CURLY DOCK
<i>Rosa multiflora</i>	MULTIFLORA ROSE
<i>Rubus spp.</i>	RASPBERRY/BLACKBERRY ³
<i>Salix interior</i>	SANDBAR WILLOW ³
<i>Saponaria officinalis</i>	BOUNCING BET
<i>Schedonorus arundinaceus</i>	TALL FESCUE
<i>Securigaria varia</i>	CROWN VETCH
<i>Setaria spp.</i>	FOXTAIL/MILLET ²
<i>Silene latifolia var. alba</i>	BLADDER CAMPION
<i>Solidago altissima</i>	TALL GOLDENROD ³
<i>Solidago canadensis</i>	CANADA GOLDENROD ³
<i>Solidago sempervirens</i>	SEASIDE GOLDENROD
<i>Sonchus arvensis</i>	PERENNIAL SOWTHISTLE ¹
<i>Sorghum alnum</i>	COLUMBUS GRASS ¹
<i>Sorghum halepense</i>	JOHNSONGRASS ¹
<i>Symphotrichum lateriflorum</i>	SIDE FLOWERING ASTER ³
<i>Symphotrichum pilosum</i>	HAIRY ASTER ³
<i>Tamarix spp.</i>	SALT CEDAR ¹
<i>Tanacetum vulgare</i>	COMMON TANSY
<i>Taraxacum officinalis</i>	COMMON DANDELION ²
<i>Thlaspi arvense</i>	FIELD PENNYCRESS ²
<i>Torilis japonica</i>	JAPANESE HEDGE PARSLEY
<i>Toxicodendron radicans</i>	POISON IVY ³
<i>Trifolium pratense</i>	RED CLOVER ²
<i>Trifolium repens</i>	WHITE CLOVER ²
<i>Typha angustifolia</i>	NARROWLEAF CATTAIL ³
<i>Typha latifolia</i>	COMMON CATTAIL ³
<i>Ulmus pumila</i>	SIBERIAN ELM
<i>Verbascum blattaria</i>	MOTH MULLEIN ²
<i>Verbascum thapsus</i>	COMMON MULLEIN ²
<i>Vinca minor</i>	PERIWINKLE
<i>Xanthium strumarium</i>	ROUGH COCKLEBUR

¹Species classified as a Noxious Weed in the State of Illinois as of the date of this document

²Species considered common weeds requiring control, not specifically considered invasive

³Species considered native (or questionably native) in the State of Illinois, but often has an aggressive growth behavior that may require control on a case-by-case basis

NATURAL AREAS ESTABLISHMENT PROVISIONS

APPROVED NATIVE SPECIES LISTS

APPENDIX - B

Mesic Prairie Seed Mix (Mesic Soils)

MIX STATISTICS	
Number of Native Species in Mix	40
Native FQ	34.6
Native Mean C Value	5.5
Native Mean W Value	2.3
National Wetland Category	FAU4
Total LBS of Native Seed	20.3
Seeds per Square Foot	145.4
Percent of Mix (by Seed Count) Requiring Stratification	61.3%

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME											SEEDS/QZ	QZ	LBS	% OF MIX		GERMINATION	TOP SOW
						Min-Max	Typical		A	M	J	J	A	S	O	by Weight	by Seed Count									
BOUCUR	<i>Bouteloua curtipendula</i>	Sideoats Grama	8	5	UPL	1.5-2.5'	2	N/A								6,000	64.00	4.00				19.68%	6.98%	N/A		
OXBCK	<i>Carex bicknellii</i>	Copper-shouldered Oval Sedge	10	3	FACU	1.5-2.5'	2	N/A								17,000	6.00	0.38				1.84%	1.96%	CM-60		
OXBRV	<i>Carex brevior</i>	Plains Oval Sedge	4	0	FAC	1-3'	2	N/A								29,000	4.00	0.25				1.25%	2.11%	CM-60		
CKMOLE	<i>Carex molesta</i>	Field Oval Sedge	2	0	FAC	1-2.5'	2	N/A								25,000	3.00	0.19				0.92%	1.36%	CM-60		
OVULP	<i>Carex vulpinoidea</i>	Brown Fox Sedge	2	-3	FACW	1.5-3.5'	3	N/A								100,000	0.50	0.03				0.15%	0.91%	CM-60		
ELYCAN	<i>Elymus canadensis</i>	Canada Wild Rye	4	3	FACU	3-5'	5	N/A								5,200	32.00	2.00				9.84%	3.03%	N/A		
JUNINT	<i>Juncus interior</i>	Inland Rush	6	0	FAC	1-2'	2	N/A								2,800,000	0.125	0.01				0.04%	6.37%	CM-60		
PANVR	<i>Panicum virgatum</i>	Switch Grass	5	0	FAC	3-6'	4	N/A								14,000	12.00	0.75				3.60%	3.06%	N/A		
SCHSCO	<i>Schizachyrium scoparium</i>	Little Bluestem	5	3	FACU	2-3'	3	N/A								15,000	98.00	3.00				14.76%	13.05%	N/A		
																			Grass/Sedge Subtotal		10.602	52.19%				

Wildflowers

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME											SEEDS/0Z	0Z/ACRE	LB/ACRE	% OF MIX		GERMINATION	TOP SOW
						Min-Max	Typical		A	M	J	J	A	S	O	by Weight	by Seed Count									
ALLGER	<i>Allium cernuum</i>	Nodding Onion	7	3	FACU	1-2'	1.5	Purple								7,800	4.70	0.25				1.23%	0.55%	CM-60		
ASCYSR	<i>Asclepias syriaca</i>	Common Milkweed	0	3	FACU	2-6'	3	Pink								4,000	2.00	0.13				0.61%	0.15%	CM-30		
ASCTUB	<i>Asclepias tuberosa</i>	Butterfly Weed	7	5	UPL	1-2.5'	2	Orange								4,300	6.00	0.38				1.84%	0.47%	CM-30		
BAPALB	<i>Baptisia alba</i>	White Wild Indigo	3	3	FACU	3-6'	4	White								1,700	4.00	0.25				1.25%	0.12%	CM-10, H, I		
CHAFAS	<i>Chamaecrista fasciculata</i>	Partridge Pea	5	3	FACU	6"-2'	2	Yellow								2,700	16.00	1.00				4.92%	0.79%	CM-10, H, I		
CORPAL	<i>Coreopsis palmata</i>	Prairie Coreopsis	6	5	UPL	1-2.5'	2	Yellow								10,000	4.00	0.25				1.23%	0.73%	CM-60, M		
CORTRI	<i>Coreopsis tripteris</i>	Tall Coreopsis	5	0	FAC	3-8'	7	Yellow								14,000	1.00	0.06				0.31%	0.25%	CM-60		
DALPUR	<i>Dalea purpurea</i>	Purple Prairie Clover	9	5	UPL	1-3'	2	Purple								18,000	8.00	0.50				2.46%	2.67%	J, I		
DESCAA	<i>Desmodium canadense</i>	Showy Tick Trefoil	4	3	FACU	3-6'	4	Purple								5,500	2.00	0.13				0.61%	0.20%	J, I		
DRYARG	<i>Eryngium yuccifolium</i>	Prairie Cinquefoil	9	3	FACU	1-3'	2	White								230,000	0.125	0.01				0.04%	0.52%	CM-60, G		
ECHPAL	<i>Echinacea pallida</i>	Pale Purple Coneflower	8	5	UPL	2-3'	3	Purple								5,200	12.50	0.75				3.68%	1.13%	CM-50 or M		
ECHPUR	<i>Echinacea purpurea</i>	Purple Coneflower	3	5	UPL	2-5'	4	Purple								6,600	2.00	0.13				0.61%	0.24%	N/A		
ERYVUC	<i>Eryngium yuccifolium</i>	Rattlesnake Master	9	0	FAC	2-5'	4	White								7,200	8.00	0.50				2.46%	1.09%	CM-60		
EUTGRA	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	4	3	FACW	2-4'	3	Yellow								350,000	0.25	0.02				0.08%	1.59%	CM-60		
HELHEL	<i>Helopsis helianthoides</i>	Early Sunflower	5	3	FACU	3-5'	5	Yellow								6,300	12.00	0.75				3.68%	1.37%	CM-10, H, I, J		
LESAP	<i>Lespedeza capitata</i>	Round-headed Bush Clover	4	3	FACU	2-5'	4	Green								8,000	2.00	0.13				0.61%	0.29%	CM-10, H, I, J		
LIAPYC	<i>Liatris pycnostachya</i>	Prairie Blazing Star	8	0	FAC	2-4'	4	Purple								11,000	4.00	0.25				1.23%	0.80%	CM-60		
MONFIS	<i>Monarda fistulosa</i>	Wild Bergamot	4	3	FACU	2.5-4'	4	Purple								70,000	4.50	0.28				1.38%	5.73%	N/A		
PORINT	<i>Porteranthus integrifolius</i>	Wild Quinine	8	5	UPL	2-3.5'	3	White								7,000	8.00	0.50				2.46%	1.02%	CM-60		
PENDIG	<i>Penstemon digitalis</i>	Fogelove Beardtongue	4	0	FAC	2-3'	3	White								130,000	2.00	0.13				0.61%	4.73%	CM-50, G		
PYCTEN	<i>Pycnanthemum tenuifolium</i>	Slender Mountain Mint	7	0	FAC	1-3'	2	White								375,000	0.25	0.02				0.08%	1.72%	N/A		
RATPIN	<i>Ratibida pinnata</i>	Yellow Coneflower	4	5	UPL	2-4'	4	Yellow								30,000	12.00	0.75				3.68%	6.55%	CM-30		
RUDHIR	<i>Rudbeckia hirta</i>	Black-eyed Susan	1	3	FACU	2-3'	2	Yellow								92,000	8.00	0.50				2.46%	13.35%	CM-30		
RUDSUB	<i>Rudbeckia subtomentosa</i>	Sweet Black-eyed Susan	9	3	FACU	3-6'	5	Yellow								43,000	0.50	0.03				0.15%	0.35%	CM-30		
SILLAC	<i>Silphium laciniatum</i>	Compass Plant	5	5	UPL	6-12'	8	Yellow								660	0.50	0.03				0.15%	0.01%	CM-60		
SOLRIG	<i>Solidago rigida</i>	Stiff Goldenrod	4	3	FACU	2-5'	4	Yellow								41,000	6.00	0.38				1.84%	4.47%	CM-60		
SYMLAE	<i>Symphoricarpos brevifolius</i>	Smooth Blue Aster	9	3	FACU	1.5-3'	3	Blue								55,000	2.00	0.13				0.61%	2.00%	N/A		
SYMNCH	<i>Symphoricarpos novae-angliae</i>	New England Aster	4	-3	FACW	3-5'	4	Purple								66,000	2.50	0.16				0.77%	3.00%	CM-60		
TRAOH	<i>Tradescantia ohioensis</i>	Ohio Spiderwort	2	3	FACU	2-4'	3	Blue								8,000	6.00	0.38				1.84%	0.87%	CM-120 or M, G		
VERSTR	<i>Verbena stricta</i>	Hoary Vervain	4	5	UPL	1-3'	2	Blue								28,000	4.00	0.25				1.23%	2.04%	CM-60		
ZIZAUR	<i>Zizia aurea</i>	Golden Alexander	7	0	FAC	1-2.5'	2	Yellow								11,000	12.00	0.75				3.68%	2.40%	CM-60 or M, G		
																Wildflower Subtotal		9.727	47.85%							
																Mix TOTALS		20.328	100.00%	100.00%						

Wet-Mesic Prairie Seed Mix (Wet-Mesic Soils)

MIX STATISTICS	
Number of Native Species in Mix	45
Native PDI	32.6
Native Mean C Value	4.9
Native Mean W Value	-1.4
National Wetland Category	FACW-
Total LBS of Native Seed	7.9
Seeds per Square Foot	222.6
Percent of Mix (by Seed Count) Requiring Stratification	80.2%

Grasses, Sedges, & Rushes																					
CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME						SEEDS/OZ	OZ	LBS	% OF MIX		GERMINATION	TOP SOW
						Min-Max	Typical		A	M	J	J	A	S				O	by Weight		
CXREV	<i>Carex brevior</i>	Prairie Oval Sedge	4	0	FAC	1-3'	2	N/A							29,000	1.38	0.06	0.80%	0.65%	CM-60	
CXCRIS	<i>Carex aristata</i>	Crested Oval Sedge	4	-3	FACW	2-4'	2	N/A							58,000	0.75	0.03	0.60%	0.97%	CM-60	
CXMOLE	<i>Carex molesta</i>	Field Oval Sedge	2	0	FAC	1-2.5'	2	N/A							25,000	2.00	0.13	1.59%	1.12%	CM-60	
CXSCOP	<i>Carex scoparia</i>	Lance-fruited Oval Sedge	7	-3	FACW	1-3'	2	N/A							84,000	0.68	0.06	0.80%	1.87%	CM-60	
CXSTIP	<i>Carex stipitata</i>	Common Fox Sedge	3	-5	OBL	1.5-3'	3	N/A							34,000	1.00	0.06	0.80%	0.76%	CM-60	
CXVULP	<i>Carex vulpinoidea</i>	Brown Fox Sedge	2	3	FACW	1.5-3.5'	3	N/A							170,000	1.00	0.13	1.59%	4.46%	CM-60	
FLEPAI	<i>Fleocharis palustris</i>	Great Spike Rush	2	5	OBL	1.5-5'	2	N/A							51,000	1.40	0.03	0.40%	0.57%	CM-60	
ELYVIR	<i>Elymus virginicus</i>	Virginia Wild Rye	4	-3	FACW	2.5-4'	4	N/A							4,200	24.00	1.50	19.09%	2.25%	N/A	
GLYSTR	<i>Glyceria striata</i>	Fowl Manna Grass	4	-5	OBL	2-3.5'	3	N/A							90,000	1.00	0.06	0.80%	2.01%	N/A	
JUNDUD	<i>Juncus dudleyi</i>	Dudley's Rush	4	-3	FACW	1-2.5'	2	N/A							3,200,000	0.30	0.03	0.40%	35.69%	CM-60	
PANVIR	<i>Panicum virgatum</i>	Switch Grass	5	0	FAC	3-6'	4	N/A							14,000	8.00	0.50	6.36%	2.50%	N/A	
SCATR	<i>Scirpus atrovirens</i>	Dark-green Bulrush	4	-5	OBL	2-6'	5	N/A							460,000	0.125	0.01	0.10%	1.28%	CM-60 or M	
SPPEC	<i>Spartina pectinata</i>	Cord Grass	4	-3	FACW	3-9'	7	N/A							6,600	15.00	1.00	12.72%	2.36%	N/A	
																Grass/Sedge Subtotal	3.617	46.02%	56.48%		

Wildflowers																				
CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME					SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX		GERMINATION	TOP SOW
						Min-Max	Typical		A	M	J	J	A				S	by Weight		
ALLCER	<i>Allium cernuum</i>	Nodding Onion	7	3	FACU	1-2'	1.5	Purple						7,600	5.00	0.38	4.77%	1.02%	CM-60	
ASCINC	<i>Asclepias incarnata</i>	Swamp Milkweed	4	-5	OBL	3-6'	4	Pink						4,800	9.00	0.19	2.39%	0.32%	CM-30	
BICKER	<i>Bidens cernua</i>	Nodding Bur Marigold	5	-5	OBL	1-3'	3	Yellow						21,000	0.75	0.05	0.60%	0.35%	CM-60	
BGLAST	<i>Boltonia asteroides</i>	False Aster	9	-5	OBL	3-5'	4	White						160,000	0.25	0.02	0.20%	0.89%	CM-60	
CHAFAS	<i>Chamaecrista fasciculata</i>	Partridge Pea	5	3	FACU	6"-2'	2	Yellow						2,700	8.00	0.50	6.36%	0.48%	CM-10, H, L	
CORTRI	<i>Coreopsis tripteris</i>	Tall Coreopsis	5	0	FAC	3-8'	7	Yellow						14,000	2.00	0.13	1.59%	0.67%	CM-60	
DESCAA	<i>Desmodium canadense</i>	Showy Tick Trefoil	4	3	FACU	3-6'	4	Purple						5,500	1.50	0.05	1.15%	0.18%	J, L	
DOEUMB	<i>Doellingeria umbellata</i>	Bar-topped Aster	9	-3	FACW	2-5'	5	Cream						67,000	0.26	0.05	0.60%	1.12%	CM-60	
EOHPUR	<i>Echinacea purpurea</i>	Purple Coneflower	3	5	UPL	2-5'	4	Purple						6,600	2.00	0.13	1.59%	0.29%	N/A	
ERYLOC	<i>Eryngium yuccifolium</i>	Rattlesnake Master	9	0	FAC	2-5'	4	White						7,500	9.00	0.50	6.36%	1.34%	CM-60	
EUPFER	<i>Eupatorium perfoliatum</i>	Boneset	4	-5	OBL	3-4'	4	White						180,000	0.125	0.01	0.10%	0.45%	CM-30	
EUTGRA	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	4	-3	FACW	2-4'	3	Yellow						350,000	0.50	0.03	0.40%	3.90%	CM-60	
EUTMAC	<i>Eutrochium maculatum</i>	Spotted Joe Pye Weed	4	5	OBL	3-6'	5	Pink						95,000	0.35	0.02	0.20%	0.53%	CM-30	
HELAUT	<i>Helianthus autumnalis</i>	Sneezeweed	5	-3	FACW	2-5'	4	Yellow						130,000	0.50	0.03	0.40%	1.45%	N/A	
LIAPYC	<i>Liatris pycnostachya</i>	Prairie Blazing Star	8	0	FAC	2-4'	4	Purple						11,000	8.00	0.19	2.39%	0.74%	CM-60	
LIASPI	<i>Liatris spicata</i>	Marsh Blazing Star	6	0	FAC	2-5'	5	Purple						11,000	1.00	0.06	0.80%	0.25%	CM-60	
MONFIS	<i>Monarda fistulosa</i>	Wild Bergamot	4	3	FACU	2.5-4'	4	Purple						70,000	2.00	0.13	1.59%	3.12%	N/A	
PENDIG	<i>Penstemon digitalis</i>	Engelvine Beardtongue	4	0	FAC	2-3'	3	White						130,000	4.00	0.06	0.80%	2.90%	CM-30, G	
PYOVIR	<i>Pycnanthemum virginianum</i>	Virginia Mountain Mint	5	3	FACW	1-4'	3	White						220,000	1.00	0.05	0.80%	4.91%	N/A	
RUDFUL	<i>Rudbeckia fulgida</i>	Orange Coneflower	8	-5	OBL	2-4'	3	Orange						31,000	1.00	0.06	0.80%	0.69%	CM-60	
RUDHIR	<i>Rudbeckia hirta</i>	Black-eyed Susan	1	3	FACU	2-3'	2	Yellow						92,000	4.00	0.25	3.18%	8.21%	CM-30	
RUDSUB	<i>Rudbeckia subtomentosa</i>	Sweet Black-eyed Susan	9	3	FACU	3-6'	5	Yellow						43,000	0.90	0.03	0.40%	0.48%	CM-30	
SILLAC	<i>Silphium laciniatum</i>	Compass Plant	5	5	UPL	6-12'	8	Yellow						660	3.00	0.19	2.39%	0.04%	CM-60	
SILTER	<i>Silphium terebinthinaceum</i>	Prairie Dock	5	0	FAC	4-10'	9	Yellow						1,000	1.50	0.09	1.19%	0.03%	CM-60	
SOLRID	<i>Solidago rigida</i>	Riddell's Goldenrod	7	-5	OBL	2-4'	3	Yellow						93,000	0.25	0.02	0.20%	0.52%	CM-60	
SOLRIS	<i>Solidago rigida</i>	Stiff Goldenrod	4	3	FACU	2-5'	4	Yellow						41,000	2.00	0.13	1.59%	1.83%	CM-60	
SYMNOV	<i>Symphoricarpos novae-angliae</i>	New England Aster	4	3	FACW	3-5'	4	Purple						66,000	1.50	0.09	1.19%	2.21%	CM-60	
THADAS	<i>Thalictrum dasycarpum</i>	Purple Meadow Rue	5	-3	FACW	3-7'	6	Cream						11,000	4.00	0.06	0.80%	0.25%	CM-60, G	
TRAOHI	<i>Triadescantia hiemalis</i>	Ohio Spiderwort	2	3	FACU	2-4'	3	Blue						8,000	5.00	0.38	4.77%	1.07%	CM-12G or M, G	
VERHAS	<i>Verbena hastata</i>	Blue Vervain	4	-3	FACW	2-6'	5	Blue						93,000	1.00	0.06	0.80%	2.07%	CM-30	
VERPAS	<i>Veronica fasciculata</i>	Common Ironweed	5	-3	FACW	3-6'	6	Purple						24,000	0.90	0.03	0.40%	0.27%	CM-60	
ZIZAUR	<i>Zizia aurea</i>	Golden Alexanders	7	0	FAC	1-2.5'	2	Yellow						11,000	4.00	0.25	3.18%	0.98%	CM-60 or M, G	
														Wildflower Subtotal	4.342	53.98%	43.52%			
														Mix TOTALS	7.859	100.00%	100.00%			

Wetland Seed Mix (Saturated Soils)

MIX STATISTICS	
Number of Native Species in Mix	13
Native PDI	16.6
Native Mean C Value	4.6
Native Mean W Value	4.5
National Wetland Category	FACW+
Total LBS of Native Seed	0.7
Seeds per Square Foot	365.7
Percent of Mix (by Seed Count) Requiring Stratification	96.4%

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME											SEEDS/OZ	OZ	LBS	% OF MIX		GERMINATION	TOP SOW
						Min-Max	Typical		A	M	J	J	A	S	O	by Weight	by Seed Count									
CKCMMO	<i>Carex comosa</i>	Bristly Sedge	5	-5	OBL	2.3-5'	2	N/A								30,000	0.50	0.03	4.49%	2.09%					CM-60	
CKHYST	<i>Carex hystericina</i>	Poxcupine Sedge	5	-5	OBL	1.2-5'	2	N/A								30,000	0.50	0.03	4.49%	2.09%					CM-60	
CKSTIP	<i>Carex stipata</i>	Common Fox Sedge	3	-5	OBL	1.5-3'	3	N/A								34,000	0.25	0.02	2.25%	1.18%					CM-60	
CKSTRI	<i>Carex stricta</i>	Common Tussock Sedge	5	-5	OBL	2.5-4'	3	N/A								53,000	0.28	0.02	2.25%	1.85%					CM-60	
CKVULP	<i>Carex vulpinoidea</i>	Brown Fox Sedge	2	-3	FACW	1.5-3.5'	3	N/A								100,000	1.00	0.06	8.99%	13.93%					CM-60	
EYVIR	<i>Elymus virginicus</i>	Virginia Wild Rye	4	-3	FACW	2.5-4'	4	N/A								4,200	4.00	0.25	35.96%	2.34%					N/A	
JUNEFF	<i>Juncus effusus</i>	Common Rush	7	-5	OBL	2-4'	3	N/A								1,000,000	0.125	0.01	1.12%	17.41%					CM-60	
LEECRY	<i>Leersia oryzoides</i>	Rice Cut Grass	4	-5	OBL	2-4'	4	N/A								34,000	0.75	0.05	6.74%	3.55%					N/A	
																			Grass/Sedge Subtotal		0.461	66.29%	44.44%			

Wildflowers

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME							SEEDS/OZ	OZ/ACRE	LB/ACRE	% OF MIX		GERMINATION	TOP SOW
						Min-Max	Typical		A	M	J	J	A	S	O				by Weight	by Seed Count		
ASOINC	<i>Asclepias incarnata</i>	Swamp Milkweed	4	-5	OBL	3-6'	4	Pink							4,800	3.00	0.19	26.97%	2.01%			CM-30
EUTMAC	<i>Eutrochium maculatum</i>	Spotted Joe Pye Weed	4	-5	OBL	3-6'	5	Pink							95,000	0.25	0.02	2.25%	3.31%			CM-30
LCBCAR	<i>Loelia cardinalis</i>	Cardinal Flower	7	-5	OBL	2-5'	3	Red							400,000	0.125	0.01	1.12%	6.96%			CM-40
MINRIN	<i>Minuartia ringens</i>	Monkey Flower	6	-5	OBL	1-3'	2	Purple							2,300,000	0.125	0.01	1.12%	40.04%			CM-40
VERHAS	<i>Verbena hastata</i>	Blue Vervain	4	-3	FACW	2-6'	5	Blue							93,000	0.25	0.02	2.25%	3.24%			CM-30
															Wildflower Subtotals		0.294	83.71%	55.56%			
															Mix TOTALS		0.898	100.00%	100.00%			

Wetland Plug Mix (0" Water Depth, Saturated Soil)

MIX STATISTICS	
Number of Native Species in Mix	9
Native PDI	20.8
Native Mean C Value	5.2
Native Mean W Value	3.8
National Wetland Category	FACW
Total # of Plants in the Mix	3364.0
Plants per Square Foot	1.0
Square Feet to be Planted	3356.0

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME											SIZE	PLANTS/ FLAT	# OF FLATS	# OF PLANTS	PLANTS/ SF	% OF TOTAL	NOTE
						Min-Max	Typical		A	M	J	J	A	S	O											
OXLUPN	<i>Carex lupulina</i>	Common Hop Sedge	7	-5	OBL	1.5-2.5	3	N/A								2" plug	50	500	400.00	0.11919	11.89%	24" o.c. (S. Rhizomatous)				
OXART	<i>Carex sartwellii</i>	Running Marsh Sedge	6	-3	FACW	1.3'	3	N/A								2" plug	50	500	250.00	0.07449	7.43%	18" o.c. (Rhizomatous)				
OXSCOP	<i>Carex scoparia</i>	Lance-fruited Oval Sedge	7	-3	FACW	1.3'	2	N/A								2" plug	50	500	200.00	0.05959	5.95%	18" o.c. (Rhizomatous)				
OXTRIB	<i>Carex tribuloides</i>	Awl-fruited Oval Sedge	3	-5	OBL	1.5-3'	3	N/A								2" plug	50	500	250.00	0.07449	7.43%	18" o.c. (Rhizomatous)				
JUNTOR	<i>Juncus torreyi</i>	Torrey's Rush	4	-3	FACW	2-3'	2	N/A								2" plug	50	500	100.00	0.0298	2.97%	18" o.c. (Rhizomatous)				
SPAPEC	<i>Spartina pectinata</i>	Cord Grass	4	-3	FACW	3-6'	7	N/A								2" plug	50	500	250.00	0.07449	7.43%	36" o.c.				
SCIATR	<i>Scirpus atrovirens</i>	Dark green Bulrush	4	-5	OBL	2-6'	5	N/A								2" plug	50	500	150.00	0.0447	4.46%	36" o.c.				
																Grass/Sedge Subtotal		\$2.00	1,600.00	0.5	47.56%					

Wildflowers

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME											SIZE	PLANTS/ FLAT	# OF FLATS	# OF PLANTS	PLANTS/ SF	% OF TOTAL	NOTE
						Min-Max	Typical		A	M	J	J	A	S	O											
ASSINC	<i>Asclepias incarnata</i>	Swamp Milkweed	4	-5	OBL	3'-5'	4	Pink								2" plug	50	500	300.00	0.08939	8.92%	18" o.c. (S. Rhizomatous)				
EUTSRA	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	4	-3	FACW	2'-4'	3	Yellow								2" plug	50	500	200.00	0.05959	5.95%	18" o.c. (A. Rhizomatous)				
EUTMAC	<i>Eutrochium maculatum</i>	Spotted Joe Pye Weed	4	-5	OBL	3'-5'	5	Pink								2" plug	50	500	250.00	0.07449	7.43%	18" o.c. (A. Rhizomatous)				
IRVVIS	<i>Irish virginiana var. stuevei</i>	Southern Blue Flag	5	-5	OBL	1'-3'	3	Purple								2" plug	50	500	150.00	0.0447	4.46%	18" o.c.				
LIA-SPI	<i>Liatris spicata</i>	Marsh Blazing Star	6	-0	FAC	2'-5'	5	Purple								2" plug	50	500	150.00	0.0447	4.46%	18" o.c. (Rhizomatous)				
LOBSP	<i>Lobelia siphilitica</i>	Great Blue Lobelia	6	-5	OBL	1'-4'	3	Blue								2" plug	50	500	150.00	0.0447	4.46%	18" o.c.				
PHYVIR	<i>Physostegia virginiana</i>	Obedient Plant	5	-3	FACW	3'-4'	4	Pink								2" plug	50	500	250.00	0.07449	7.43%	18" o.c.				
RUDFUL	<i>Rudbeckia fulgida</i>	Orange Coneflower	8	-5	OBL	2'-4'	3	Orange								2" plug	50	250	114.00	0.03347	3.35%	18" o.c. (Rhizomatous)				
VERFAS	<i>Veronica fasciculata</i>	Common Ironweed	5	-3	FACW	3'-6'	6	Purple								2" plug	50	250	200.00	0.05959	5.95%	18" o.c.				
																Wildflower Subtotal		36.00	1,764.00	0.5	52.44%					
																Mix TOTALS		68.00	3,564.00	1.0	100.00%					

Coefficients of Conservatism: Swink, E. and G. Wilhelm, 1994. Plants of the Chicago Region, 4th Edition. Indianapolis: Indiana Academy of Science.

Wetness Values: Midwest region values from Uehara, R.W., M. Butterwick, N.C. Melvin, and W.N. Krichner, 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

S. Rhizomatous - Slowly Rhizomatous, spreads but typically stays localized forming small clumps or groups.

Rhizomatous - Spreads readily locally forming moderate to large groupings.

A. Rhizomatous - Aggressively Rhizomatous, spreads quickly and may become dominant throughout a planting area if conditions are ideal.

Emergent Wetland Seed Mix (0-6" Water Depth)

MIX STATISTICS	
Number of Native Species in Mix	29
Native FQI	29.2
Native Mean C-Value	5.4
Native Mean W-Value	-5.0
National Wetland Category	OBL
Total LBS of Native Seed	48.6
Seeds per Square Foot	162.9
Percent of Mix (by Seed Count) Requiring Stratification	95.0%

Grasses, Sedges, & Rushes																
CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME							
						Min-Max	Typical		A	M	J	J	A	S	O	
CKCOMO	<i>Carex comosa</i>	Bristly Sedge	5	-5	OBL	2-3.5'	2	N/A								
CKHYST	<i>Carex hystericina</i>	Porcupine Sedge	5	-5	OBL	1-2.5'	2	N/A								
CKLUPN	<i>Carex lupulina</i>	Common Hopp Sedge	7	-5	OBL	1.5-3.5'	5	N/A								
CKSTRI	<i>Carex stricta</i>	Common Tussock Sedge	5	-5	OBL	2.5-4'	3	N/A								
CKUTRI	<i>Carex utriculata</i>	Common Yellow Lake Sedge	10	-5	OBL	1.5-5'	3	N/A								
ELFLAL	<i>Eleocharis palustris</i>	Great Spike Rush	2	-5	OBL	1-3.5'	2	N/A								
JUNLEF	<i>Juncus effusus</i>	Common Rush	7	-5	OBL	2-4'	3	N/A								
LEECRY	<i>Leersia oryzoides</i>	Rice Cut Grass	4	-5	OBL	2-4'	4	N/A								
SCHPUP	<i>Scheuchzeria palustris</i> var. <i>pungens</i>	Charismatic's Rush	5	-5	OBL	2-5'	5	N/A								
SCHTAB	<i>Scheuchzeria palustris</i> var. <i>germanica</i>	Great Bulrush	5	-5	OBL	4-7'	6	N/A								
SCIAIR	<i>Scirpus atrovirens</i>	Dark green Bulrush	4	-5	OBL	2-6'	5	N/A								
SCICYP	<i>Scirpus cyperinus</i>	Wool Grass	6	-5	OBL	3-5'	5	N/A								
SCHACU	<i>Scheuchzeria palustris</i>	Hardstem Bulrush	6	-5	OBL	3-9'	6	N/A								
															Grass/Sedge Subtotal:	23.569
															48.00	54.06%

Wildflowers																
CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME							
						Min-Max	Typical		A	M	J	J	A	S	O	
ACOCAL	<i>Acorus calamus</i>	Sweet Flag	7	-5	OBL	1-3'	2	White/Green								
AUSUB	<i>Alisma subcordatum</i>	Mud Plantain	4	-5	OBL	1-3'	3	White								
ASOCNC	<i>Asclepias incarnata</i>	Swamp Milkweed	4	-5	OBL	3-6'	4	Pink								
CHECLA	<i>Chelone glabra</i>	Turtlehead	8	-5	OBL	3-6'	5	Green								
EUPPER	<i>Eupatorium perfoliatum</i>	Boneset	4	-5	OBL	3-4'	4	White								
EUTMAC	<i>Eutrochium maculatum</i>	Spotted Joe-Pye Weed	4	-5	OBL	3-6'	5	Pink								
HIBLAE	<i>Hibiscus laevis</i>	Herb-Rose	6	-5	OBL	3-6'	5	Pink								
IRIVIS	<i>Iris virginica</i> var. <i>striata</i>	Southern Blue Flag	5	-5	OBL	1-3'	3	Purple								
LUDALT	<i>Ludwigia alternifolia</i>	Seedbox	6	-5	OBL	1.5-3.5'	3	Yellow								
LYTALA	<i>Lythrum alatum</i>	Winged Loosestrife	7	-5	OBL	1-3'	3	Purple								
MINIRIN	<i>Mimulus ringens</i>	Monkey Flower	6	-5	OBL	1-3'	3	Purple								
PENEDC	<i>Pentstemon sedifolius</i>	Gitchee Stonecrop	5	-5	OBL	1-2'	2	Red								
PERHYD	<i>Peristrophe hydrophoroides</i>	Swamp Smartweed	2	-5	OBL	1-3'	2	White								
GAELAT	<i>Lagotis latifolia</i>	Common Arrowweed	4	-5	OBL	1-3'	3	White								
GIUSUA	<i>Stum suave</i>	Tall Water Parsnip	7	-5	OBL	2-6'	4	White								
GOLRID	<i>Solidago riddellii</i>	Riddell's Goldenrod	7	-5	OBL	2-4'	3	Yellow								
															Wildflower Subtotal:	20.031
															48.00	45.96%
															Mix TOTALS	48.594
															100.00%	100.00%

*Following are the common reasons for not including these recommended plug species within the seed mix:

- 1) Does not germinate well from seed in the field
- 2) Seed is very expensive
- 3) Low number of seeds per ounce
- 4) Requires specialized microclimate OR has a limited native range
- 5) Seed is not commercially available or is only available in small quantities

Coefficients of Conservatism: Swink, F., and G. Wilhelm. 1994. Plants of the Chicago Region. 4th Edition. Indianapolis, Indiana: Academy of Science.

Wetness Values: Midwest region values from Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron. 2014. 41: 1-42.

Germination Codes

- N/A: Seed should germinate upon sowing in a warm location; no pretreatment necessary
 CM # of stratifying days: Seeds germinate after a period of cold, moist stratification
 WM # of stratifying days: Seeds germinate after a period of warm, moist stratification
 B: Hot water treatment
 G: Seeds germinate most successfully in cool soil
 H: Seeds need scarification
 L: Legume, Rhizobium inoculum
 J: Remove the hulls from these legume seeds
 K: Hemiparasitic species which needs a host plant
 L: Plant fresh seed or keep moist
 M: Best planted outdoors in the fall
 O: Seed needs sucking
 S: Fern spore sowing
 P: Not sure

Emergent Wetland Plug Mix (0-6" Water Depth)

MIX STATISTICS	
Number of Native Species in Mix	15
Native PGI	29.2
Native Mean C Value	5.3
Native Mean W Value	-4.9
National Wetland Category	OBL
Total # of Plants in the Mix	98100.0
Plants per Square Foot	0.5
Square Feet to be Planted	191327.0

Grasses, Sedges, & Rushes

Grasses, Sedges, & Rushes																						
CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM	BLOOM TIME							SIZE	PLANTS/ FLAT	# OF FLATS	# OF PLANTS	PLANTS/ SF	% OF TOTAL	NOTE*
						Min-Max	Typical	COLOR	A	M	J	J	A	S	O							
BOFLU	<i>Boerhaavia fluitans</i>	River Bulrush	4	-5	OBL	3-6.5'	6	N/A								2" plug	38	38	760.00	0.0	0.77%	18" o.c. (A. Rhizomatous)
CAICAN	<i>Calamagrostis canadensis</i>	Blue Joint Grass	3	-5	OBL	2-5'	4	N/A								2" plug	38	38	760.00	0.0	1.55%	18" o.c. (A. Rhizomatous)
CKCOMO	<i>Carex comosa</i>	Bristly Sedge	5	-5	OBL	2-3.5'	2	N/A								2" plug	50	50	1,000.00	0.0	5.10%	18" o.c. (S. Rhizomatous)
CKLACU	<i>Carex lasiocarpa</i>	Common Lake Sedge	6	-5	OBL	2.5-4'	3	N/A								2" plug	38	38	760.00	0.0	2.32%	18" o.c. (A. Rhizomatous)
CKLUPN	<i>Carex lupulina</i>	Common Loop Sedge	7	-5	OBL	1.5-3.5'	3	N/A								2" plug	38	38	760.00	0.0	1.55%	18" o.c. (Rhizomatous)
CKSTRI	<i>Carex stricta</i>	Common Tussock Sedge	5	-5	OBL	2.5-4'	3	N/A								2" plug	50	50	1,000.00	0.0	2.04%	18" o.c. (S. Rhizomatous)
CKTRIC	<i>Carex trichocarpa</i>	Hairy-fruited Lake Sedge	7	-5	OBL	2.5-4'	4	N/A								2" plug	50	50	1,000.00	0.0	5.10%	18" o.c. (A. Rhizomatous)
CKVULP	<i>Carex vulpina</i>	Brown Fox Sedge	2	-3	FACW	1.5-3.5'	3	N/A								2" plug	50	50	1,000.00	0.0	4.08%	18" o.c. (S. Rhizomatous)
JUNEFF	<i>Juncus effusus</i>	Common Rush	7	-5	OBL	2-4'	3	N/A								2" plug	50	50	1,000.00	0.0	1.02%	18" o.c. (S. Rhizomatous)
LEORY	<i>Leersia oryzoides</i>	Rice Cut Grass	4	-5	OBL	2-4'	4	N/A								2" plug	50	50	1,000.00	0.0	2.04%	18" o.c. (A. Rhizomatous)
SCHACU	<i>Schoenoplectus acutus</i>	Hardstem Bulrush	6	-5	OBL	3-9'	6	N/A								2" plug	50	50	1,000.00	0.0	1.02%	18" o.c. (A. Rhizomatous)
SCHTAB	<i>Schoenoplectus tabernaemontani</i>	Great Bulrush	5	-5	OBL	4-7'	6	N/A								2" plug	50	50	1,000.00	0.0	3.06%	18" o.c. (A. Rhizomatous)
SCHPLN	<i>Scirpus pungent</i>	Chairmaker's Rush	5	-5	OBL	2-5'	5	N/A								2" plug	50	50	1,000.00	0.0	5.10%	18" o.c. (A. Rhizomatous)
SCIATR	<i>Scirpus atrovirens</i>	Dark-green Bulrush	4	-5	OBL	2-6'	5	N/A								2" plug	50	50	1,000.00	0.0	1.02%	18" o.c. (Rhizomatous)
SCICYP	<i>Scirpus cyperinus</i>	Wool Grass	6	-5	OBL	3-5'	5	N/A								2" plug	50	50	1,000.00	0.0	2.04%	18" o.c. (S. Rhizomatous)
Grass/Sedge Subtotal																	780.00	37,980.00	0.2	37.80%		

Wildflowers

Wildflowers																					
CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT		BLOOM COLOR	BLOOM TIME						SIZE	PLANTS/ FLAT	# OF FLATS	# OF PLANTS	PLANTS/ SF	% OF TOTAL	NOTE*
						Min-Max	Typical		A	M	J	J	A	S							
ACOCAL	<i>Acorus calamus</i>	Sweet Flag	7	-5	OBL	1-3'	2	White/Green							2" plug	50	50.00	3,000.00	0.0	3.06%	18" o.c. (Rhizomatous)
AUSUB	<i>Alopecurus subarcticus</i>	Mud Plantain	4	-5	OBL	1-3'	3	White							2" plug	32	32.00	1,120.00	0.0	1.14%	18" o.c.
ASZINC	<i>Azalepis incarnata</i>	Swamp Milkweed	4	-5	OBL	3-6'	4	Pink							2" plug	50	50.00	3,000.00	0.0	3.06%	18" o.c. (S. Rhizomatous)
EUTMAC	<i>Eutrochium maculatum</i>	Spotted Joe Pye Weed	4	-5	OBL	3-6'	5	Pink							2" plug	50	50.00	2,000.00	0.0	2.04%	18" o.c.
HIBLAE	<i>Hibiscus laevis</i>	Hard-leaved Rose Mallow	6	-5	OBL	3-6'	5	Pink							2" plug	50	50.00	3,000.00	0.0	3.06%	18" o.c.
IRVVIS	<i>Iris virginica</i> var. <i>strobilata</i>	Southern Blue Flag	5	-5	OBL	1-3'	3	Purple							2" plug	38	380.00	11,020.00	0.1	11.23%	12" o.c. (Rhizomatous)
LOBCAR	<i>Lobelia cardinalis</i>	Cardinal Flower	7	-5	OBL	2-5'	3	Red							2" plug	50	50.00	2,000.00	0.0	2.04%	18" o.c.
LYCAM	<i>Lycopus americanus</i>	Water Horehound	5	-5	OBL	1-3'	2	White							2" plug	38	38.00	1,520.00	0.0	1.55%	18" o.c.
LYTALA	<i>Lythrum alatum</i>	Winged Loosestrife	7	-5	OBL	1-3'	3	Purple							2" plug	50	50.00	2,000.00	0.0	2.04%	18" o.c. (Rhizomatous)
MIMRIN	<i>Mimulus ringens</i>	Monkey Flower	6	-5	OBL	1-3'	2	Purple							2" plug	50	50.00	3,000.00	0.0	3.06%	18" o.c.
PERHYD	<i>Persicaria hydropiperoides</i>	Swamp Smartweed	2	-5	OBL	1-3'	2	White							2" plug	38	38.00	760.00	0.0	0.77%	18" o.c.
PONCOR	<i>Pontederia cordata</i>	Pickersweed	10	-5	OBL	1-3'	2	Purple							2" plug	32	32.00	1,920.00	0.0	1.96%	18" o.c. (Rhizomatous)
SAGLAT	<i>Sagittaria latifolia</i>	Common Arrowhead	4	-5	OBL	1-3'	3	White							2" plug	32	32.00	1,840.00	0.0	12.07%	12" o.c. (Rhizomatous)
SOURID	<i>Solidago rigida</i>	Riddell's Goldenrod	7	-5	OBL	2-4'	3	Yellow							2" plug	50	50.00	3,000.00	0.0	3.06%	18" o.c. (S. Rhizomatous)
SPAEUR	<i>Sparganium eurycarpum</i>	Great Bur Reed	6	-5	OBL	2-6'	4	White							2" plug	32	32.00	1,840.00	0.0	12.07%	18" o.c. (Rhizomatous)
															Wildflower Subtotal		1,605.00	61,020.00	0.3	62.20%	
															Mix TOTALS		2,385.00	99,100.00	0.5	100.00%	

Coefficients of Conservatism: Swink, F. and G. Wilhelm, 1994. Plants of the Chicago Region, 4th Edition. Indianapolis: Indiana Academy of Science.

Wetness Values: Midwest region values from Uchir, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirdner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41:1-42.

S. Rhizomatous - Slowly Rhizomatous, spreads but typically stays localized forming small clumps or groups

Rhizomatous - Spreads readily locally forming moderate to large groupings

A. Rhizomatous - Aggressively Rhizomatous, spreads quickly and may become dominant throughout a planting area if conditions are ideal

Deep Emergent Plug Mix (6-18" Water Depth)

MIX STATISTICS	
Number of Native Species in Mix	12
Native FQI	20.2
Native Mean C Value	5.8
Native Mean W Value	-5.0
National Wetland Category	OBL
Total # of Plants in the Mix	2890.0
Plants per Square Foot	0.5
Square Feet to be Planted	5645.0

Grasses, Sedges, & Rushes

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT	BLOOM	BLOOM TIME	SIZE	PLANTS/	# OF	# OF	PLANTS/	% OF	NOTE
						Min-Max	Typical	COLOR	A M J J A S O	FLAT	FLATS	PLANTS	SF	TOTAL	
OKCOMO	<i>Carex canadensis</i>	Bristly Sedge	5	-5	OBL	2'-3.5'	2	N/A		2" plug	50	7.00	350.00	0.1	12.11%
SCHACU	<i>Scheuchzeria palustris</i>	Hardstem Bulrush	6	-5	OBL	3'-5'	6	N/A		2" plug	50	8.00	150.00	0.0	5.19%
SCHPLN	<i>Scirpus pungens</i>	Chairmaker's Rush	5	-5	OBL	2'-5'	5	N/A		2" plug	50	7.00	350.00	0.1	12.11%
SCHTAB	<i>Scheuchzeria palustris</i>	Great Bulrush	5	-5	OBL	4'-7'	9	N/A		2" plug	50	10.00	500.00	0.1	17.30%
Grass/Sedge Subtotal:											27.00	1,950.00	0.2	46.71%	

Wildflowers

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT	BLOOM	BLOOM TIME	SIZE	PLANTS/	# OF	# OF	PLANTS/	% OF	NOTE
						Min-Max	Typical	COLOR	A M J J A S O	FLAT	FLATS	PLANTS	SF	TOTAL	
ACOCAL	<i>Azorella californica</i>	Sweet Flag	7	-5	OBL	1'-3'	2	Yellow/Green		2" plug	50	5.00	250.00	0.0	8.65%
NYMODO	<i>Nymphaea odorata</i>	White Water Lily	7	-5	OBL	4'-12"	0.5	White		Bare Root	1	70.00	70.00	0.0	2.42%
PERAMS	<i>Persicaria amphibia</i> var. <i>stipularis</i>	Water Smartweed	4	-5	OBL	1'-3'	2	Pink		Bare Root	1	120.00	120.00	0.0	4.15%
PERCOC	<i>Persicaria coccinea</i>	Scarlet Smartweed	4	-5	OBL	1'-3'	2	Pink		Bare Root	1	250.00	250.00	0.0	8.65%
POTNOD	<i>Potamogeton nodosus</i>	Potamogeton	10	-5	OBL	1'-3'	2	Purple		2" plug	32	10.00	320.00	0.1	11.07%
POTNOD	<i>Potamogeton nodosus</i>	Long-leaf Pondweed	7	-5	OBL	3'-8"	0.5	White		Bare Root	1	50.00	50.00	0.0	1.73%
SAGLAT	<i>Sagittaria latifolia</i>	Common Arrowhead	4	-5	OBL	1'-3'	3	White		2" plug	32	5.00	160.00	0.0	5.54%
SPAEUR	<i>Sparganium eurycarpum</i>	Great Bur Reed	6	-5	OBL	2'-6'	4	White		2" plug	32	10.00	320.00	0.1	11.07%
Wildflower Subtotal:											520.00	1,540.00	0.3	85.29%	
Mix TOTALS											547.00	2,890.00	0.5	100.00%	

Coefficients of Conservation: Swink, F. and G. Wilhelm, 1994. Plants of the Chicago Region, 4th Edition. Indianapolis: Indiana Academy of Science.

Wetness Values: Midwest region values from Uchiar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner, 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

S. Rhizomatous - Slowly Rhizomatous, spreads but typically stays localized forming small clumps or groups.

Rhizomatous - Spreads readily locally forming moderate to large groupings.

A. Rhizomatous - Aggressively Rhizomatous, spreads quickly and may become dominant throughout a planting area if conditions are ideal.

Floating Aquatic Plug Mix (18"+ Water Depth)

MIX STATISTICS	
Number of Native Species in Mix	4
Native FQI	12.5
Native Mean C Value	6.3
Native Mean W Value	-5.0
National Wetland Category	OBL
Total # of Plants in the Mix	1900.0
Plants per Square Foot	0.5
Square Feet to be Planted	3705.0

Wildflowers

CODE	SCIENTIFIC NAME	COMMON NAME	C-VALUE	W-VALUE	WETNESS	HEIGHT	BLOOM	BLOOM TIME	SIZE	UNIT OF	# OF	PLANTS/	% OF	NOTE
						Min-Max	Typical	COLOR	A M J J A S O	MEASUR	PLANTS	SF	TOTAL	
NLPALDV	<i>Najas advena</i>	Yellow Pond Lily	7	-5	OBL	6"-12"	1	Yellow		Bare Root	Each	285.00	0.076923	15.00%
NYMODO	<i>Nymphaea odorata</i>	White Water Lily	7	-5	OBL	4'-12"	0.5	White		Bare Root	Each	85.50	0.230769	45.00%
PERAMS	<i>Persicaria amphibia</i> var. <i>stipularis</i>	Water Smartweed	4	-5	OBL	1'-3'	2	Pink		Bare Root	Each	85.00	0.025641	5.00%
POTNOD	<i>Potamogeton nodosus</i>	Long-leaf Pondweed	7	-5	OBL	3'-8"	0.5	White		Bare Root	Each	65.50	0.179487	35.00%
Mix TOTALS											1,900.00	0.51	100.00%	

Coefficients of Conservation: Swink, F. and G. Wilhelm, 1994. Plants of the Chicago Region, 4th Edition. Indianapolis: Indiana Academy of Science.

Wetness Values: Midwest region values from Uchiar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner, 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

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Rhizomatous - Spreads readily locally forming moderate to large groupings.

A. Rhizomatous - Aggressively Rhizomatous, spreads quickly and may become dominant throughout a planting area if conditions are ideal.

Note #1 - plant in 6-12" water with shoot pointed toward deeper water.

NATURAL AREAS ESTABLISHMENT PROVISIONS

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NATURAL AREAS ESTABLISHMENT PROVISIONS

PRE-APPROVED NATIVE PLANT NURSERIES

APPENDIX - C

NATURAL AREAS ESTABLISHMENT PROVISIONS

Native Seed

Agrecol, Inc., Evansville, WI
Phone: (608) 223-3571

Prairie Moon Nursery, Winona, MN
Phone: (507) 452-1362

Shooting Star Native Seeds, Spring Grove, MN
Phone: (507) 498-3944

Native Plugs

Agrecol, Inc., Evansville, WI
Phone: (608) 223-3571

Genesis Nursery, Inc., Tampico, IL
Phone: (877) 817-5325

J&J Transplant Aquatic Nursery, LLC, Wild Rose, WI
Phone: (800) 622-5055

Midwest Natural Garden, St. Charles, IL
Phone: (847) 742-1792

Pizzo Native Plant Nursery, LLC, Leland, IL
Phone: (815) 495-2300

GLOSSARY

NATURAL AREAS ESTABLISHMENT PROVISIONS

Acceptable Species: Vegetative species that have been seeded or planted as specified and/or volunteer native species with a C-value of 2 or greater, except for those species listed in Appendix-A.

Aerial coverage: The vegetation covering the ground surface above the ground surface; including all leaves, stems, flower parts, etc. Aerial coverage can be visualized by considering a bird's-eye view of the vegetation.

Cover: The vertical projection of vegetation from the ground as viewed from above.

Density: Numbers of individuals or stems per unit area.

Dominant Species: Plant species or species groups, which by means of their number, coverage or size, have considerable influence or control upon the conditions or existence of associated species.

Erosion: The washing away or dislodging of soil by water, wind or ice.

Established: Establish is defined in botany as a species being allowed to thrive and reproduce.

Invasive Species: An undesirable species of plant or animal, often non-native, that competes with desirable, native plants and animals for light, space, water, food and nutrients. An invasive species, left untreated, will destroy the integrity of an ecosystem and will often become the only plant or animal inhabiting a particular landscape.

Native Species: 1) an indigenous species that is normally found as part of a particular ecosystem. 2) a species that was present in a defined North American area prior to European settlement.

Ocular Assessment: The act of making a professional judgment about something based on what is physically seen by the observers eyes.

Plant Community: A group of plants that need a particular set of environmental conditions (i.e. light, soil type, moisture) in order to thrive. Examples include dry prairie, mesic prairie, wet prairie, wetland, emergent, savanna, dry-mesic woodland, etc.

Planting Area: The physical area(s) of a project site receiving site preparation, planting and/or stewardship activities. A plant community may consist of multiple planting areas.

Quadrat: Small areas of a standard size placed along transects or selected at random to act as representative samples for assessing the local distribution of plants or animals.

Remnant: A surviving trace or vestige of vegetation that has remained undisturbed or minimally undisturbed since European settlement. Remnant habitats are often found in fragmented form dissected by human development with a highly diverse number of native plants or native indicator species.

Transect: A straight line through a natural feature or across the earth's surface, along which observations are made or measurements taken.

Vegetative Cover: The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants. Vegetative cover may exceed 100 percent.

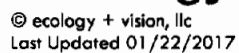
Vigorous: Well-rooted in soil and displaying healthy, strong vegetative growth.

NATURAL AREAS ESTABLISHMENT PROVISIONS

BID SUBMITTAL FORMS

APPENDIX - E

1. The first step in the process is to identify the problem or goal. This involves understanding the current situation and what needs to be achieved.

[illegible]

NATURAL AREAS ESTABLISHMENT PROVISIONS

PROPOSED STAFF SCHEDULE

[illegible]

1. *What is the main purpose of the study?*

2. *What are the research objectives?*

3. *What is the research methodology?*

4. *What are the key findings?*

5. *What are the conclusions?*


6. *What are the limitations of the study?*

7. *What are the implications of the study?*

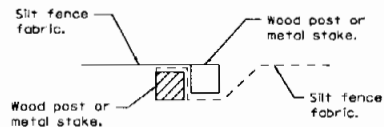
8. *What are the future research directions?*

9. *What are the contributions of the study?*

10. *What are the practical applications of the study?*

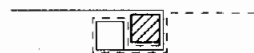
 ecology
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Last Updated 01/22/2017

STANDARD DRAWINGS



Place end-post (stake) of first silt fence adjacent to end-post (stake) of second silt fence with fabric positioned as shown.

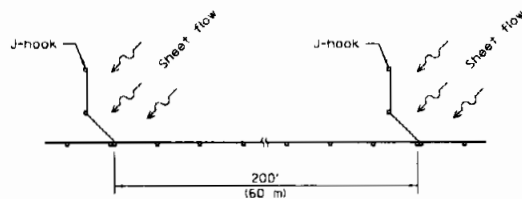
STEP 1



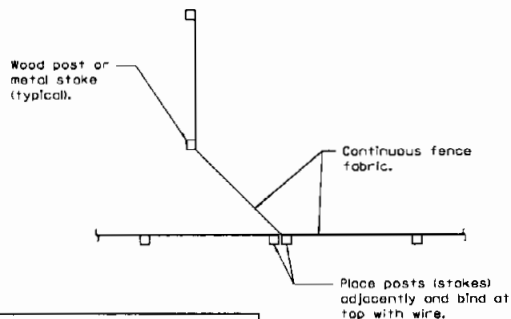
Rotate posts (stakes) together 180° clockwise and drive both posts (stakes) 18 (450) into ground.

STEP 2

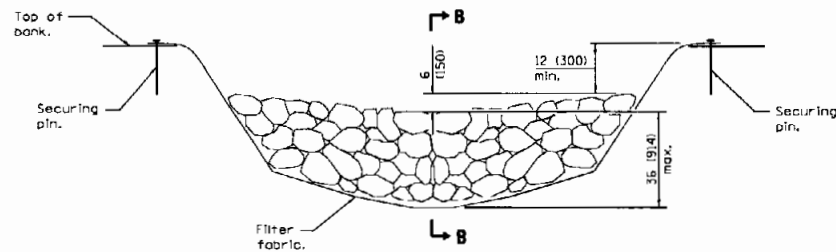
ATTACHING TWO SILT FILTER FENCES (Not applicable for J-hooks)



SILT FILTER J-HOOK PLACEMENT

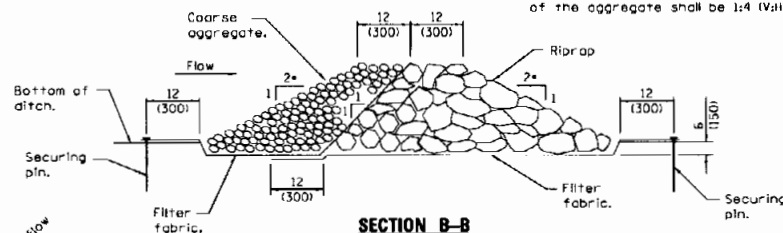


J-HOOK



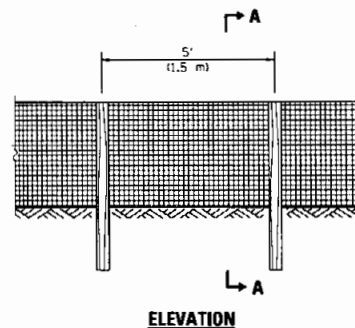
ELEVATION

* When the ditch check is within the clear zone and the road is open to traffic, the traffic approach slope of the aggregate shall be 1:4 (V:H).

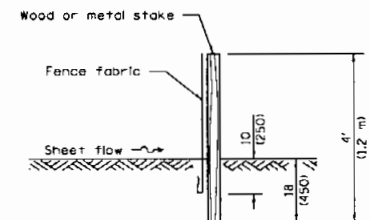


SECTION B-B

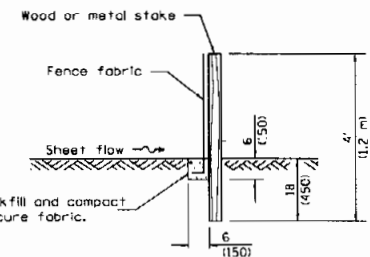
AGGREGATE DITCH CHECK



SILT FILTER FENCE AS A PERIMETER EROSION BARRIER



SLICE METHOD



TRENCH METHOD

SECTION A-A

GENERAL NOTES

The installation details and dimensions shown for perimeter erosion barriers shall also apply for inlet and pipe protection.

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

PASSED January 1, 2013

Michael Beard
ENGINEER OF POLICY AND PROCEDURES

APPROVED January 1, 2013

ENGINEER OF DESIGN AND ENVIRONMENT

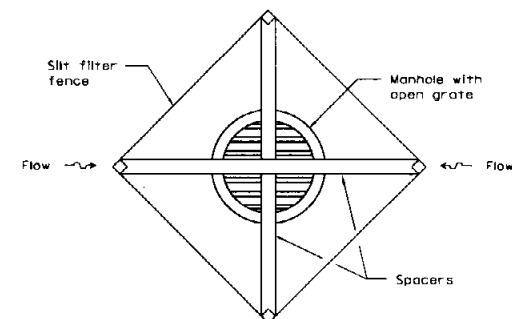
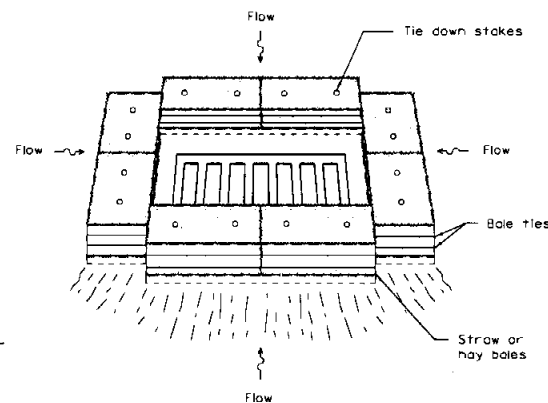
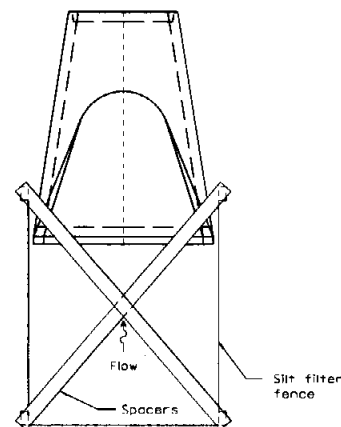
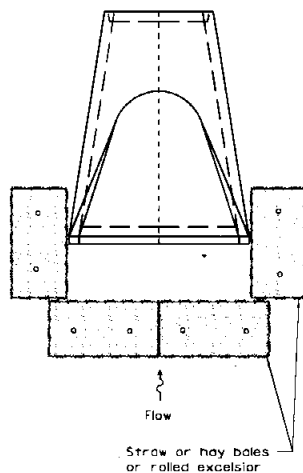
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DATE	REVISIONS
1-1-13	Corrected notation for flowline (F) on SEDIMENT BASIN ELEVATION.
1-1-12	Omitted hay/straw perimeter barrier. Added SLICE METHOD to SECTION A-A.

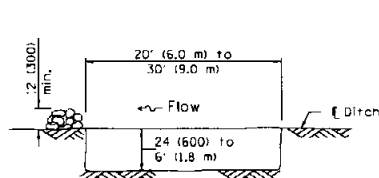
TEMPORARY EROSION CONTROL SYSTEMS

(Sheet 1 of 2)

STANDARD 280001-07

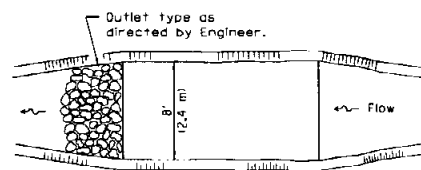


INLET AND PIPE PROTECTION



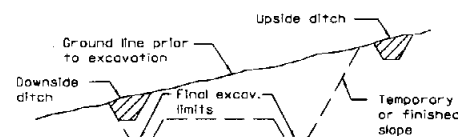
The performance of the basin will improve if put into a series.

ELEVATION

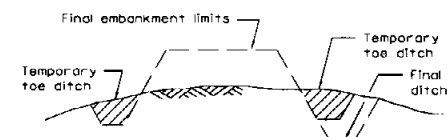


The long dimension should be parallel with the direction of the flow. Accumulated silt shall be removed anytime the basins become 75% filled.

PLAN



TYPICAL CUT CROSS-SECTION



TYPICAL FILL CROSS-SECTION

TEMPORARY DITCHES FOR CUT & FILL SECTIONS

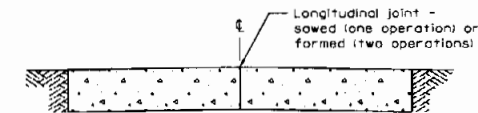
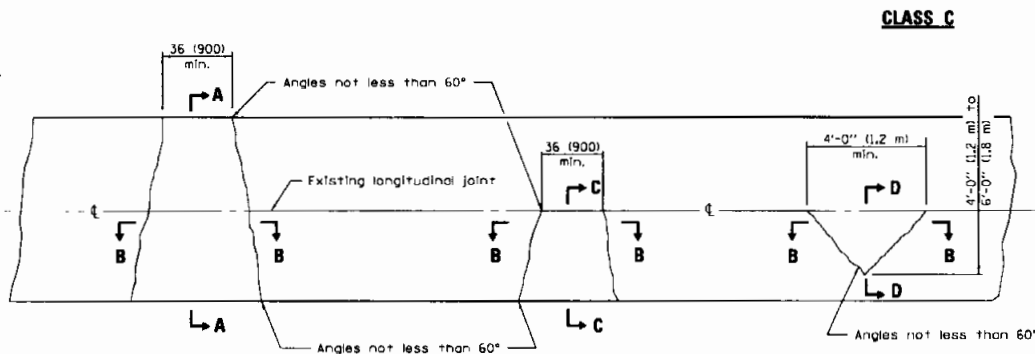
SEDIMENT BASIN

Illinois Department of Transportation	
PASSED	January 1, 2013
Michael Beard ENGINEER OF POLICY AND PROCEDURES	
APPROVED	January 1, 2013
[Signature] ENGINEER OF DESIGN AND ENVIRONMENT	
ISSUED	1-1-13

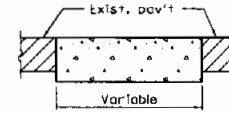
TEMPORARY EROSION CONTROL SYSTEMS

(Sheet 2 of 2)

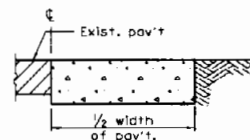
STANDARD 280001-07



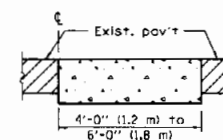
SECTION A-A



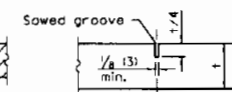
SECTION B-B



SECTION C-C

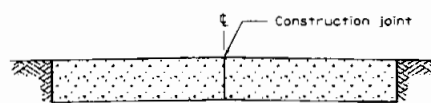
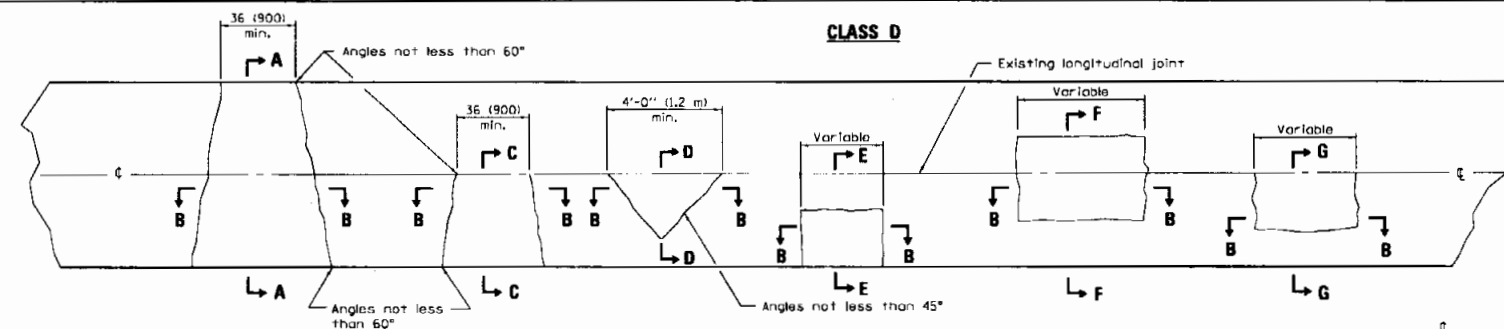


SECTION D-D



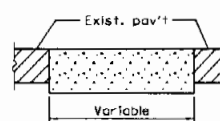
DETAIL OF SAWED CONTRACTION JOINT

Note:
Longitudinal joints shall be as detailed on Standard 420001, except tie bars are not required for patches 20'-0" (6.0 m) or less in length.

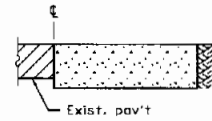


SECTION A-A

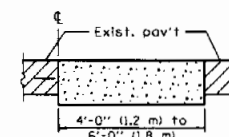
(Built in two operations)



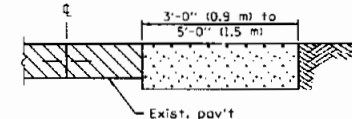
SECTION B-B



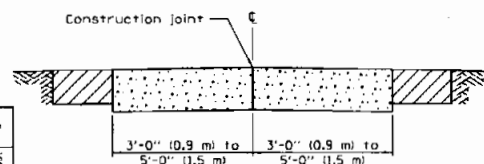
SECTION C-C



SECTION D-D

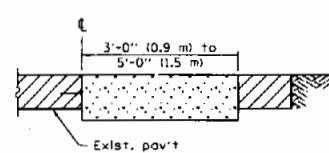


SECTION E-E



SECTION F-F

(Built in two operations)



SECTION G-G

GENERAL NOTES

Existing tie bars shall be either cut or removed. Marginal bars shall be cut.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-08	Switched units to English (metric).
1-1-07	Revised Note for Class C patches.

CLASS C and D PATCHES

STANDARD 442201-03

Illinois Department of Transportation

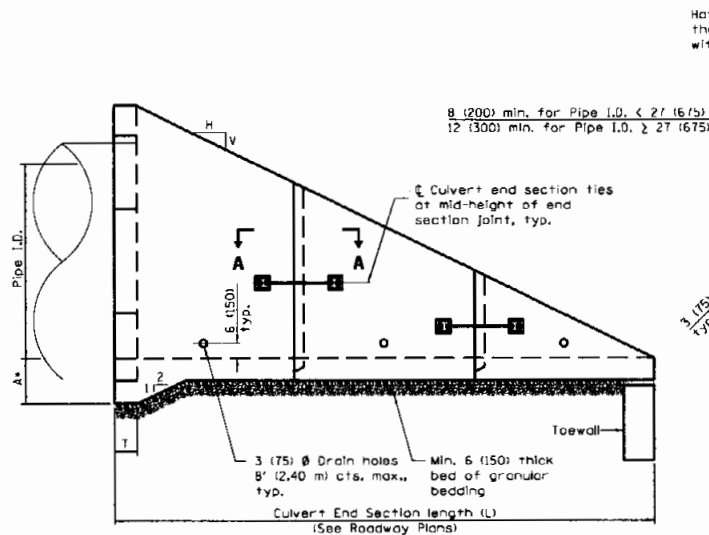
PASSED January 1, 2008

ENGINEER OF POLICY AND PROCEDURES

APPROVED January 1, 2008

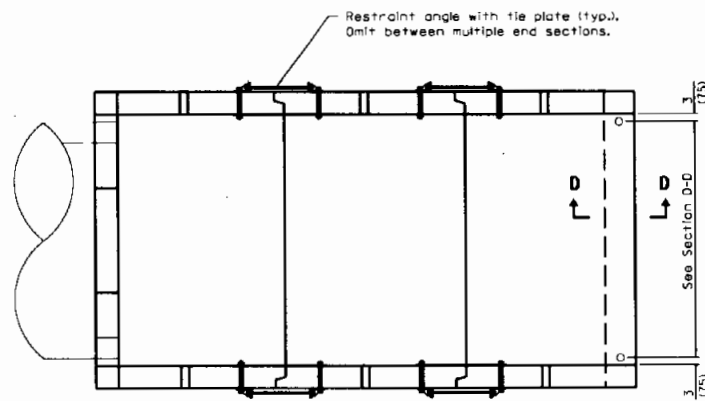
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

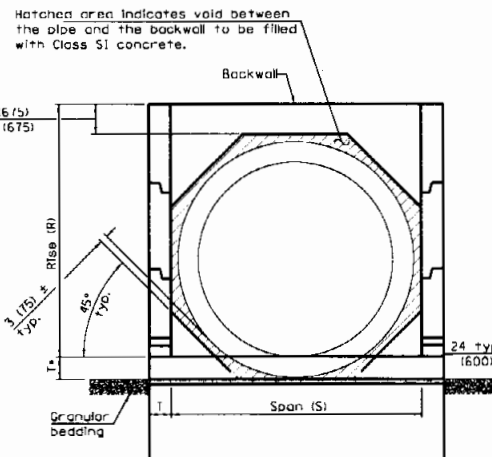


ELEVATION

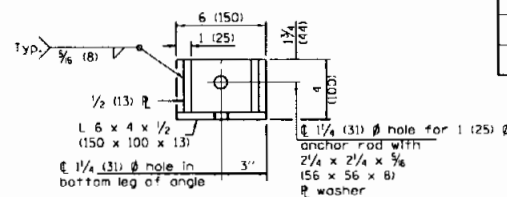
• This dimension shall be increased by 1/2 (38) for CIP field construction. See General Notes.



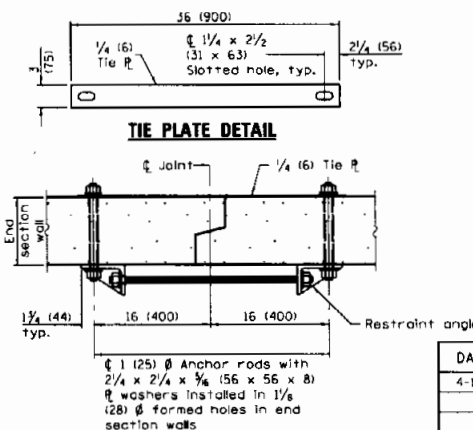
PLAN



END VIEW



RESTRAINT ANGLE DETAIL



SECTION A-A
(Showing end section tie details)

PIPE CULVERT END SECTION DIMENSIONS

Pipe I.D.	A	R	S	T	Slope of End Section			
					L			
					1:2	1:3	1:4	1:6
15 (375)	14 (350)	29 (737)	28 (711)	8 (200)	5'-6" (1.68 m)	7'-11" (2.42 m)	10'-4" (3.16 m)	15'-2" (4.63 m)
18 (450)	15 (375)	33 (838)	32 (813)	8 (200)	6'-2" (1.88 m)	8'-11" (2.72 m)	11'-8" (3.56 m)	17'-2" (5.24 m)
21 (525)	15 (375)	36 (914)	34 (864)	8 (200)	6'-8" (2.03 m)	9'-8" (2.95 m)	12'-8" (3.86 m)	18'-8" (5.69 m)
24 (600)	15 (375)	39 (990)	37 (930)	8 (200)	7'-2" (2.19 m)	10'-5" (3.18 m)	13'-8" (4.17 m)	20'-2" (6.15 m)
27 (675)	15 (375)	42 (1066)	40 (1016)	8 (200)	7'-8" (2.54 m)	11'-2" (3.71 m)	14'-8" (4.88 m)	23'-8" (7.21 m)
30 (750)	16 (400)	45 (1142)	43 (1092)	8 (200)	8'-2" (2.75 m)	12'-2" (4.02 m)	16'-4" (5.29 m)	25'-8" (7.83 m)
33 (825)	16 (400)	48 (1218)	46 (1168)	8 (200)	8'-8" (2.90 m)	13'-2" (4.25 m)	17'-4" (5.60 m)	27'-2" (8.29 m)
36 (900)	16 (400)	51 (1294)	49 (1244)	8 (200)	9'-2" (3.05 m)	14'-2" (4.47 m)	18'-4" (5.90 m)	28'-8" (8.74 m)
42 (1050)	17 (425)	57 (1442)	55 (1392)	8 (200)	10'-0" (3.41 m)	16'-5" (5.01 m)	21'-8" (6.61 m)	32'-2" (9.81 m)
48 (1200)	17 (425)	63 (1590)	61 (1540)	8 (200)	11'-2" (3.71 m)	17'-11" (5.46 m)	23'-8" (7.22 m)	35'-2" (10.73 m)
54 (1350)	18 (450)	69 (1738)	67 (1688)	8 (200)	12'-4" (4.01 m)	19'-8" (6.00 m)	26'-0" (7.93 m)	38'-8" (11.79 m)
60 (1500)	18 (450)	75 (1886)	73 (1836)	8 (200)	14'-4" (4.37 m)	21'-2" (6.46 m)	28'-0" (8.54 m)	41'-8" (12.71 m)
66 (1650)	19 (475)	81 (2034)	79 (1984)	8 (200)	15'-6" (4.73 m)	22'-11" (6.99 m)	30'-4" (9.26 m)	45'-2" (13.78 m)
72 (1800)	19 (475)	87 (2182)	85 (2132)	8 (200)	16'-6" (5.03 m)	24'-5" (7.45 m)	32'-4" (9.87 m)	48'-2" (14.70 m)
78 (1950)	21 (525)	93 (2330)	91 (2280)	9 (230)	17'-9" (5.41 m)	26'-3" (8.01 m)	34'-9" (10.60 m)	51'-9" (15.78 m)
84 (2100)	21 (525)	99 (2478)	97 (2428)	9 (230)	18'-9" (5.72 m)	27'-9" (8.46 m)	36'-9" (11.21 m)	54'-9" (16.70 m)

GENERAL NOTES

This Standard is for use with single pipe culverts and multi-pipe culvert installations. For multi-pipe culvert installations, place the end sections side-by-side leaving a 3 (75) space between adjacent end section walls and fill the spaces with Class SI concrete.

The number of segments shown in elevation is for example only. The length and number of precast sections required to construct the end section shall be determined by the Contractor.

See roadway plans for slope (V:H) and pipe inside diameter.

End section may be installed up to ± 15 degrees skewed with roadway.

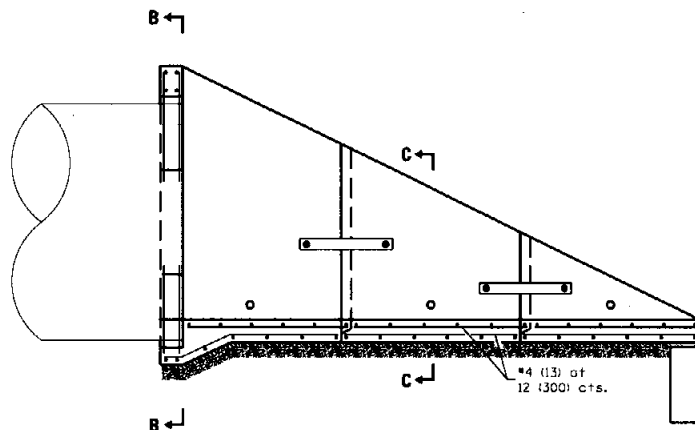
2/4 x 2/4 x 3/8 (56 x 56 x 8) plate washers shall be provided under each nut required for the anchor rods. Holes in the walls for the culvert tie assembly may be drilled using core bits in lieu of formed holes.

See Standard 542311 for end sections having traversable pipe grate.

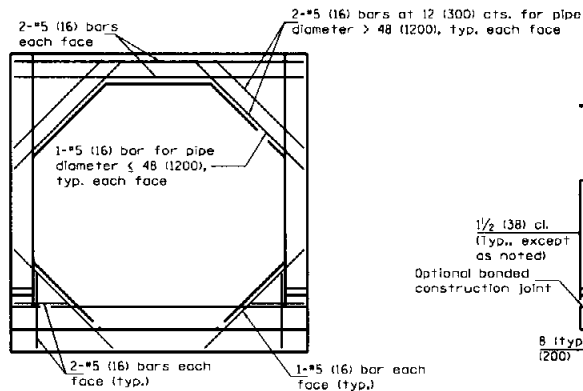
All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

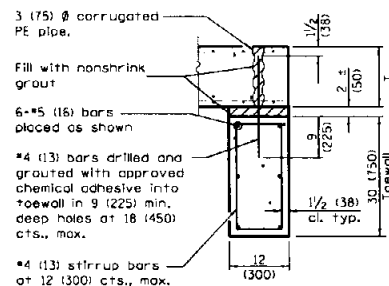
DATE	REVISIONS	CONCRETE END SECTIONS FOR PIPE CULVERTS 15" (375 mm) THRU 84" (2100 mm) DIA.
4-15-16	Added general note for multiple end sections.	
4-1-16	Added note to omit restraint angle and tie plate for mult. end sections.	
		(Sheet 1 of 3)
		STANDARD 542001-06



LONGITUDINAL SECTION
(Showing bottom slab and backwall reinforcement.)



SECTION B-B
(Showing backwall reinforcement only.)
(Pipe omitted for clarity.)

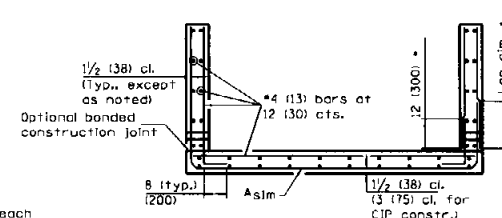


SECTION D-D

LAP DIMENSION

#4 (13) bar = 17 (425)
#5 (16) bar = 21 (525)
#6 (19) bar = 25 (625)

*The Contractor may use lap splices for the sidewall reinforcement at the locations shown.



SECTION C-C

REINFORCEMENT SCHEDULE

Pipe I.D.	Asim	
	Bar Size	Bar Spacing
15	4	12
(375)	(13)	(300)
18	4	12
(450)	(13)	(300)
21	4	12
(525)	(13)	(300)
24	4	12
(600)	(13)	(300)
27	4	12
(675)	(13)	(300)
30	4	12
(750)	(13)	(300)
33	4	12
(825)	(13)	(300)
36	4	12
(900)	(13)	(300)
42	4	8
(1050)	(13)	(200)
48	4	8
(1200)	(13)	(200)
54	5	8
(1350)	(16)	(200)
60	5	8
(1500)	(16)	(200)
66	5	8
(1650)	(16)	(200)
72	6	8
(1800)	(19)	(200)
78	6	8
(1950)	(19)	(200)
84	6	8
(2100)	(19)	(200)

CONCRETE END SECTIONS FOR PIPE CULVERTS
15" (375 mm) THRU 84" (2100 mm) DIA.

(Sheet 2 of 3)

STANDARD 542001-06

Illinois Department of Transportation

APPROVED *[Signature]* April 15, 2016
ENGINEER OF BRIDGES AND STRUCTURES

APPROVED *[Signature]* April 15, 2016
ENGINEER OF DESIGN AND ENVIRONMENT

153155

QUANTITIES

Pipe I.D.	Concrete yd ³ (m ³) ①				Reinforcement Without Lap lbs. (kg)				Reinforcement With Lap lbs. (kg)			
	Slope of End Section				Slope of End Section				Slope of End Section			
	1:2	1:3	1:4	1:6	1:2	1:3	1:4	1:6	1:2	1:3	1:4	1:6
15	1.3	1.7	2.1	2.8	190	230	280	360	210	260	310	410
(375)	(1.0)	(1.3)	(1.6)	(2.1)	(85.2)	(104.1)	(123.3)	(159.2)	(94.9)	(117.6)	(140.3)	(182.9)
18	1.6	2.1	2.6	3.5	230	290	350	450	260	330	400	520
(450)	(1.2)	(1.6)	(2.0)	(2.7)	(104.3)	(131.1)	(158.0)	(207.3)	(114.8)	(146.0)	(177.3)	(234.0)
21	1.8	2.3	2.9	3.9	260	320	380	510	280	360	430	580
(525)	(1.4)	(1.8)	(2.2)	(3.0)	(114.5)	(143.3)	(172.2)	(229.9)	(126.5)	(159.7)	(193.0)	(259.5)
24	2.1	2.7	3.3	4.5	270	350	420	560	300	390	470	630
(600)	(1.6)	(2.1)	(2.5)	(3.4)	(121.9)	(155.8)	(189.3)	(251.5)	(133.9)	(172.8)	(211.6)	(282.6)
27	2.6	3.4	4.2	5.8	350	440	540	740	380	480	600	830
(675)	(2.0)	(2.6)	(3.2)	(4.4)	(155.5)	(198.5)	(244.4)	(336.3)	(169.6)	(217.8)	(269.6)	(373.2)
30	2.9	3.9	4.9	6.8	380	490	600	830	410	530	660	920
(750)	(2.2)	(3.0)	(3.7)	(5.2)	(169.6)	(219.2)	(271.9)	(374.0)	(184.5)	(240.0)	(299.2)	(415.9)
33	3.2	4.3	5.3	7.4	400	520	640	880	430	570	710	970
(825)	(2.4)	(3.3)	(4.1)	(5.7)	(179.7)	(234.9)	(290.3)	(397.6)	(195.2)	(257.2)	(319.0)	(438.9)
36	3.5	4.7	5.9	8.3	440	580	720	990	480	630	780	1090
(900)	(2.7)	(3.6)	(4.5)	(6.3)	(197.8)	(262.4)	(323.8)	(449.4)	(214.2)	(286.1)	(354.0)	(493.7)
42	4.3	5.8	7.3	10.3	570	770	950	1330	620	840	1040	1470
(1050)	(3.3)	(4.4)	(5.6)	(7.9)	(256.4)	(346.4)	(429.0)	(601.3)	(279.4)	(380.0)	(471.6)	(663.7)
48	5.0	6.8	8.6	12.2	670	910	1140	1610	720	990	1240	1760
(1200)	(3.8)	(5.2)	(6.6)	(9.3)	(301.1)	(409.9)	(514.8)	(728.2)	(325.6)	(445.8)	(561.2)	(796.8)
54	6.0	8.2	10.3	14.7	890	1200	1530	2170	990	1340	1710	2440
(1350)	(4.6)	(6.3)	(7.9)	(11.2)	(403.6)	(544.5)	(692.0)	(985.0)	(448.6)	(608.1)	(775.8)	(1108.2)
60	6.8	9.3	11.8	16.8	1020	1400	1780	2530	1120	1550	1980	2820
(1500)	(5.2)	(7.1)	(9.0)	(12.8)	(461.5)	(635.3)	(806.8)	(1149.8)	(508.8)	(704.5)	(896.8)	(1281.5)
66	7.9	10.9	13.8	19.7	1150	1570	2010	2880	1260	1730	2220	3190
(1650)	(6.0)	(8.3)	(10.6)	(15.1)	(519.0)	(712.4)	(911.1)	(1305.8)	(570.2)	(786.1)	(1007.9)	(1449.3)
72	8.8	12.2	15.5	22.2	1520	2120	2690	3880	1710	2400	3050	4410
(1800)	(6.7)	(9.3)	(11.9)	(17.0)	(689.9)	(962.1)	(1222.5)	(1761.3)	(777.0)	(1088.2)	(1384.8)	(2001.0)
78	11.4	15.8	20.1	28.9	1750	2400	3100	4490	1950	2700	3490	5060
(1950)	(8.7)	(12.1)	(15.4)	(22.1)	(791.1)	(1090.7)	(1409.0)	(2039.7)	(885.5)	(1223.1)	(1583.9)	(2298.9)
84	12.6	17.4	22.3	32.1	1900	2680	3430	4960	2120	3000	3840	5560
(2100)	(9.6)	(13.3)	(17.0)	(24.5)	(862.7)	(1217.4)	(1558.6)	(2254.4)	(959.6)	(1359.6)	(1743.2)	(2526.8)

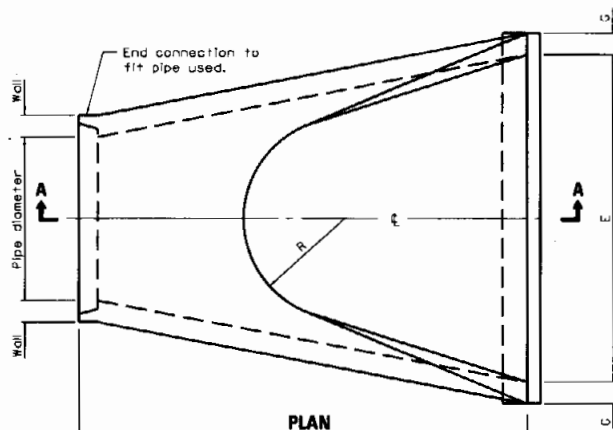
① For cast-in-place construction, increase concrete volumes by approximately 12%.

Illinois Department of Transportation	
APPROVED	APR 11 2016
ENGINEER OF BRIDGES AND STRUCTURES	
APPROVED	APR 11 2016
ENGINEER OF DESIGN AND ENVIRONMENT	

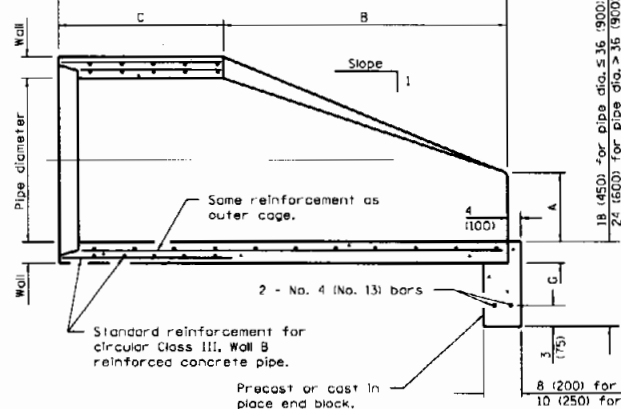
CONCRETE END SECTIONS FOR PIPE CULVERTS
15" (375 mm) THRU 84" (2100 mm) DIA.

(Sheet 3 of 3)

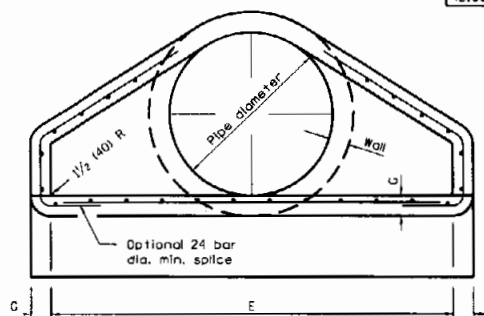
STANDARD 542001-06



PLAN



SECTION A-A



END VIEW

PIPE DIA.	APPROX. QTY. lbs. (kg)	WALL	A	B	C	D	E	G	R	APPROX. SLOPE
12 (300)	530 (240)	2 (51)	4 (102)	24 (610)	4'-0 7/8" (1.241 m)	6'-0 7/8" (1.851 m)	24 (610)	2 (51)	9 (229)	1:2.4
15 (375)	740 (335)	2 1/4 (61)	6 (152)	27 (686)	3'-10" (1.168 m)	6'-1" (1.854 m)	30 (762)	2 1/4 (61)	11 (280)	1:2.4
18 (450)	990 (450)	2 1/2 (64)	9 (229)	27 (686)	3'-10" (1.168 m)	6'-1" (1.854 m)	36 (914)	2 1/2 (64)	12 (305)	1:2.4
21 (525)	1280 (580)	2 3/4 (70)	9 (229)	35 (889)	3'-11" (1.168 m)	6'-1" (1.854 m)	3'-6" (1.067 m)	2 3/4 (70)	13 (330)	1:2.4
24 (600)	1520 (690)	3 (76)	9 1/2 (241)	3'-7 1/2" (1.105 m)	30 (762)	6'-1 1/2" (1.867 m)	4'-0" (1.219 m)	3 (76)	14 (356)	1:2.5
27 (675)	1930 (875)	3 1/4 (83)	10 1/2 (267)	4'-0" (1.219 m)	25 1/2 (648)	6'-1 1/2" (1.867 m)	4'-6" (1.372 m)	3 1/4 (83)	14 1/2 (368)	1:2.4
30 (750)	2190 (995)	3 1/2 (89)	12 (305)	4'-6" (1.375 m)	19 1/4 (502)	6'-1 3/4" (1.874 m)	5'-0" (1.524 m)	3 1/2 (89)	15 (381)	1:2.5
33 (825)	3200 (1450)	3 3/4 (95)	13 1/2 (343)	4'-10 1/2" (1.486 m)	39 1/4 (997)	8'-1 3/4" (2.483 m)	5'-6" (1.676 m)	3 3/4 (95)	17 1/2 (445)	1:2.5
36 (900)	4100 (1860)	4 (102)	15 (381)	5'-3" (1.6 m)	34 1/4 (883)	8'-1 3/4" (2.483 m)	6'-0" (1.829 m)	4 (102)	20 (508)	1:2.5
42 (1050)	5380 (2440)	4 1/2 (114)	21 (533)	5'-3" (1.6 m)	35 (889)	8'-2" (2.489 m)	6'-6" (1.981 m)	4 1/2 (114)	22 (559)	1:2.5
48 (1200)	6550 (2970)	5 (127)	24 (610)	6'-0" (1.829 m)	26 (660)	8'-2" (2.489 m)	7'-0" (2.134 m)	5 (127)	22 (559)	1:2.5
54 (1350)	8240 (3740)	5 1/2 (140)	27 (686)	5'-5" (1.651 m)	35 (889)	8'-4" (2.54 m)	7'-6" (2.286 m)	5 1/2 (140)	24 (610)	1:2.0
60 (1500)	8730 (3960)	6 (152)	35 (889)	5'-0" (1.524 m)	39 (991)	8'-3" (2.515 m)	8'-0" (2.438 m)	6 (152)	*	1:1.9
66 (1650)	10710 (4860)	6 1/2 (165)	30 (762)	6'-0" (1.829 m)	27 (686)	8'-3" (2.515 m)	8'-6" (2.591 m)	6 1/2 (165)	*	1:1.7
72 (1800)	12520 (5680)	7 (178)	36 (914)	6'-6" (1.981 m)	21 (533)	8'-3" (2.514 m)	9'-0" (2.743 m)	7 (178)	*	1:1.8
78 (1950)	14770 (6700)	7 1/2 (191)	36 (914)	7'-6" (2.286 m)	21 (533)	9'-3" (2.819 m)	9'-6" (2.896 m)	7 1/2 (191)	*	1:1.8
84 (2100)	18160 (8240)	8 (203)	36 (914)	7'-6 1/2" (2.299 m)	21 (533)	9'-3 1/2" (2.832 m)	10'-0" (3.048 m)	8 (203)	*	1:1.6

* Radius as furnished by manufacturer

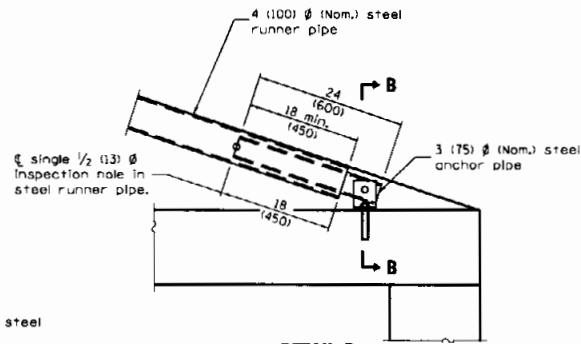
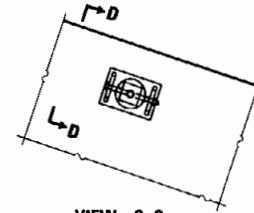
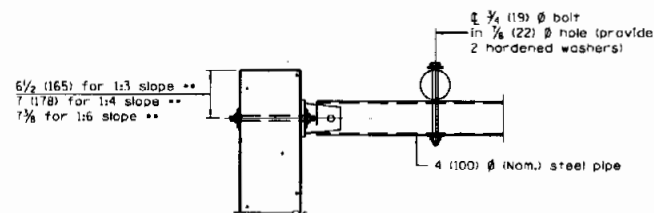
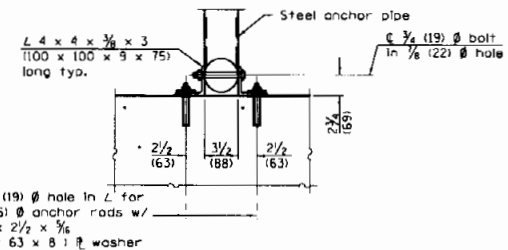
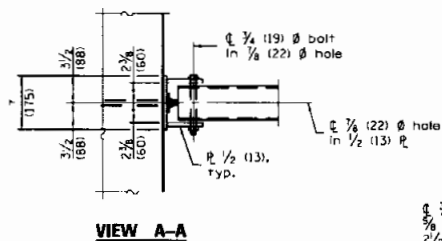
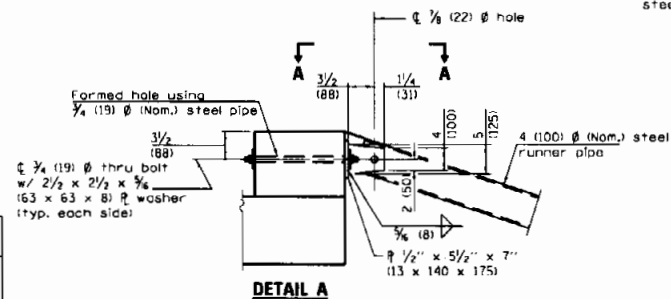
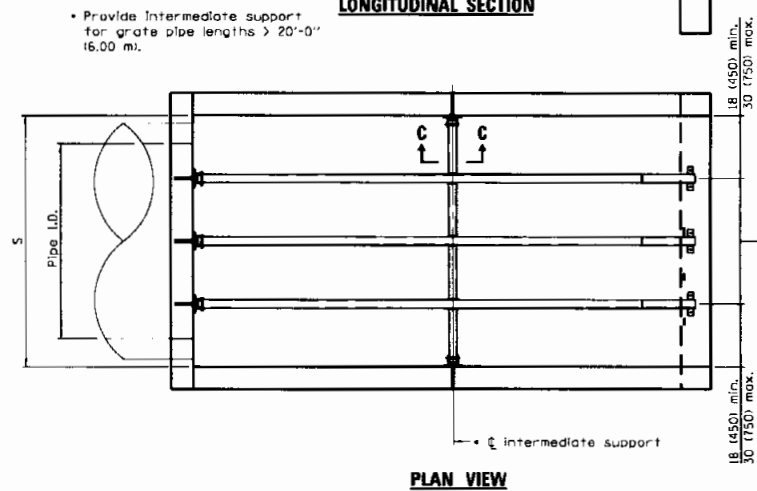
GENERAL NOTES

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
APPROVED January 1, 2011	16-C-1 (01/55)
ENGINEER OF BRIDGES AND STRUCTURES	
APPROVED January 1, 2011	
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS	<p>PRECAST REINFORCED CONCRETE FLARED END SECTION</p> <p>STANDARD 542301-03</p>
1-1-11	Clarified ref. to pipe dia. on Section A-A. Changed	
	"inner" to "outer" cage ref.	
1-1-09	Switched units to English (metric).	



GENERAL NOTES

This standard shall only be used on concrete end sections not skewed more than ± 15 degrees with roadway.

The minimum distance from the center of a hole to the free edge of a structural shape or plate shall be $1\frac{1}{2}$ (38) unless noted otherwise.

All dimensions are in inches (millimeters) unless otherwise shown.

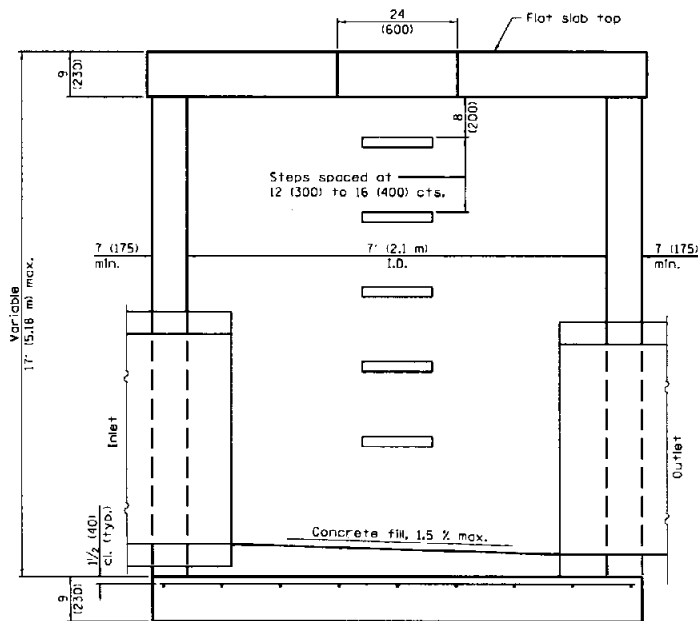
DATE	REVISIONS	<p>TRAVERSABLE PIPE GRATE</p> <p>(Sheet 1 of 2)</p> <p>STANDARD 542311-06</p>
4-1-16	Corrected typo.	
1-1-14	Added 27 (675) pipe culvert to sched. Modified dimension in SECTION D-D.	

PIPE-GRADE SCHEDULE FOR PIPE CULVERT END SECTIONS

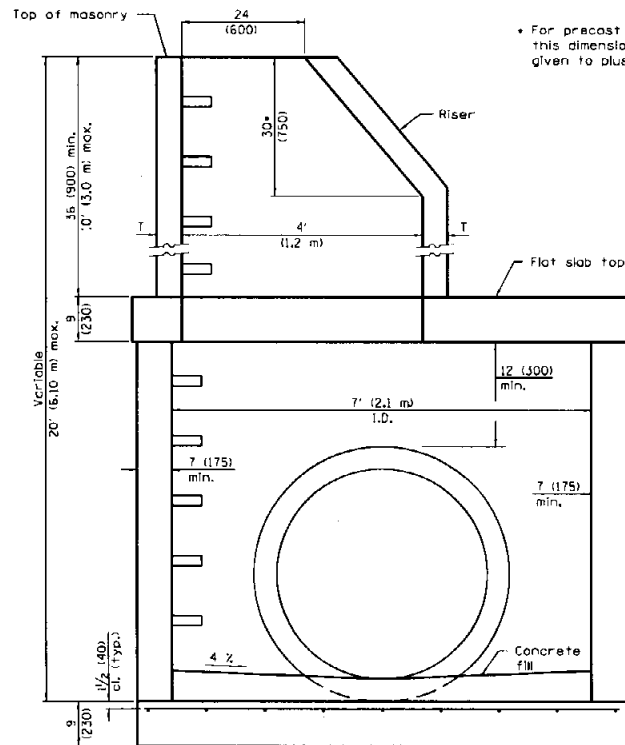
Pipe I.D.	Slope of End Section								
	1:3			1:4			1:6		
	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe
27	1 @ 9'-8"	N/A	9'-8"	1 @ 12'-11"	N/A	12'-11"	1 @ 19'-7"	N/A	19'-7"
(675)	1 @ (2.95 m)	N/A	(2.95 m)	1 @ (3.94 m)	N/A	(3.94 m)	1 @ (5.97 m)	N/A	(5.97 m)
30	1 @ 11'-4"	N/A	11'-4"	1 @ 14'-10"	N/A	14'-10"	1 @ 21'-10"	1 @ 3'-6"	25'-4"
(750)	1 @ (3.43 m)	N/A	(3.43 m)	1 @ (4.52 m)	N/A	(4.52 m)	1 @ (6.65 m)	1 @ (1.07 m)	(7.72 m)
33	1 @ 12'-1"	N/A	12'-1"	1 @ 15'-10"	N/A	15'-10"	1 @ 23'-5"	1 @ 3'-7"	27'-0"
(825)	1 @ (3.68 m)	N/A	(3.68 m)	1 @ (4.83 m)	N/A	(4.83 m)	1 @ (7.14 m)	1 @ (1.09 m)	(8.23 m)
36	1 @ 12'-10"	N/A	12'-10"	1 @ 16'-10"	N/A	16'-10"	1 @ 24'-11"	2 @ 3'-11"	32'-9"
(900)	1 @ (3.91 m)	N/A	(3.91 m)	1 @ (5.13 m)	N/A	(5.13 m)	1 @ (7.59 m)	2 @ (1.19 m)	(9.97 m)
42	2 @ 14'-9"	N/A	29'-6"	2 @ 19'-3"	N/A	38'-6"	2 @ 28'-6"	2 @ 4'-7"	66'-2"
(1050)	2 @ (4.50 m)	N/A	(9.00 m)	2 @ (5.87 m)	N/A	(11.74 m)	2 @ (8.69 m)	2 @ (1.40 m)	(120.18 m)
48	2 @ 16'-4"	N/A	32'-8"	2 @ 21'-4"	1 @ 5'-1"	47'-9"	2 @ 31'-6"	2 @ 5'-1"	73'-2"
(1200)	2 @ (4.98 m)	N/A	(9.96 m)	2 @ (6.50 m)	1 @ (1.55 m)	(14.55 m)	2 @ (9.60 m)	2 @ (1.55 m)	(22.30 m)
54	2 @ 18'-2"	N/A	36'-4"	2 @ 23'-9"	2 @ 5'-9"	59'-0"	2 @ 35'-1"	4 @ 5'-9"	93'-2"
(1350)	2 @ (5.54 m)	N/A	(11.08 m)	2 @ (7.24 m)	2 @ (1.75 m)	(16.23 m)	2 @ (10.69 m)	4 @ (1.75 m)	(28.38 m)
60	2 @ 19'-9"	N/A	39'-6"	2 @ 25'-10"	3 @ 6'-3"	70'-5"	2 @ 38'-1"	4 @ 6'-3"	101'-2"
(1500)	2 @ (6.02 m)	N/A	(12.04 m)	2 @ (7.87 m)	3 @ (1.91 m)	(21.47 m)	2 @ (11.61 m)	4 @ (1.91 m)	(30.86 m)
66	2 @ 21'-7"	2 @ 6'-11"	51'-0"	2 @ 28'-2"	3 @ 6'-11"	77'-1"	2 @ 41'-11"	5 @ 6'-11"	127'-5"
(1650)	2 @ (6.58 m)	2 @ (2.11 m)	(17.38 m)	2 @ (8.59 m)	3 @ (2.11 m)	(23.51 m)	2 @ (12.78 m)	5 @ (2.11 m)	(36.11 m)
72	3 @ 23'-2"	2 @ 7'-5"	84'-4"	3 @ 30'-3"	3 @ 7'-5"	113'-0"	3 @ 44'-8"	5 @ 7'-5"	171'-1"
(1800)	3 @ (7.06 m)	2 @ (2.26 m)	(25.70 m)	3 @ (9.22 m)	3 @ (2.26 m)	(34.44 m)	3 @ (13.61 m)	5 @ (2.26 m)	(52.13 m)
78	3 @ 25'-0"	3 @ 8'-1"	99'-3"	3 @ 32'-8"	4 @ 8'-1"	130'-4"	3 @ 48'-3"	6 @ 8'-1"	193'-3"
(1950)	3 @ (7.62 m)	3 @ (2.46 m)	(30.24 m)	3 @ (9.96 m)	4 @ (2.46 m)	(39.72 m)	3 @ (14.71 m)	6 @ (2.46 m)	(58.89 m)
84	3 @ 26'-7"	3 @ 8'-7"	105'-6"	3 @ 34'-9"	4 @ 8'-7"	138'-3"	3 @ 51'-3"	6 @ 8'-7"	206'-3"
(2100)	3 @ (8.10 m)	3 @ (2.62 m)	(32.16 m)	3 @ (10.59 m)	4 @ (2.62 m)	(42.25 m)	3 @ (15.62 m)	6 @ (2.62 m)	(62.58 m)

PIPE-GRADE SCHEDULE FOR ELLIPTICAL PIPE CULVERT END SECTIONS

Pipe I.D. (Equiv. Round)	Slope of End Section								
	1:3			1:4			1:6		
	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe	Main Pipe No. / Length	Int. Support No. / Length	Total Length of Pipe
21	1 @ 8'-2"	N/A	8'-2"	1 @ 11'-2"	N/A	11'-2"	1 @ 17'-5"	N/A	17'-5"
(525)	1 @ (2.49 m)	N/A	(2.49 m)	1 @ (3.40 m)	N/A	(3.40 m)	1 @ (5.31 m)	N/A	(5.31 m)
24	1 @ 8'-2"	N/A	8'-2"	1 @ 11'-2"	N/A	11'-2"	1 @ 17'-5"	N/A	17'-5"
(600)	1 @ (2.49 m)	N/A	(2.49 m)	1 @ (3.40 m)	N/A	(3.40 m)	1 @ (5.31 m)	N/A	(5.31 m)
27	1 @ 8'-11"	N/A	8'-11"	1 @ 12'-2"	N/A	12'-2"	1 @ 18'-11"	N/A	18'-11"
(675)	1 @ (2.72 m)	N/A	(2.72 m)	1 @ (3.71 m)	N/A	(3.71 m)	1 @ (5.77 m)	N/A	(5.77 m)
30	1 @ 9'-5"	N/A	9'-5"	1 @ 12'-11"	N/A	12'-11"	1 @ 19'-11"	N/A	19'-11"
(750)	1 @ (2.87 m)	N/A	(2.87 m)	1 @ (3.94 m)	N/A	(3.94 m)	1 @ (6.07 m)	N/A	(6.07 m)
36	2 @ 11'-0"	N/A	22'-0"	2 @ 14'-11"	N/A	29'-10"	2 @ 22'-11"	1 @ 4'-7"	50'-5"
(900)	2 @ (3.35 m)	N/A	(6.70 m)	2 @ (4.55 m)	N/A	(9.10 m)	2 @ (6.99 m)	1 @ (1.40 m)	(15.38 m)
42	2 @ 12'-4"	N/A	24'-8"	2 @ 16'-8"	N/A	33'-4"	2 @ 25'-6"	2 @ 5'-5"	61'-10"
(1050)	2 @ (3.76 m)	N/A	(7.52 m)	2 @ (5.08 m)	N/A	(10.16 m)	2 @ (7.77 m)	2 @ (1.65 m)	(18.84 m)
48	2 @ 13'-8"	N/A	27'-4"	2 @ 18'-5"	N/A	36'-10"	2 @ 28'-0"	3 @ 6'-1"	64'-3"
(1200)	2 @ (4.17 m)	N/A	(8.34 m)	2 @ (5.61 m)	N/A	(11.22 m)	2 @ (8.53 m)	3 @ (1.85 m)	(22.61 m)
54	2 @ 15'-0"	N/A	30'-0"	2 @ 20'-1"	2 @ 6'-9"	53'-8"	2 @ 30'-7"	3 @ 6'-9"	81'-5"
(1350)	2 @ (4.75 m)	N/A	(9.50 m)	2 @ (6.12 m)	2 @ (2.06 m)	(16.36 m)	2 @ (9.32 m)	3 @ (2.06 m)	(24.82 m)
60	3 @ 16'-7"	N/A	49'-9"	3 @ 22'-2"	2 @ 7'-7"	81'-8"	3 @ 33'-7"	4 @ 7'-7"	131'-1"
(1500)	3 @ (5.05 m)	N/A	(15.15 m)	3 @ (6.76 m)	2 @ (2.31 m)	(24.90 m)	3 @ (10.24 m)	4 @ (2.31 m)	(39.96 m)
66	3 @ 17'-11"	N/A	53'-9"	3 @ 23'-11"	2 @ 8'-3"	88'-3"	3 @ 36'-2"	4 @ 8'-3"	141'-6"
(1650)	3 @ (5.46 m)	N/A	(16.38 m)	3 @ (7.29 m)	2 @ (2.51 m)	(26.89 m)	3 @ (11.02 m)	4 @ (2.51 m)	(43.10 m)
72	3 @ 19'-6"	N/A	58'-6"	3 @ 25'-11"	3 @ 8'-11"	104'-6"	3 @ 39'-2"	4 @ 8'-11"	153'-2"
(1800)	3 @ (5.94 m)	N/A	(17.82 m)	3 @ (7.90 m)	3 @ (2.72 m)	(31.86 m)	3 @ (11.94 m)	4 @ (2.72 m)	(46.70 m)

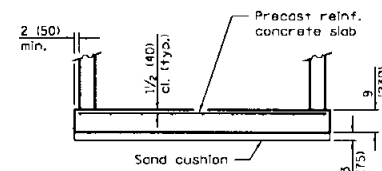
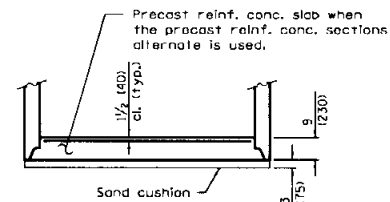


ELEVATION
(With Flat Slab Top Only)



ELEVATION
(With Flat Slab Top and Riser)

* For precast reinforced concrete sections, this dimension may vary from the dimension given to plus 6 (150).



ALTERNATE BOTTOM SLABS

GENERAL NOTES

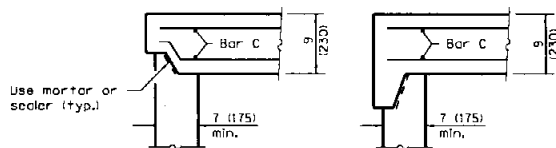
Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.

Bottom slabs shall be reinforced with a minimum of 0.31 sq. in./ft. (660 sq. mm/m) in both directions with a maximum spacing of 12 (300).

Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise shown.



ALTERNATE JOINT CONFIGURATIONS

ALTERNATE MATERIALS FOR RISER WALLS	T (min)
Concrete Masonry Units	5 (125)
Precast Reinforced Concrete Sections	4 (100)
Cast-in-Place Concrete	6 (150)

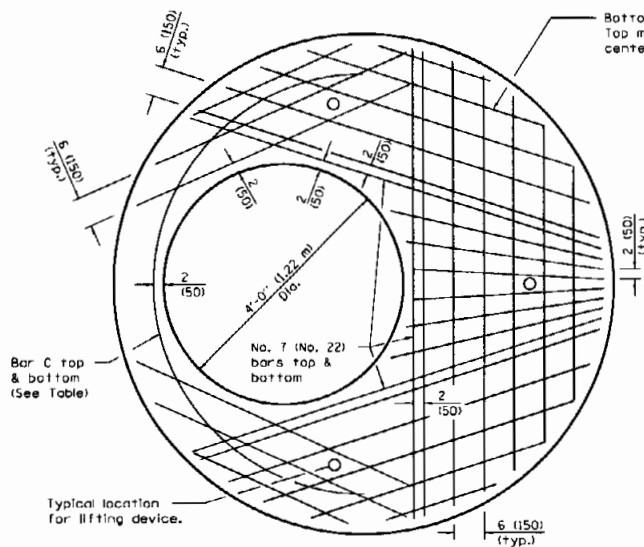
Illinois Department of Transportation	
PASSED	April 1, 2016
ENGINEER OF POLICY AND PROCEDURES	
APPROVED	April 1, 2016
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
4-1-16	Changed terminology to 'welded wire reinforcement'.
1-1-14	Increased maximum heights.
	Revised General Notes.

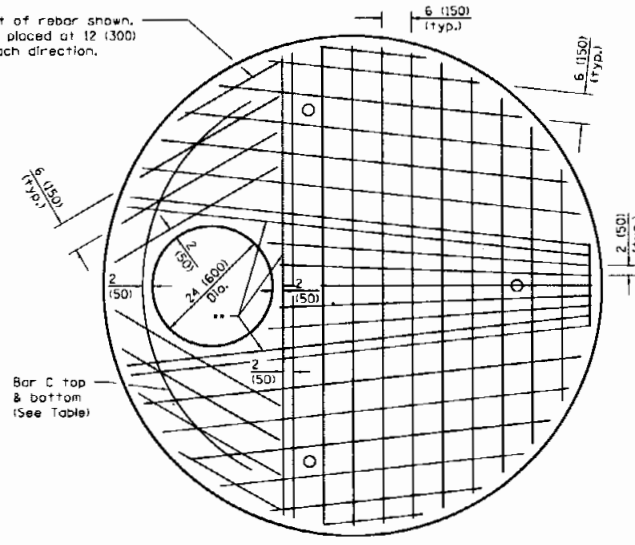
MANHOLE TYPE A 7' (2.1 m) DIAMETER

(Sheet 1 of 2)

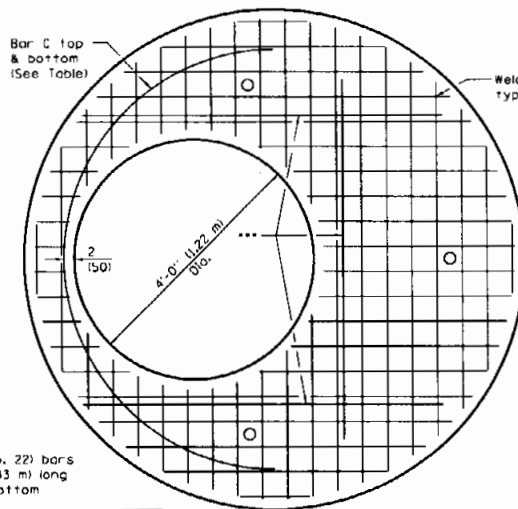
STANDARD 602411-05



PLAN
Showing Rebar Reinforcement

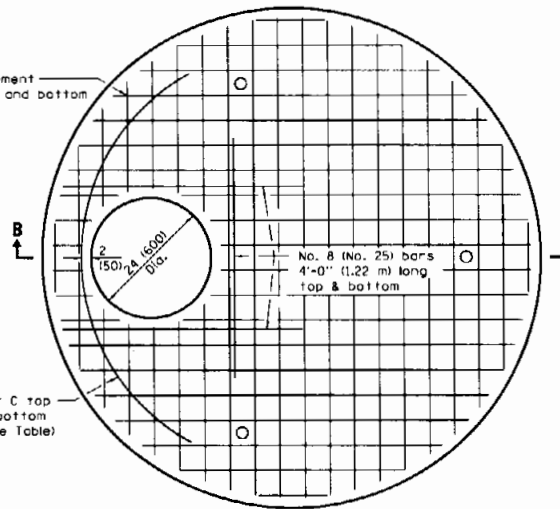


*** No. 8 (No. 25) bars
top & bottom



*** No. 7 (No. 22) bars
6'-0" (1.83 m) long
top & bottom

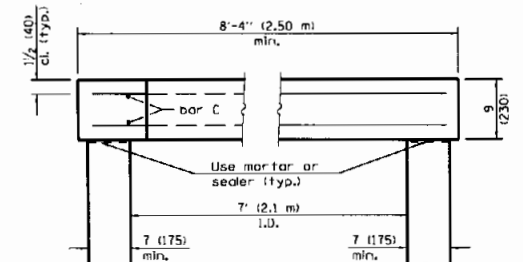
PLAN
Showing Welded Wire Reinforcement



Bar C top
& bottom
(See Table)

Diameter of opening	Reinforcement Bar Size	Reinforcement "As" WWR each direction	No. 4 (No. 13) Bar C	
			Length	Radius
24 (600)	Bottom mat No. 8 (No. 25)	Bottom mat **** 1.57 sq. in./ft. (3325 sq. mm/m)	7'-6"	3'-6"
	Top mat No. 4 (No. 13)	Top mat **** 0.20 sq. in./ft. (425 sq. mm/m)	12.30 m (1.067 m)	
4'-0" (1.2 m)	Bottom mat No. 7 (No. 22)	Bottom mat **** 1.20 sq. in./ft. (2540 sq. mm/m)	11'-0"	3'-6"
	Top mat No. 4 (No. 13)	Top mat **** 0.20 sq. in./ft. (425 sq. mm/m)	13.35 m (1.067 m)	

**** A maximum of two layers of welded wire reinforcement may be used to satisfy the required "As" for each mat.



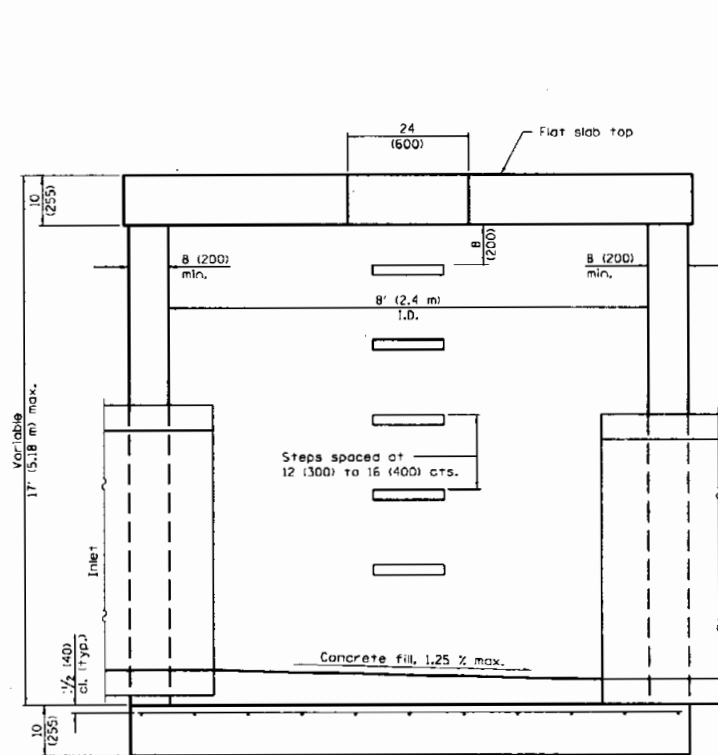
SECTION B-B
(Typical of each top)

MANHOLE TYPE A
7' (2.1 m) DIAMETER

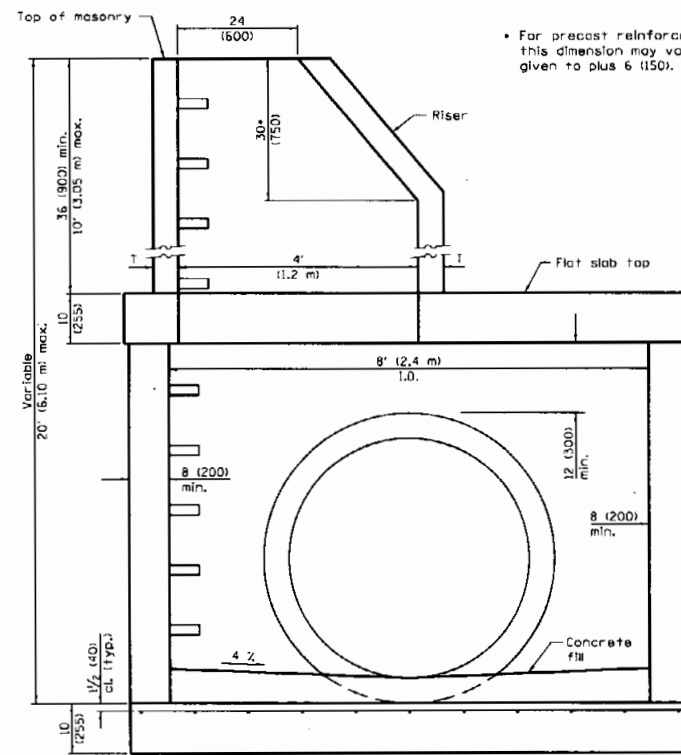
(Sheet 2 of 2)

STANDARD 602411-04

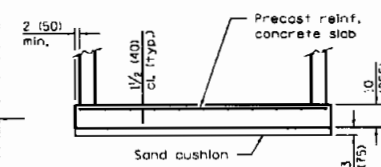
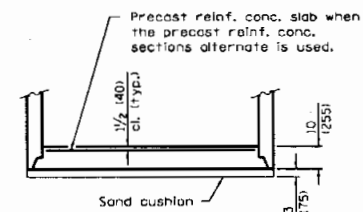
Illinois Department of Transportation	
PASSED	April 1, 2016
ENGINEER OF POLICY AND PROCEDURES	
APPROVED	April 1, 2016
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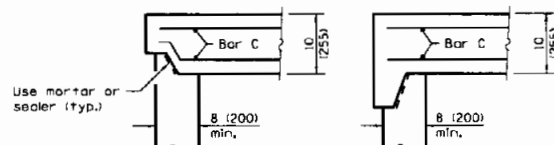
ELEVATION
(With Flat Slab Top Only)



ELEVATION
(With Flat Slab Top and Riser)



ALTERNATE BOTTOM SLABS



ALTERNATE JOINT CONFIGURATIONS

ALTERNATE MATERIALS FOR RISER WALLS	T (min)
Concrete Masonry Units	5 (125)
Precast Reinforced Concrete Sections	4 (100)
Cast-in-Place Concrete	6 (150)

GENERAL NOTES

Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.

Bottom slabs shall be reinforced with a minimum of 0.34 sq. in./ft. (720 sq. mm/m) in both directions, with a maximum spacing of 11 (280).

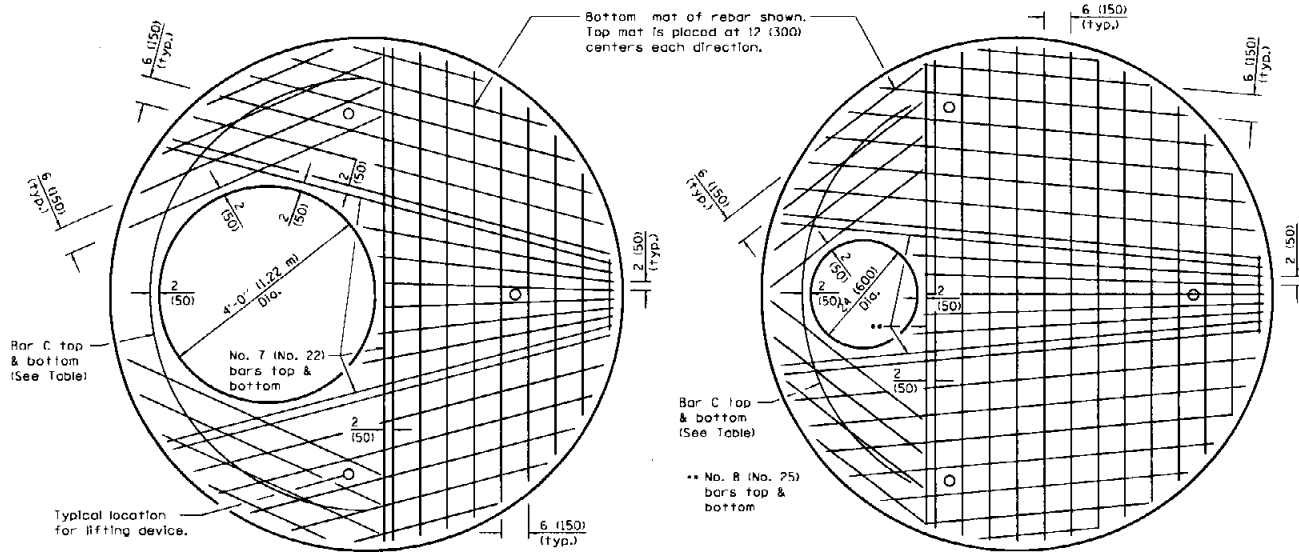
Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS	MANHOLE TYPE A 8' (2.4 m) DIAMETER (Sheet 1 of 2) STANDARD 602416-05
4-1-16	Changed terminology to 'welded wire reinforcement'.	
1-1-14	Increased maximum heights.	
	Revised General Notes.	

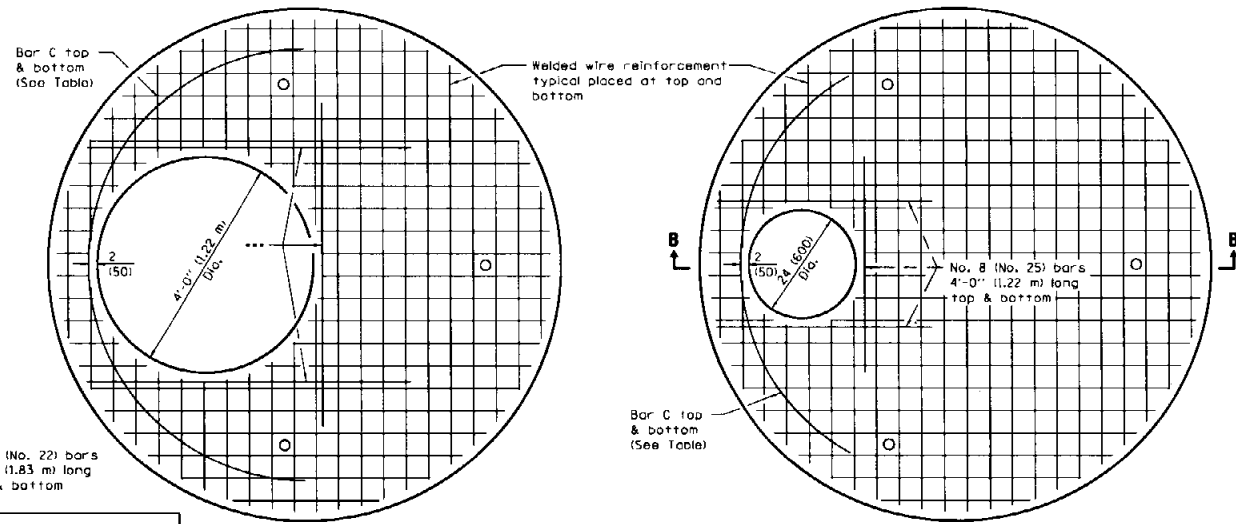
Illinois Department of Transportation	
PASSED	April 1, 2016
Michael Beard ENGINEER OF POLICY AND PROCEDURES	
APPROVED	April 1, 2016
[Signature] ENGINEER OF DESIGN AND ENVIRONMENT	



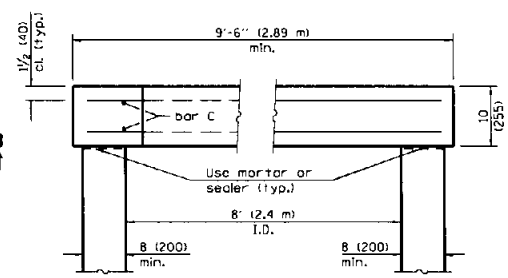
PLAN
Showing Rebar Reinforcement

Diameter of opening	Reinforcement Bar Size	Reinforcement "As" WWR each direction	No. 4 (No. 13) Bar C length	Radius
24 (600)	Bottom mat No. 8 (No. 25)	Bottom mat **** 1.57 sq. in./ft. (3325 sq. mm/m)	8'-6" (2.60 m)	4'-0" (1.219 m)
	Top mat No. 4 (No. 13)	Top mat **** 0.22 sq. in./ft. (470 sq. mm/m)		
4'-0" (1.2 m)	Bottom mat No. 7 (No. 22)	Bottom mat **** 1.20 sq. in./ft. (2540 sq. mm/m)	12'-6" (3.80 m)	4'-0" (1.219 m)
	Top mat No. 4 (No. 13)	Top mat **** 0.22 sq. in./ft. (470 sq. mm/m)		

**** A maximum of two layers of welded wire reinforcement may be used to satisfy the required "As" for each mat.



PLAN
Showing Welded Wire Reinforcement



SECTION B-B

Illinois Department of Transportation

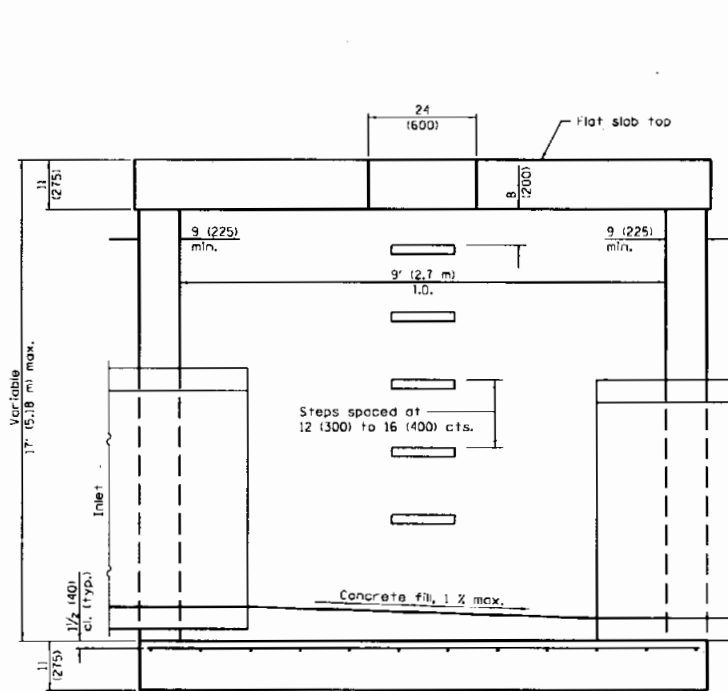
PASSED April 1, 2016

ENGINEER OF POLICY AND PROCEDURES

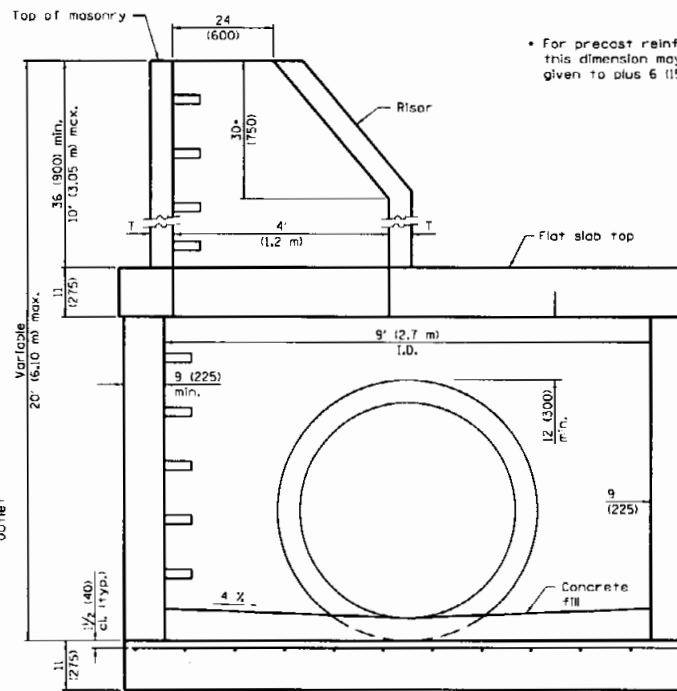
APPROVED April 1, 2016

ENGINEER OF DESIGN AND ENVIRONMENT

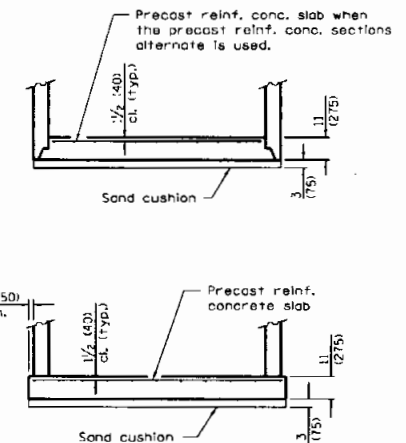
MANHOLE TYPE A
8' (2.4 m) DIAMETER
(Sheet 2 of 2)
STANDARD 602416-05



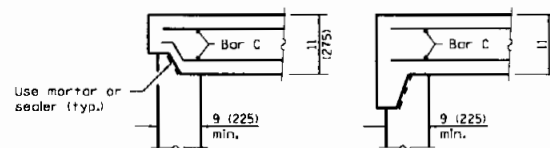
ELEVATION
(With Flat Slab Top Only)



ELEVATION
(With Flat Slab Top and Riser)



ALTERNATE BOTTOM SLABS



ALTERNATE JOINT CONFIGURATIONS

ALTERNATE MATERIALS FOR RISER WALLS	T (min)
Concrete Masonry Units	5 (125)
Precast Reinforced Concrete Sections	4 (100)
Cast-In-Place Concrete	6 (150)

GENERAL NOTES

Joint configuration and dimensions of flat slab top shall match and fit the riser joint detail.

Bottom slabs shall be reinforced with a minimum of 0.31 sq. in./ft. (180 sq. mm/m) in both directions with a maximum spacing of 10 (250).

Bottom slabs may be connected to the riser as determined by the fabricator; however, only a single row of reinforcement around the perimeter may be utilized.

See Standard 602701 for details of manhole steps.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
4-1-16	Changed terminology to "welded wire reinforcement".
1-1-14	Increased maximum heights.
	Revised General Notes.

MANHOLE TYPE A
9' (2.7 m) DIAMETER

(Sheet 1 of 2)

STANDARD 602421-05

Illinois Department of Transportation

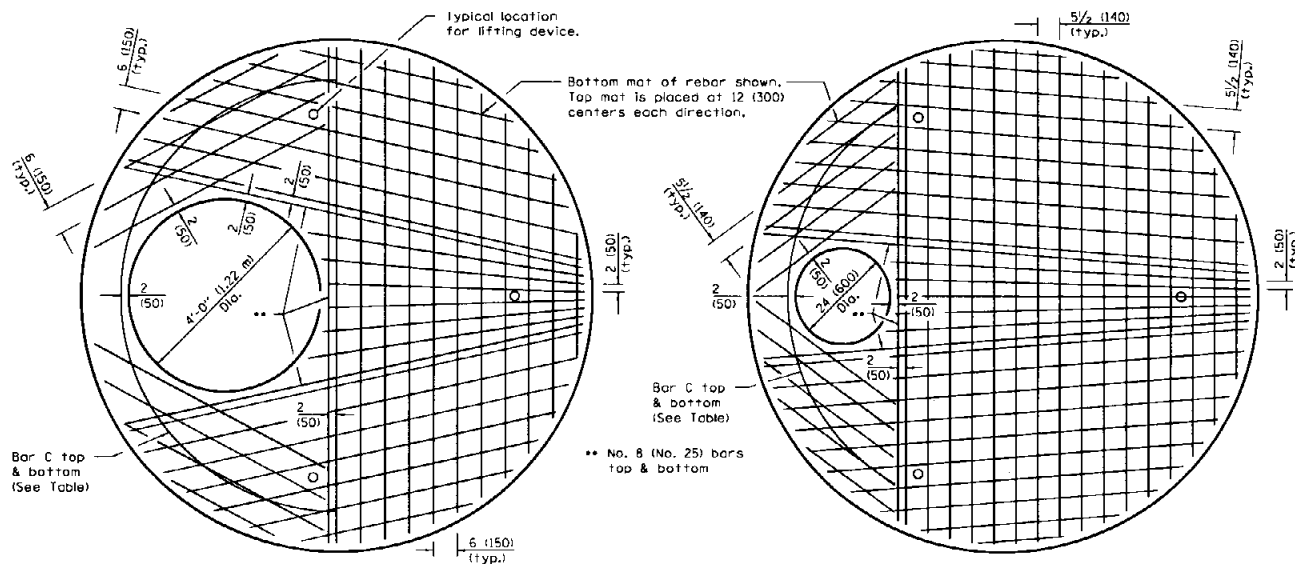
PASSED April 1, 2016

ENGINEER OF POLICY AND PROCEDURES

APPROVED April 1, 2016

ENGINEER OF DESIGN AND ENVIRONMENT

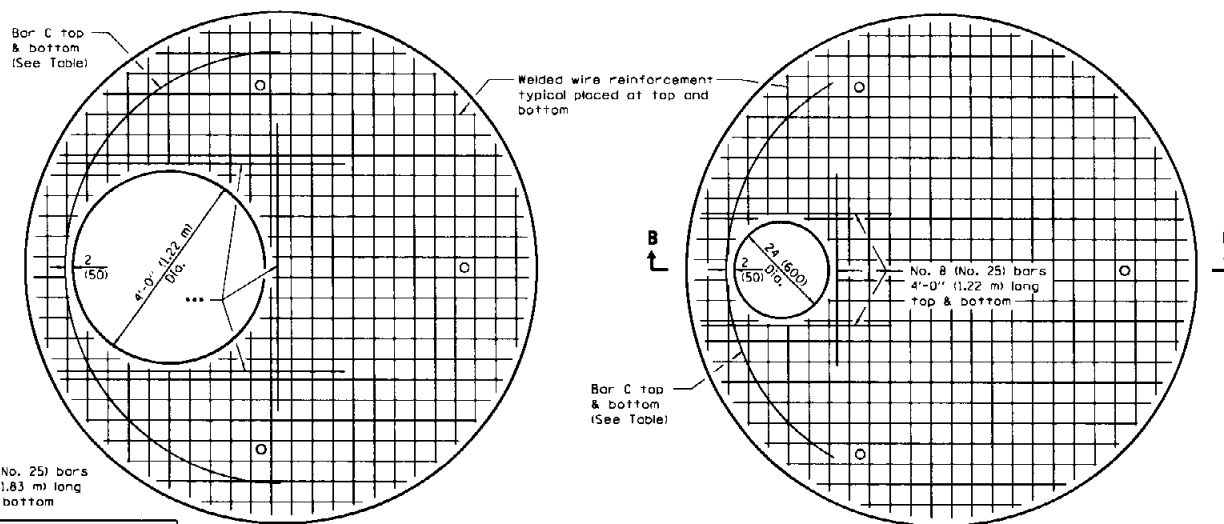
30-1-a (07/05)



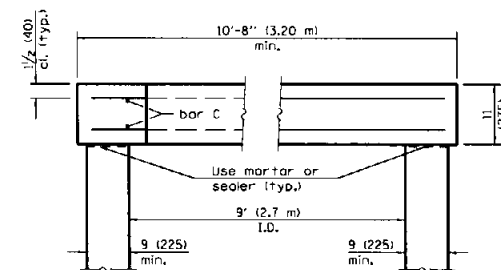
PLAN
Showing Rebar Reinforcement

Diameter of opening	Reinforcement Bar Size	Reinforcement "As" WWR each direction	No. 4 (No. 13) Bar C	
			length	Radius
24 (600)	Bottom mat No. 8 (No. 25)	Bottom mat **** 1.71 sq. in./ft. (3620 sq. mm/m)	9'-6" (2.90 m)	4'-6" (1.37 m)
	Top mat No. 4 (No. 13)	Top mat **** 0.24 sq. in./ft. (510 sq. mm/m)		
	Bottom mat No. 8 (No. 25)	Bottom mat **** 1.57 sq. in./ft. (3325 sq. mm/m)	14'-2" (4.30 m)	4'-6" (1.37 m)
	Top mat No. 4 (No. 13)	Top mat **** 0.24 sq. in./ft. (510 sq. mm/m)		

**** A maximum of two layers of welded wire reinforcement may be used to satisfy the required "As" for each mat.



PLAN
Showing Welded Wire Reinforcement



SECTION B-B

Illinois Department of Transportation

PASSED April 1, 2016

ENGINEER OF POLICY AND PROCEDURES

APPROVED April 1, 2016

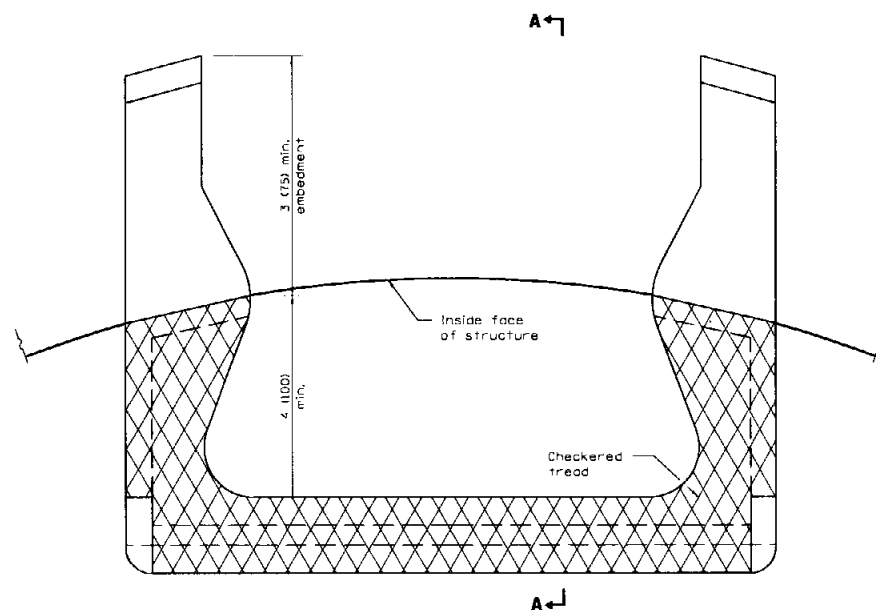
ENGINEER OF DESIGN AND ENVIRONMENT

MANHOLE TYPE A
9' (2.7 m) DIAMETER

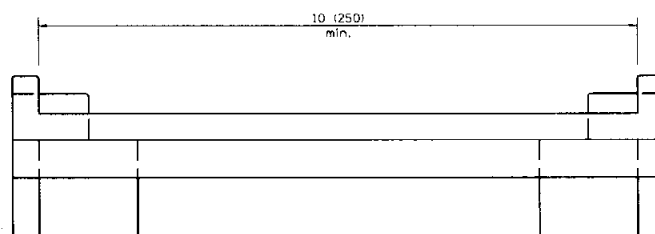
(Sheet 2 of 2)

STANDARD 602421-05

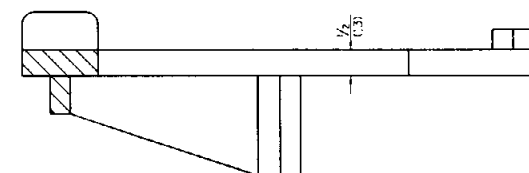
CAST IRON STEPS



PLAN VIEW



ELEVATION VIEW



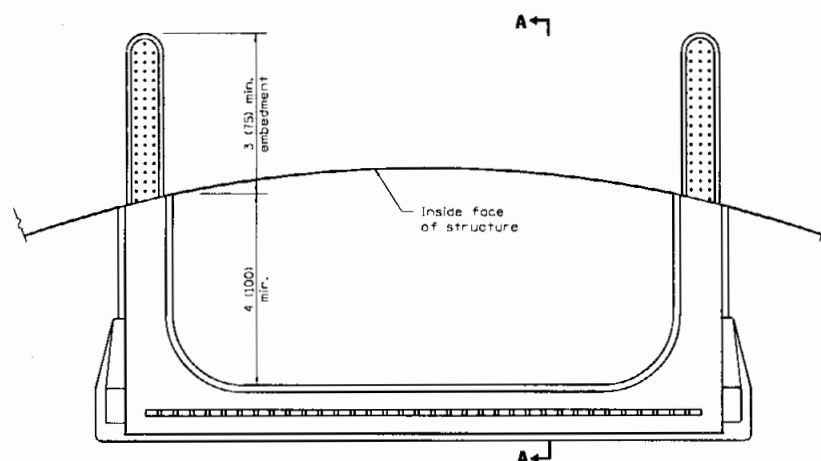
SECTION A-A

All dimensions are in inches (millimeters) unless otherwise shown.

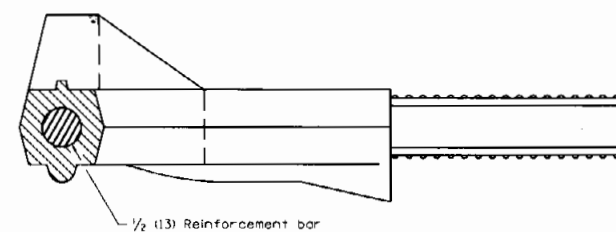
Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF POLICY AND PROCEDURES	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS	MANHOLE STEPS
1-1-09	Switched units to English (metric).	
4-1-06	Revised title, drawings, and added plastic steps on sheet 2.	
		(Sheet 1 of 2)
		STANDARD 602701-02

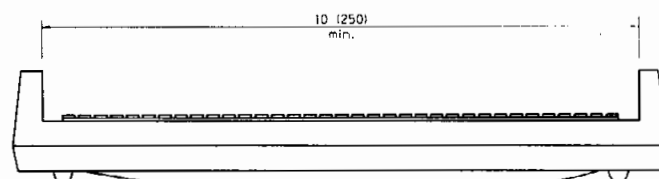
PLASTIC STEPS



PLAN VIEW



SECTION A-A



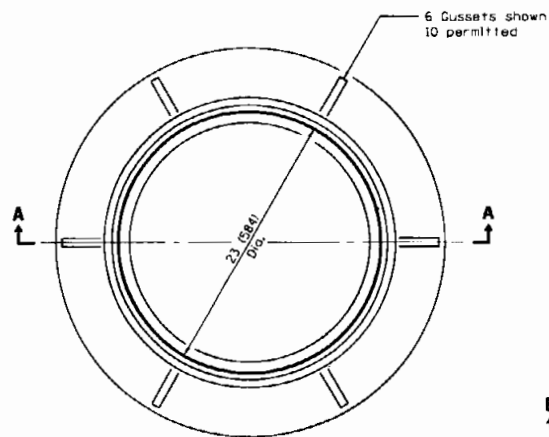
ELEVATION VIEW

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF POLICY AND PROCEDURES	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

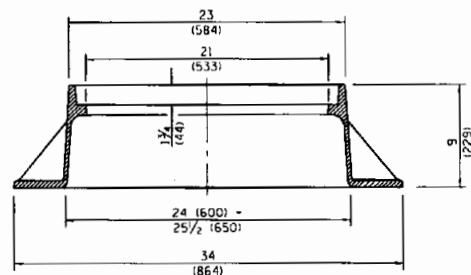
MANHOLE STEPS

(Sheet 2 of 2)

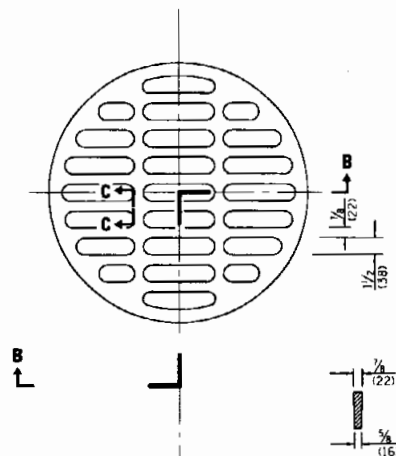
STANDARD 602701-02



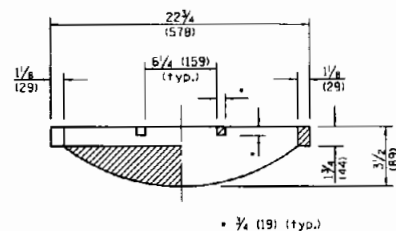
CAST FRAME



SECTION A-A
Gray Iron

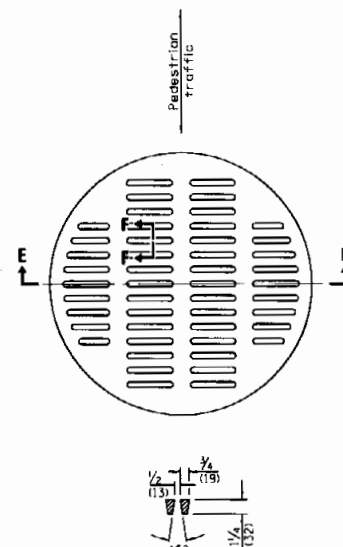


SECTION C-C

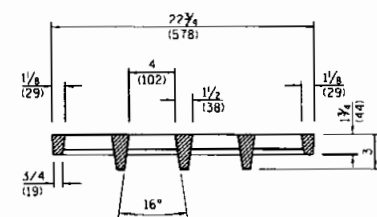


SECTION B-B

CAST OPEN LID

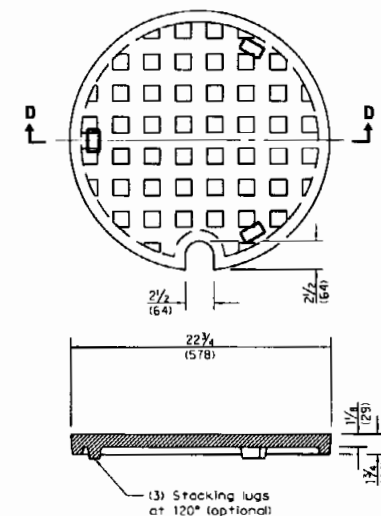


SECTION F-F



SECTION E-E

**ADA COMPLIANT
CAST OPEN LID**



SECTION D-D

CAST CLOSED LID
Gray Iron Lid

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

PASSED January 1, 2015

ENGINEER OF POLICY AND PROCEDURES

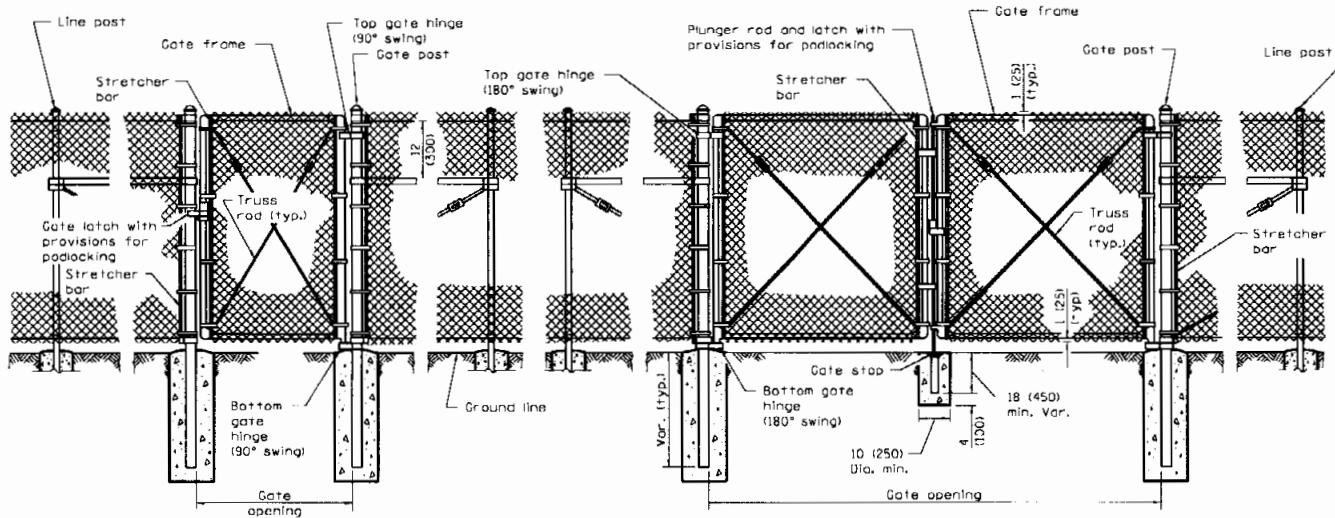
APPROVED January 1, 2015

ENGINEER OF DESIGN AND ENVIRONMENT

DATE	REVISIONS
1-1-15	Revised dimensioning of frame. Added ADA compliant open lid.
1-1-09	Switched units to English (metric).

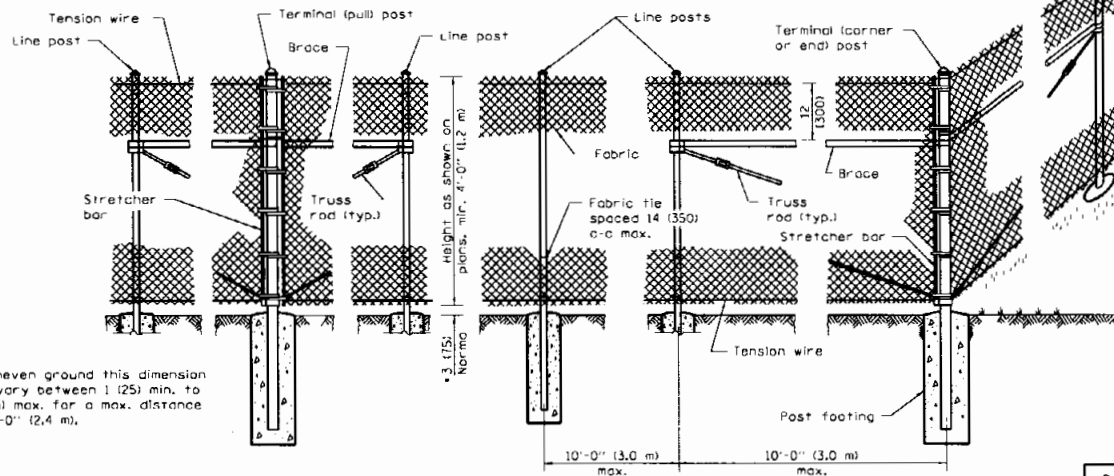
**FRAME AND LIDS
TYPE 1**

STANDARD 604001-04



**PEDESTRIAN GATE
ARRANGEMENT**

**VEHICLE GATE
ARRANGEMENT**

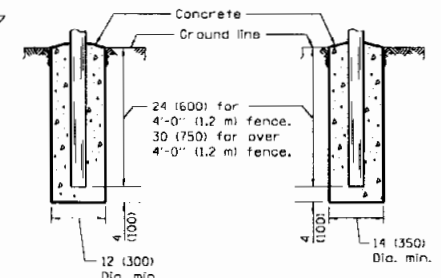


* On uneven ground this dimension may vary between 1 (25) min. to 5 (125) max. for a max. distance of 8'-0" (2.4 m).

**PULL POST
ARRANGEMENT**

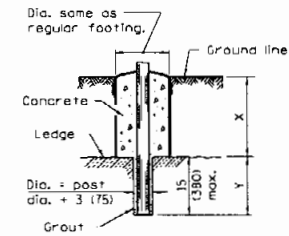
**LINE POST
ARRANGEMENT**

**CORNER OR END POST
ARRANGEMENT**



**FOOTING FOR
LINE POST**

**FOOTING FOR GATE
& TERMINAL POST**



**FOOTING FOR POST IN
ROCK LEDGE**

GENERAL NOTES

Pull posts shall be placed at locations determined by the Engineer. They shall be placed at 660' (200 m) intervals between posts to which the ends of the fabric are clamped or midway between such posts when the distance is less than 1320' (400 m) and greater than 660' (200 m).

X + Y shall not exceed 24 (600), 30 (750), or 36 (900), as applicable. When X is 0 - 9 (0 - 225), 15 (380), or 21 (525), then Y = 15 (375) and the post shall be shortened as required. When X exceeds 9 (225), 15 (380), or 21 (525), then Y shall be decreased correspondingly.

All dimensions are in inches (millimeters) unless otherwise shown.

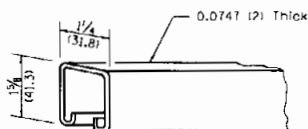
Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF POLICY AND PROCEDURES	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-99	Rev. "pans" to "plans" in LINE POST ARRANGEMENT.

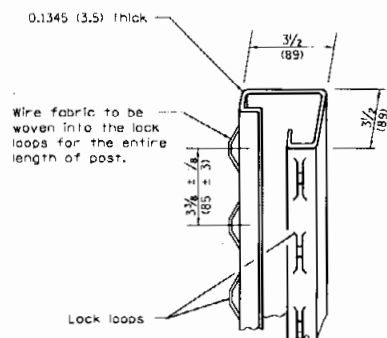
CHAIN LINK FENCE

(Sheet 1 of 3)

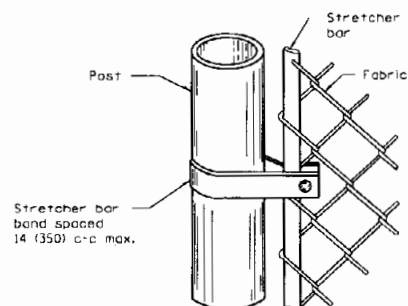
STANDARD 664001-02



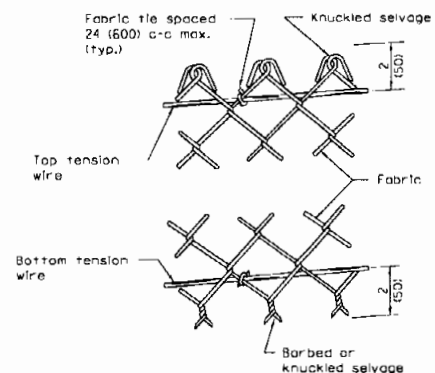
**ROLL FORMED
SECTION OF BRACE**



**ROLL FORMED SECTION OF
TERMINAL & GATE POST**



**METHOD OF FASTENING
STRETCHER BAR TO POST**



**METHOD OF TYING
FABRIC TO TENSION WIRES**

LINE POST	
Section	lbs./ft. (kg/m)
Pipe Type A 1.90 (48.3) O.D.	2.72 (4.05)
Pipe Type B 1.90 (48.3) O.D.	2.28 (3.39)
Pipe Type C 1.90 (48.3) O.D.	2.26 (3.36)
H 1.875x1.625 (47.6x41.3)	2.72 (4.05)
□	1.60 (2.38)
I	2.30 (3.42)

TERMINAL POST	
Section	lbs./ft. (kg/m)
Pipe Type A 2.375 (60.3) O.D.	3.65 (5.43)
Pipe Type B 2.375 (60.3) O.D.	3.11 (4.63)
Pipe Type C 2.375 (60.3) O.D.	3.08 (4.60)
Roll Formed 3 1/2 x 3 1/2 (89.0x89.0)	See detail
Sq. Tubing 2 1/2 x 2 1/2 (63.5x63.5)	4.32 (6.43)

HORIZONTAL BRACES	
Section	lbs./ft. (kg/m)
Pipe Type A 1.66 (42.2) O.D.	2.27 (3.38)
Pipe Type B 1.66 (42.2) O.D.	1.83 (2.72)
Pipe Type C 1.66 (42.2) O.D.	1.92 (2.71)
H 1.31x1.5 (33.3x38.1)	2.25 (3.35)
Roll Formed 1 3/8 x 1 1/4 (41.3x31.8)	See detail

GATE FRAMES	
Section	lbs./ft. (kg/m)
Pipe Type A 1.66 (42.2) O.D.	2.27 (3.38)
Pipe Type B 1.66 (42.2) O.D.	1.83 (2.72)
Pipe Type C 1.66 (42.2) O.D.	1.82 (2.71)

GATE POSTS *							
Gate Opening • ft. (m)		Pipe Type A		Sq. Tubing		Pipe Type B	
Single	Double	Size (O.D.)	lbs./ft. (kg/m)	Size	lbs./ft. (kg/m)	Size (O.D.)	kg/m (lbs./ft.)
Up to 4 (1.2)	Up to 8 (2.5)	2.375 (60.3)	3.65 (5.43)	2 1/2 (63.5)	4.32 (6.43)	2.375 (60.3)	3.11 (4.63)
Over 4 (1.2) to 8 (2.5)	Over 8 (2.5) to 16 (5.0)	2.875 (73.0)	5.79 (8.62)	3 (76.2)	5.78 (8.60)	2.875 (73.0)	4.64 (6.91)
Over 8 (2.5) to 12 (3.6)	Over 16 (5.0) to 24 (7.4)	3.5 (89.0)	7.58 (11.28)	3 (76.2)	8.80 (13.10)	3.5 (89)	5.707 (8.49)

* The 3 1/2 x 3 1/2 (89.0 x 89.0) roll formed section as detailed may be used as gate posts for single gate up to 6' (1.8 m) and double gate up to 12' (3.6 m).

Illinois Department of Transportation

PASSED January 1, 2009

ENGINEER OF POLICY AND PROCEDURES

APPROVED January 1, 2009

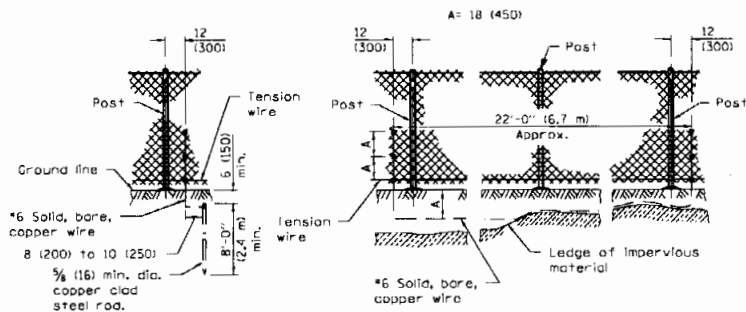
ENGINEER OF DESIGN AND ENVIRONMENT

18-111 01/05/09

CHAIN LINK FENCE

(Sheet 2 of 3)

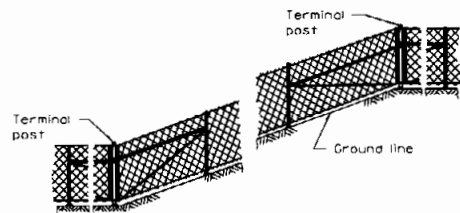
STANDARD 664001-02



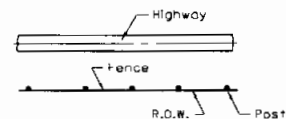
STANDARD GROUND

**COUNTERPOISE GROUND
(ALTERNATE)**

PROTECTIVE ELECTRICAL GROUNDS



INSTALLATION ON SLOPES



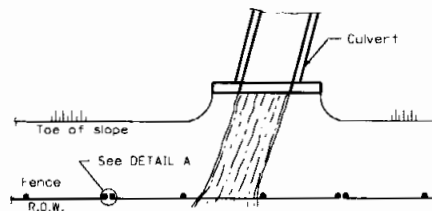
PLAN



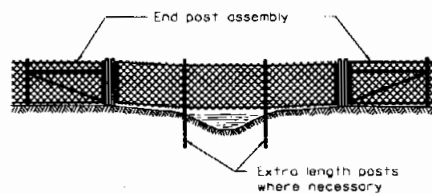
When fence line has a change in direction of 15° or more, a terminal post shall be placed as shown above.

Where angle is less than 15° and existing conditions require a terminal post, they shall be placed as directed by the Engineer.

INSTALLATION AT CORNERS

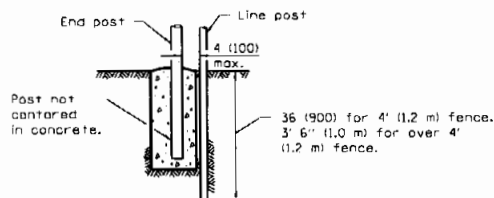


**PLAN
AT STREAM CROSSING**

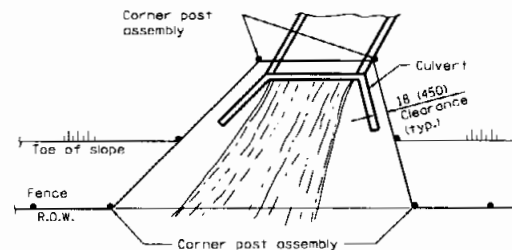


The chain link fabric shall be replaced by barbed wire strands at 12 (300) maximum centers between the double posts shown on DETAIL A when shown on the plans.

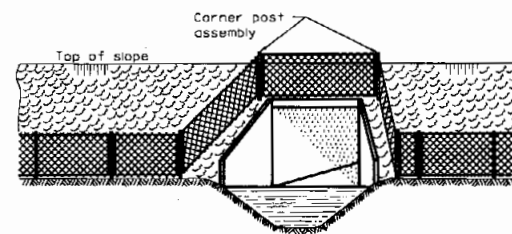
**ELEVATION
INSTALLATION OVER STREAM**



DETAIL A



**PLAN
AT HEADWALL**



When the width of the culvert makes it necessary to anchor a post to the top of the culvert, a cast iron shoe or other device approved by the Engineer shall be used.

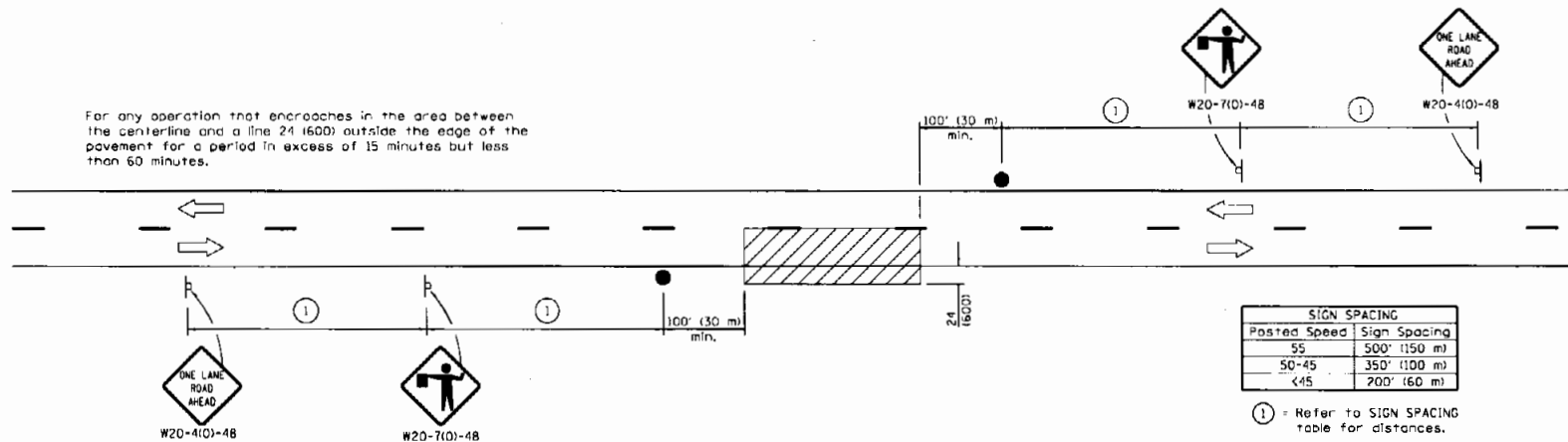
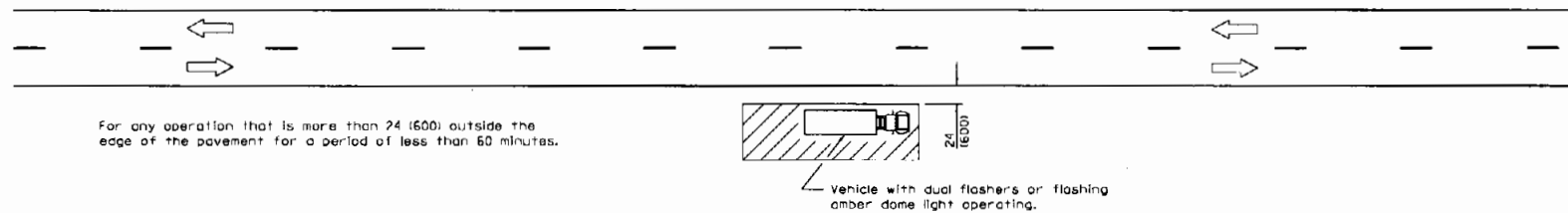
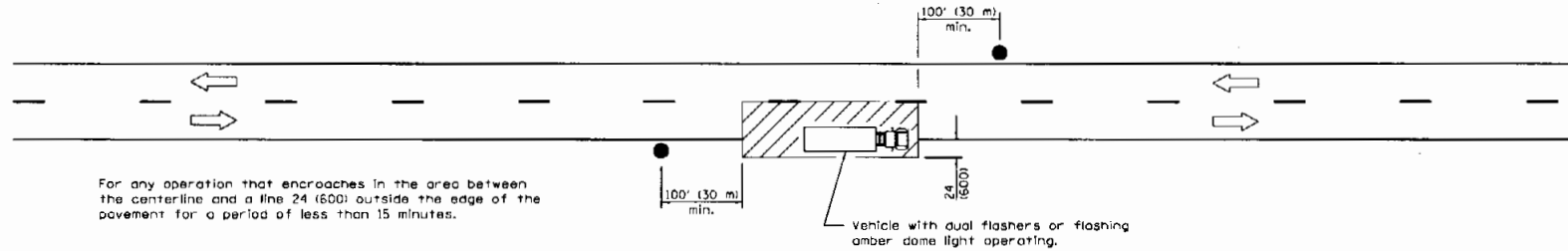
**ELEVATION
INSTALLATION AROUND HEADWALL**

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF POLICY AND PROCEDURES	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

CHAIN LINK FENCE

STANDARD 664001-02

(Sheet 3 of 3)



SIGN SPACING	
Posted Speed	Sign Spacing
55	500' (150 m)
50-45	350' (100 m)
45	200' (60 m)

TYPICAL APPLICATIONS

Marking patches
Field survey
String line
Utility operations
Cleaning up debris on pavement

SYMBOLS

- Work area
- Sign on portable or permanent support
- Flagger with traffic control sign

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

APPROVED: *[Signature]* 2011
ENGINEER OF SAFETY ENGINEERING

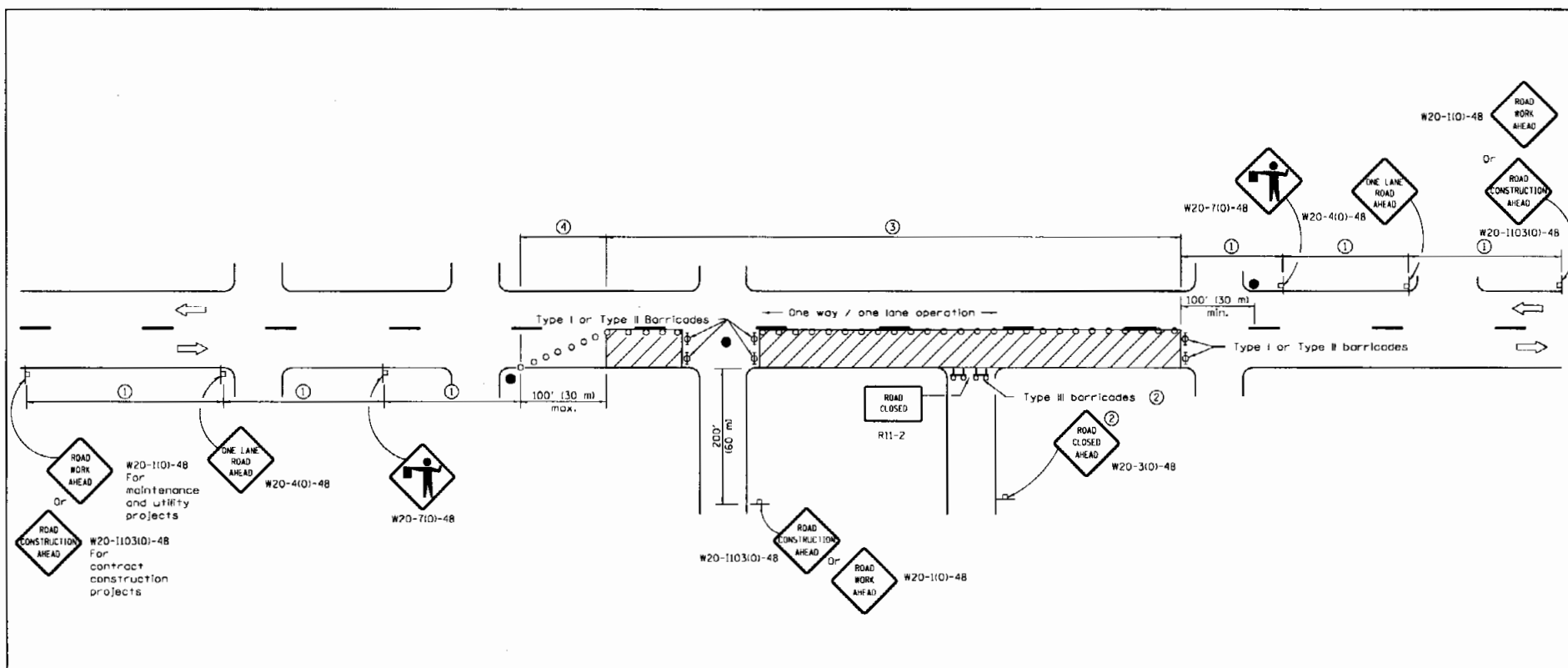
APPROVED: *[Signature]* 2011
ENGINEER OF DESIGN AND ENVIRONMENT

(6-1-1 07/05)

DATE	REVISIONS
1-1-11	Revised flagger sign.
1-1-09	Switched units to English (metric).

LANE CLOSURE, 2L, 2W, SHORT TIME OPERATIONS

STANDARD 701301-04



SIGN SPACING	
Posted Speed	Sign Spacing
55	500' (150 m)
50-45	350' (100 m)
<45	200' (60 m)

SYMBOLS

- Work area
- Cone, drum or barricade (not required for moving operations)
- Sign on portable or permanent support
- Flagger with traffic control sign
- Barricade or drum with flashing light
- Type III barricade with flashing lights

- ① Refer to SIGN SPACING TABLE for distances.
- ② For approved sideroad closures.
- ③ Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.
- ④ Cones, drums or barricades at 20' (6 m) centers.

GENERAL NOTES

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of one traffic lane in an urban area.

All dimensions are in inches (millimeters) unless otherwise shown.

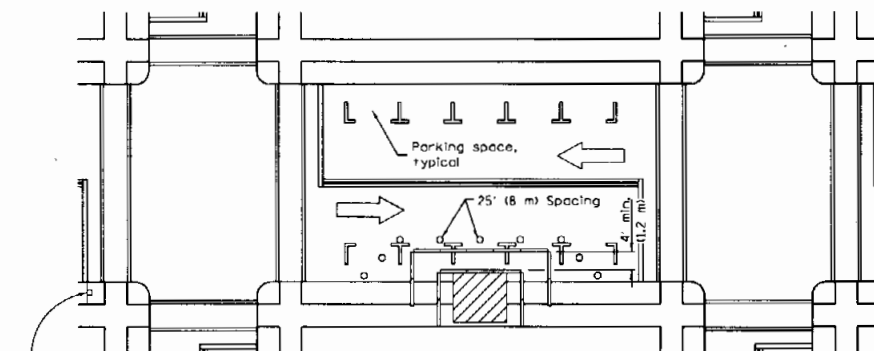
Illinois Department of Transportation

APPROVED *[Signature]* January 1, 2011
 ENGINEER OF SAFETY ENGINEERING

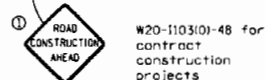
APPROVED *[Signature]* January 1, 2011
 ENGINEER OF DESIGN AND ENVIRONMENT

(18-1-1) (01/11)

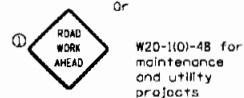
DATE	REVISIONS	URBAN LANE CLOSURE, 2L, 2W, UNDIVIDED
1-1-11	Revised flagger sign.	
1-1-09	Switched units to English (metric).	
	Corrected sign No.'s.	
		STANDARD 701501-06



① Omit whenever duplicated by road work traffic control.



Or



SIDEWALK DIVERSION

GENERAL NOTES

This Standard is used where, at any time, pedestrian traffic must be rerouted due to work being performed.

This Standard must be used in conjunction with other Traffic Control & Protection Standards when roadway traffic is affected.

Temporary facilities shall be detectable and accessible.

The temporary pedestrian facilities shall be provided on the same side of the closed facilities whenever possible.

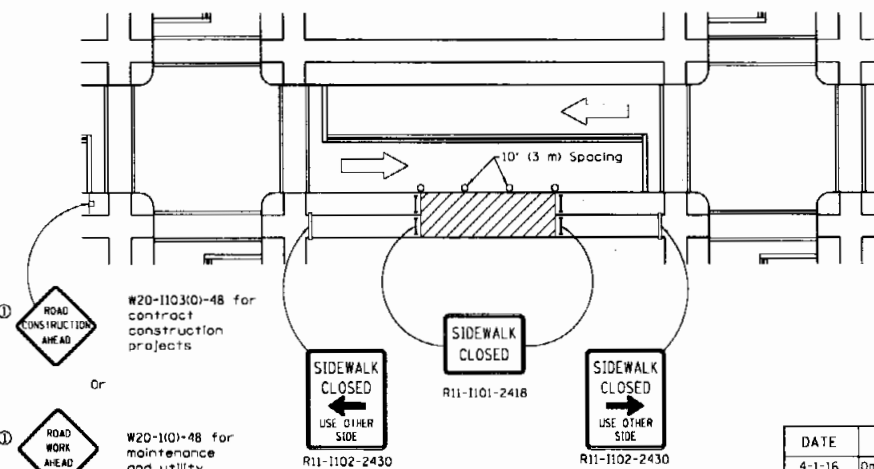
The SIDEWALK CLOSED / USE OTHER SIDE sign shall be placed at the nearest crosswalk or intersection to each end of the closure. Where the closure occurs at a corner, the signs shall be erected on the corners across the street from the closure. The SIDEWALK CLOSED signs shall be used at the ends of the actual closures.

Type III barricades and R11-2-4830 signs shall be positioned as shown in "ROAD CLOSED TO ALL TRAFFIC" detail on Standard 701901.

All dimensions are in inches (millimeters) unless otherwise shown.

SYMBOLS

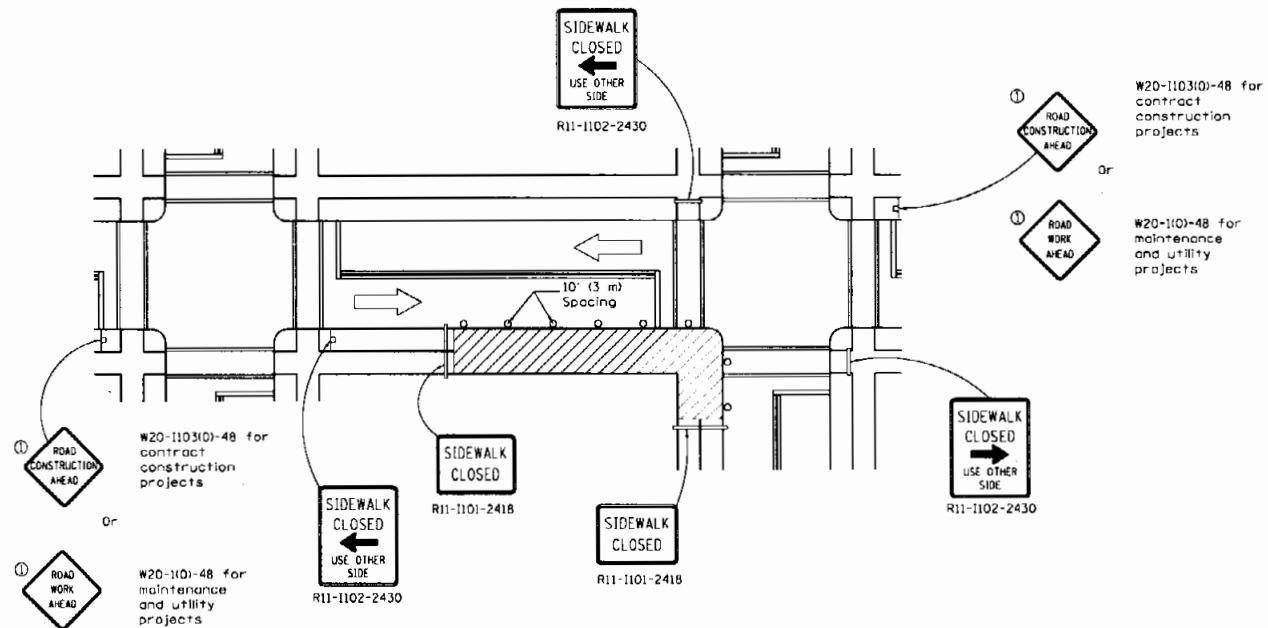
- Work area
- Sign on portable or permanent support
- Barricade or drum
- Cone, drum or barricade
- Type III barricade
- Detectable pedestrian channelizing barricade



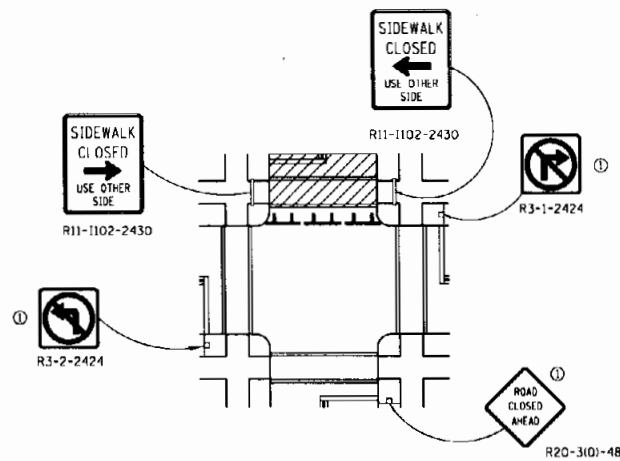
SIDEWALK CLOSURE

Illinois Department of Transportation	
APPROVED	APR 11 2016
ENGINEER OF SAFETY ENGINEERING	
APPROVED	APR 11 2016
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS	SIDEWALK, CORNER OR CROSSWALK CLOSURE (Sheet 1 of 2) STANDARD 701801-06
4-1-16	Omitted orange safety fence from standard as this is covered in the std. spec.	
11-12	Added SIDEWALK DIVERSION.	
	Modified appearance of plan views. Renamed Std.	



CORNER CLOSURE



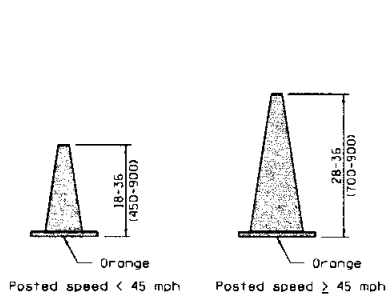
CROSSWALK CLOSURE

SIDEWALK, CORNER OR CROSSWALK CLOSURE

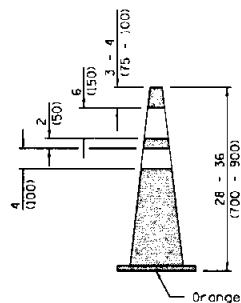
(Sheet 2 of 2)

STANDARD 701801-06

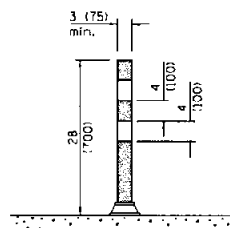
Illinois Department of Transportation	
APPROVED	April 1, 2016
<i>[Signature]</i>	
ENGINEER OF SAFETY ENGINEERING	
APPROVED	April 1, 2016
<i>[Signature]</i>	
ENGINEER OF DESIGN AND ENVIRONMENT	



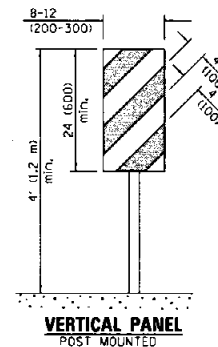
**CONE FOR
DAYTIME**



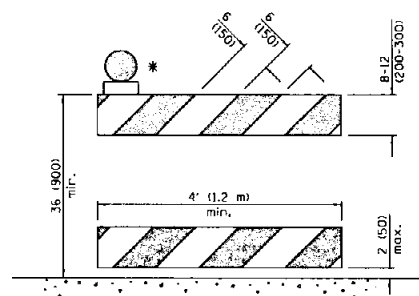
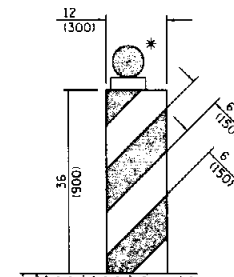
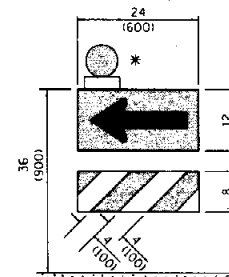
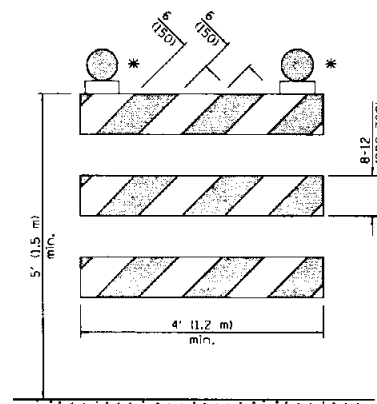
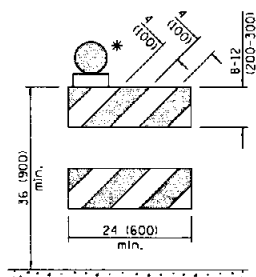
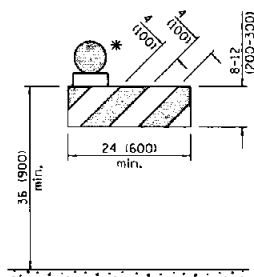
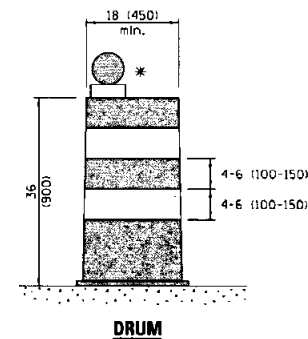
**REFLECTORIZED CONE
FOR NIGHTTIME**



TUBULAR MARKER



VERTICAL PANEL



* Warning lights (if required)

GENERAL NOTES

All heights shown shall be measured above the pavement surface.

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

APPROVED January 1, 2017
ENGINEER OF OPERATIONS

APPROVED January 1, 2017
ENGINEER OF DESIGN AND ENVIRONMENT

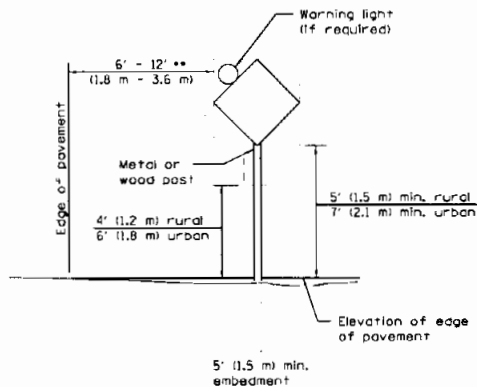
16-1-1 CDS/SL

DATE	REVISIONS
1-1-17	Changed FLEXIBLE DELINEATOR to TUBULAR MARKER.
4-1-16	Add dlm's to barricades. Rev. note for post mnt. signs.
	Rev. cone dtls. Add #12-1103.

**TRAFFIC CONTROL
DEVICES**

(Sheet 1 of 3)

STANDARD 701901-06



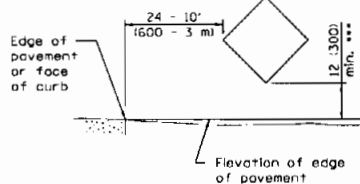
POST MOUNTED SIGNS

** When curb or paved shoulder are present this dimension shall be 24 (600) to the face of curb or 6' (1.8 m) to the outside edge of the paved shoulder.



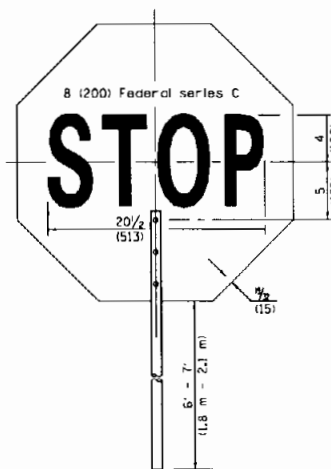
WIDTH RESTRICTION SIGN

XX'-XX" width and X miles are variable.

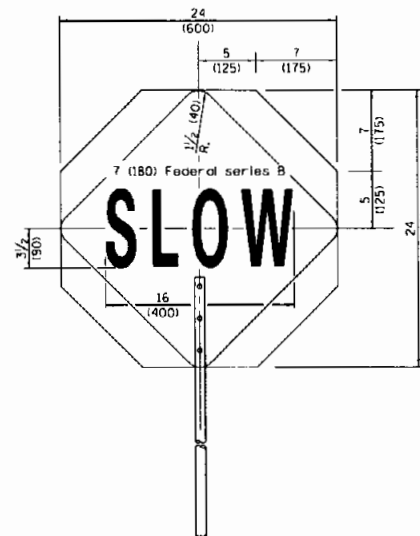


SIGNS ON TEMPORARY SUPPORTS

*** When work operations exceed four days, this dimension shall be 5' (1.5 m) min. If located behind other devices, the height shall be sufficient to be seen completely above the devices.

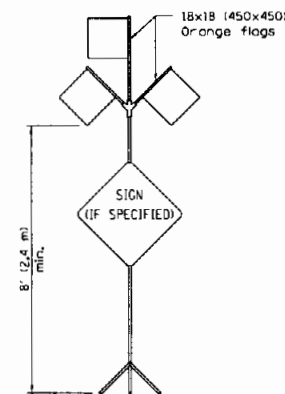


FRONT SIDE



REVERSE SIDE

FLAGGER TRAFFIC CONTROL SIGN



HIGH LEVEL WARNING DEVICE

ROAD
CONSTRUCTION
NEXT X MILES

END
CONSTRUCTION

G20-1104(0)-6036

G20-1105(0)-6024

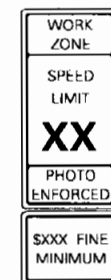
This signing is required for all projects 2 miles (3200 m) or more in length.

ROAD CONSTRUCTION NEXT X MILES sign shall be placed 500' (150 m) in advance of project limits.

END CONSTRUCTION sign shall be erected at the end of the job unless another job is within 2 miles (3200 m).

Dual sign displays shall be utilized on multi-lane highways.

WORK LIMIT SIGNING



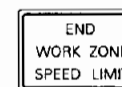
W21-115(0)-3618

R2-1-3648

R10-1108p-3618 ****

R2-1106p-3618

Sign assembly as shown on Standards or as allowed by District Operations.



G20-1103(0)-6036

This sign shall be used when the above sign assembly is used.

HIGHWAY CONSTRUCTION SPEED ZONE SIGNS

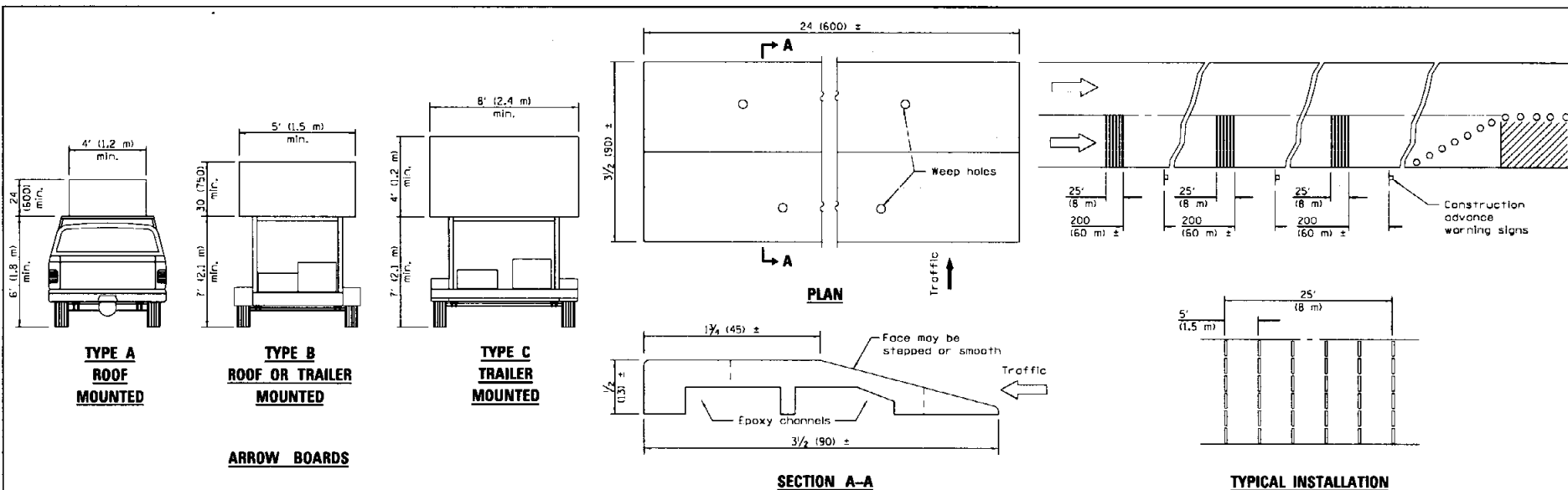
**** R10-1108p shall only be used along roadways under the jurisdiction of the State.

TRAFFIC CONTROL DEVICES

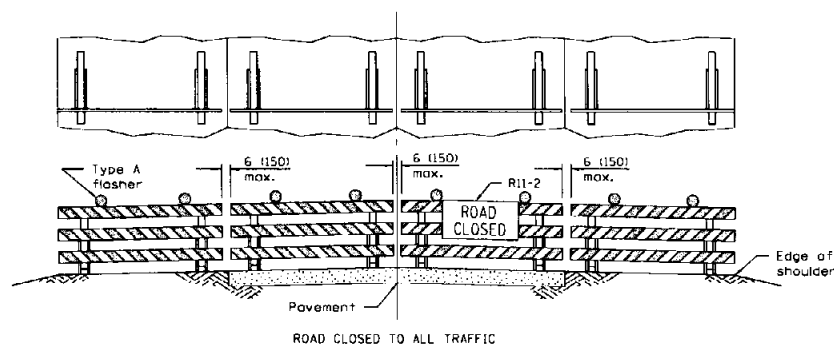
(Sheet 2 of 3)

STANDARD 701901-06

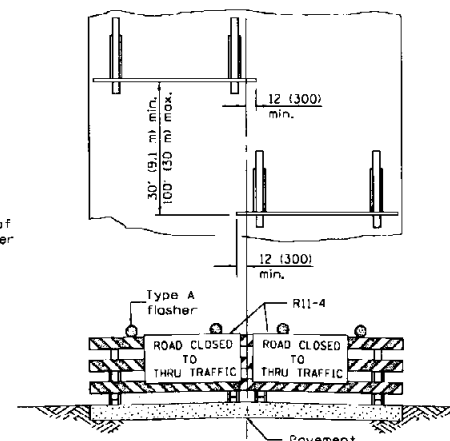
Illinois Department of Transportation	
APPROVED	2017
ENGINEER OF OPERATIONS	
APPROVED	2017
ENGINEER OF DESIGN AND ENVIRONMENT	



TEMPORARY RUMBLE STRIPS



Reflectorized striping may be omitted on the back side of the barricades. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the sign may be mounted on an NCHRP 350 temporary sign support directly in front of the barricade.



Reflectorized striping shall appear on both sides of the barricades. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the signs may be mounted on NCHRP 350 temporary sign supports directly in front of the barricade.

Illinois Department of Transportation

APPROVED January 1, 2017

ENGINEER OF OPERATIONS

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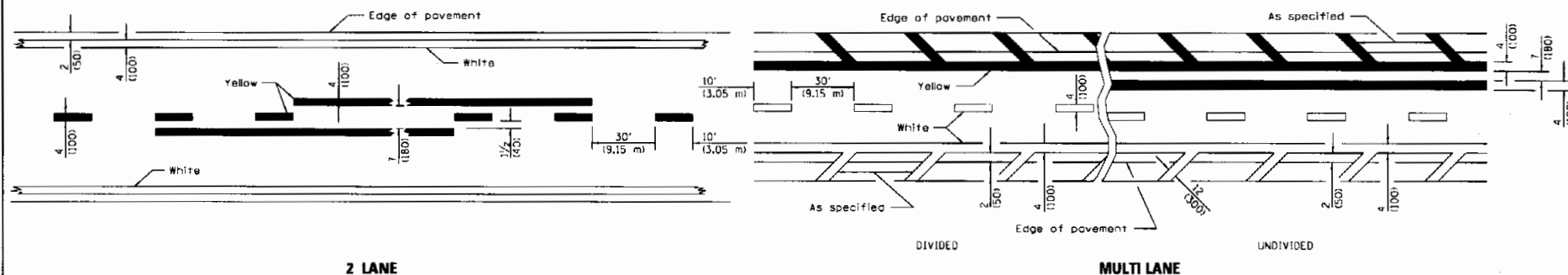
48-1-1 DMSSE

TYPICAL APPLICATIONS OF TYPE III BARRICADES CLOSING A ROAD

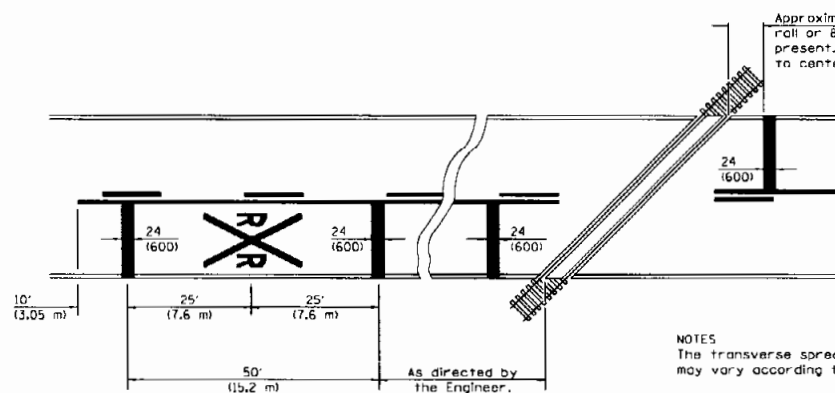
TRAFFIC CONTROL DEVICES

(Sheet 3 of 3)

STANDARD 701901-06



LANE AND EDGE LINES

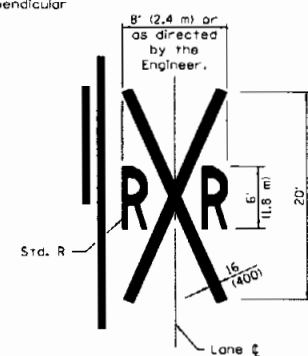


NOTES

The transverse spread of the "X" may vary according to lane width.

On multi-lane roads, the stop lines shall extend across all approach lanes and separate RXR symbols shall be placed adjacent to each other in each lane.

When the pavement marking symbol is used, a portion of the symbol should be located directly adjacent to the Advance Warning Sign (W10-1) as placed by Table 2C-4, Condition B of the MUTCD.

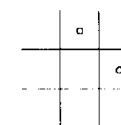
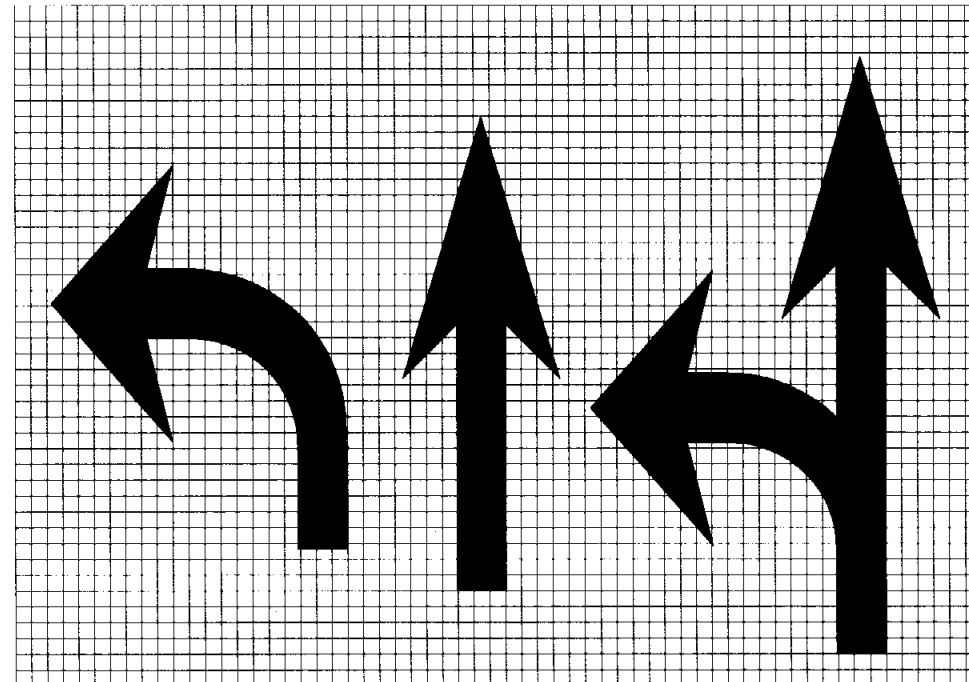
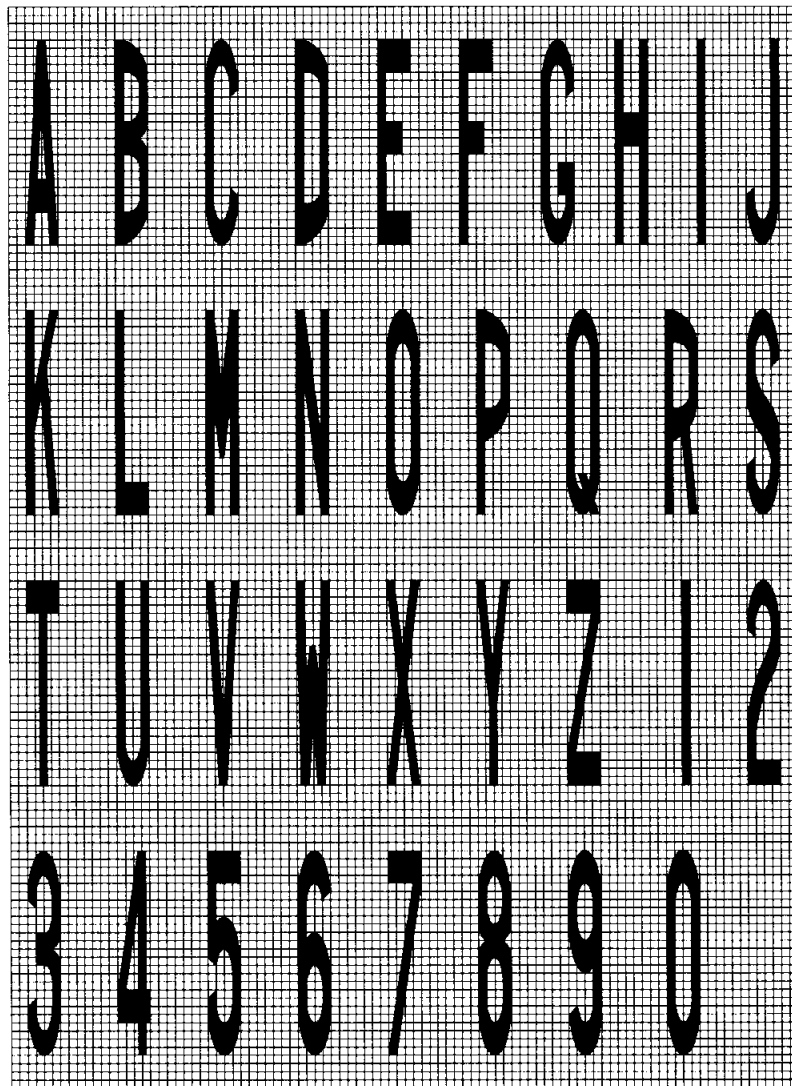


PAVEMENT MARKINGS AT RAILROAD-HIGHWAY GRADE CROSSING

All dimensions are in inches (millimeters) unless otherwise shown.

APPROVED	January 1, 2015
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS	TYPICAL PAVEMENT MARKINGS
1-1-15	Added symbols. Revised bike symbol. Revised note for stop line at RR crossing.	
1-1-14	Added bike symbol. Renamed 'LANE DROP ARROW' detail to 'LANE-REDUCTION ARROW'.	(Sheet 1 of 3)
		STANDARD 780001-05



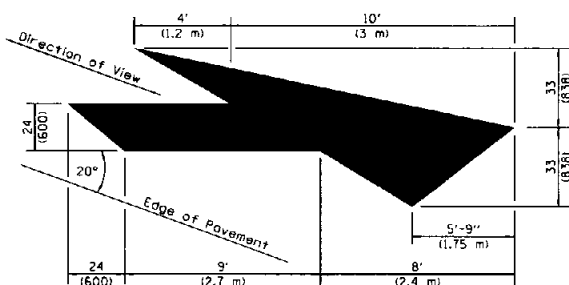
Legend Height	Arrow Size	a
6" (1.8 m)	Small	2.9 (74)
8" (2.4 m)	Large	3.8 (96)

The space between adjacent letters or numerals should be approximately 3 (75) for 6" (1.8 m) legend and 4 (100) for 8" (2.4 m) legend.

LETTER AND ARROW GRID SCALE

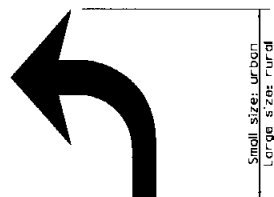
Illinois Department of Transportation	
APPROVED <u>January 1, 2015</u> <u>John Doe</u> ENGINEER OF OPERATIONS	(4-11) 01551
APPROVED <u>January 1, 2015</u> <u>John Doe</u> ENGINEER OF DESIGN AND ENVIRONMENT	

TYPICAL PAVEMENT MARKINGS (Sheet 2 of 3)
STANDARD 780001-05



LANE-REDUCTION ARROW

Right lane-reduction arrow shown.
Use mirror image for left lane.

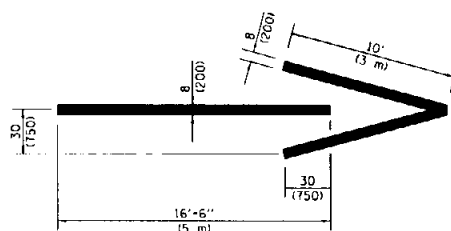


20' (6 m): urban
50' (15 m): rural
(Between arrow
and word or
between words)

ONLY

6' (1.8 m): urban
8' (2.4 m): rural

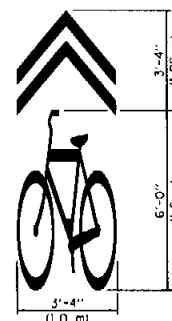
WORD AND ARROW LAYOUT



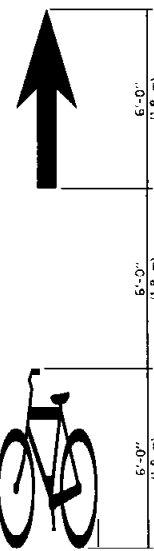
WRONG WAY ARROW



INTERNATIONAL SYMBOL OF ACCESSIBILITY



SHARED LANE SYMBOL



BIKE SYMBOL

(Arrow is optional.)

Illinois Department of Transportation

APPROVED January 1, 2015

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TYPICAL PAVEMENT MARKINGS

(Sheet 3 of 3)

STANDARD 780001-05