TECHNICAL SPECIFICATIONS AND DRAWINGS

FOR

OAK TERRACE WATER SYSTEM NEW WATER SUPPLY WELL DRILLING AND TESTING

PREPARED FOR

LAKE COUNTY DEPARTMENT OF PUBLIC WORKS

PREPARED BY

RHMG ENGINEERS, INC.
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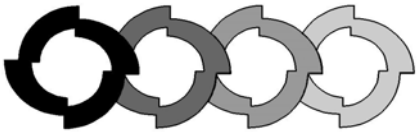

PROJECT NO. 22002021

SEPTEMBER, 2020

TECHNICAL SPECIFICATIONS

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FOR

OAK TERRACE WATER SYSTEM - NEW WELL DRILLING AND TESTING

PREPARED FOR

LAKE COUNTY PUBLIC WORKS DEPARTMENT
LAKE COUNTY, ILLINOIS

SECTION 01000

PROJECT REQUIREMENTS

1. GENERAL

1.01 DESCRIPTION

A. Work Specified Herein and Elsewhere

1. This Section includes:

   a. Summary of the Work
   b. Coordination
   c. Abbreviations and symbols
   d. Preconstruction meeting
   e. Coordination meeting
   f. Construction schedules
   g. Shop Drawings and product data and samples
   h. Record Documents
   i. Quality control
   j. Construction facilities and temporary controls
   k. Work Sequence
   l. Operation of existing facilities
   m. CONTRACTOR use of premises

2. Related Work specified elsewhere includes:

   a. Division 1
   b. Division 2
   c. Appendix A – Drawings
   d. Appendix B – Existing Well Data

1.02 SUMMARY OF WORK

A. Work Covered by Contract Documents

1. The Work to be performed under this Contract consists of the following:

   a. 8-inch diameter well drilling

   b. Water Supply Well pumping, sampling and analysis

   c. Water level measurement at test well location and existing West Oak Middle School water supply well with data loggers.

   d. Formation sampling and analysis

   Perform all Work in accordance with this Contract. Furnish all materials, equipment, tools, and labor which

is reasonably and properly inferable and necessary for the proper completion of the Work, whether specifically indicated in this Contract or not.

2. All fees and permits for the installation and closure of the wells which are required by controlling agencies or authorities, including fees for the review of Contract Documents prior to construction, will be secured and paid for by the CONTRACTOR.

B. Contract

1. The CONTRACTOR shall perform the Work per the unit cost categories in the Bid Form as attached to these specifications.

C. Work Included

1. The Work includes all labor, equipment, and materials for the complete advancement, sampling, water sample testing, monitoring well installation and closure, test well installation, water supply well installation and test pumping.

2. In addition, repair, replace, or otherwise settle with OWNER, if damage to property or existing facilities occurs, including damage to pavements, utilities, lawns, structures, etc.

D. Restriction of Working Hours

1. Construction activities shall be restricted to Monday through Friday between the hours of 7:00 a.m. and 7:00 p.m. Work after 7:00 pm and on weekends will be approved or denied by the OWNER on a case by case basis.

Note: During the pumping test, working hours of 24 hours per day may be required for the duration of the pumping tests.

1.03 PERMITS

A. Test Well

1. The installation of the test well will require a permit from the Lake County Health Department. If the test well is to be closed/abandoned a permit for its closure/abandonment will be required from the Lake County Health Department. Obtaining these permits, as appropriate for the work performed, will be the responsibility of the CONTRACTOR.

B. Monitoring Existing Well

1. The existing West Oak Middle School Well will be used as a monitoring well for test pumping of the well. The timing of test pumping operations will need to be coordinated to ensure that the school's water needs at the time of the test will be met.

C. Water Supply Well

1. The installation of the water supply well will require a permit from the Illinois EPA (IEPA), the IEPA permit application will be completed by the ENGINEER and submitted by the OWNER.

1.04 COORDINATION

A. CONTRACTOR shall be fully responsible for the coordination of its Work and the Work of its employees, Subcontractors, and Suppliers and to assure compliance with schedules.

B. The coordination requirements of this Section are in addition to the requirements of the OWNERS's contracting requirements.

C. CONTRACTOR shall provide a minimum 24 hour notice to the Lake County Health Department prior to the installation of the test well.

D. CONTRACTOR shall provide a minimum 24 hour notice to the Lake County Health Department prior to closure of any well.

l.05 ABBREVIATIONS AND SYMBOLS

A. Referenced Standards

1. Any reference to published specifications or standards of any organization or association shall comply with the requirements of the specification or standard which is current on the date of the Advertisement for Bids. In case of a conflict between the referenced specifications or standards, the one having the more stringent requirements shall govern.

2. In case of conflict between the referenced specifications or standards and the Contract Documents, the Contract Documents shall govern.

B. Abbreviations

1. The following are definitions of abbreviations which may be used this Contract:

a. AA - Aluminum Association
b. AASHTO - American Association of State Highway and Transportation Officials
c. ACI - American Concrete Institute
d. ANSI - American National Standard Institute
e. ASTM - American Society for Testing and Materials
f. AWS - American Welding Society
g. AWWA - American Water Works Association
h. CRSI - Concrete Reinforcing Steel Institute
i. E/A - Engineer and/or Architect
j. FS - Federal Specifications
k. IBC - International Building Code
l. NEC - National Electrical Code
m. NECA - National Electrical Contractor's Association
n. NEMA - National Electrical Manufacturer's Association
o. NSF - National Science Foundation
p. OSHA - U.S. Department of Labor, Occupational Safety and Health Administration
q. PS - United States Products Standards
r. STD.SPEC. - Applicable State Department of Transportation Standard Specifications for Road and Bridge Construction
s. SSPC - Structural Steel Painting Council
t. UL - Underwriter's Laboratories, Inc.

1.06 PRECONSTRUCTION MEETING

A. The OWNER will schedule a preconstruction meeting prior to beginning the Work to review submittal procedures, construction methods, establish a construction schedule, and review other topics that may apply to this project.

1.07 COORDINATION MEETINGS

A. CONTRACTOR shall schedule meetings as required to coordinate all Work, insure proper installations in correct locations at appropriate times, and to avoid delays in completing the Work.

1.08 CONSTRUCTION SCHEDULES

A. Submit an overall schedule of operations to the OWNER and ENGINEER for approval prior to any construction operations. An updated schedule shall be included with each pay request. Inform the OWNER and ENGINEER of all changes in the schedule.

B. There will be time periods during which some Work will not be conducted. These periods are to allow time for performance test data evaluation.

1.09 SUBMITTALS

A. Qualifications

1. CONTRACTOR shall be a licensed water well driller pursuant to the Illinois Water Well and Pump Installation Contractor's License Act [225 ILCS 345].

2. CONTRACTOR shall meet the requirements of the Lake County Department of Health.

B. Procedures

Submit the following:

1. Shop drawings, catalog data, and manufacturer's technical data showing complete information on proposed methods, materials, and equipment to be used.

2. Drilling methods shall include:

a. Detail drawings and written descriptions of the entire procedure for the advancement of the wells.

b. Methods for sampling.

c. Methods for the test pumping.

3. Method of closure for the wells. This shall include:

a. Detail drawings and written descriptions of the entire procedure for closure and abandonment of the wells.

b. Materials to be used for backfilling and sealing of the wells.

1.10 RECORD DOCUMENTS

A. As the Work progresses, CONTRACTOR shall mark on a set of Contract Documents all changes from the Contract Documents. The CONTRACTOR shall maintain a drilling log and deliver to the OWNER a log of each well.

1.11 QUALITY CONTROL

A. Laboratory Testing Services

1. Except where specified in individual Specification Sections, CONTRACTOR shall employ and pay for an

independent testing laboratory to perform specified testing services.

2. Any testing laboratory utilized by CONTRACTOR shall be an independent laboratory acceptable to the OWNER and the ENGINEER and complying with the latest edition of the "Recommended Requirements for Independent Laboratory Qualification", published by the American Council of Independent Laboratories.

3. Testing laboratories shall promptly notify the ENGINEER and CONTRACTOR of irregularities or deficiencies of the Work which are observed during performance of services. Laboratories shall submit two (2) copies of all reports directly to the ENGINEER and two (2) copies to CONTRACTOR.

B. Testing Materials

1. Unless otherwise specified, all sampling and testing shall be in accordance with the latest published Standard Methods in effect at the time Bidder's Proposals are received. If no Standards apply, applicable standard methods of the Federal Government or of other recognized agencies shall be used.

C. Source and Quality of Materials and Equipment

1. The source of materials to be used shall be in accordance with the Contract Documents and as approved by the ENGINEER before delivery. The approval of the source of any material shall continue as long as the material conforms to the Specifications.

2. All material not conforming to the requirements of the Specifications shall be considered as defective and shall be removed from the Work. If in place, faulty materials shall be removed by CONTRACTOR at its expense and replaced with acceptable material unless permitted otherwise by the OWNER. No defective materials which have been subsequently corrected shall be reused until approval has been given.

3. Upon failure of CONTRACTOR to comply immediately with any order of the ENGINEER to remove and replace defective material, the OWNER shall have authority to remove and replace defective materials, and to deduct the cost of removal and replacement from any monies due or to become due to CONTRACTOR. Failure to reject any defective materials or Work at the time of installation shall in no way prevent later rejection when such defects are discovered, nor obligate the OWNER to issue its Final Acceptance.

1.12 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

A. Responsibility

1. All construction facilities and temporary controls remain the property of CONTRACTOR establishing them and shall be maintained in a safe and useful condition until removed from the Work Site.

B. Temporary Sanitary Facilities

1. Provide temporary toilet facilities as required. Maintain these during the entire period of construction under this Contract for the use of all construction personnel on the job. Enough chemical toilets shall be provided to conveniently serve the needs of all personnel. Chemical toilets and their maintenance shall meet the requirements of State and Local Health Regulations and Ordinances.

C. Site Drainage

1. CONTRACTOR shall keep the Work Site free from water at all times to permit continuous access and to prevent damage to the Work. All water pumped from the Work site shall be discharged into the storm drainage system via an approved portable sediment containment system.

D. Security

1. CONTRACTOR shall provide inspection of Work Site area daily and shall take whatever measures are necessary to protect the safety of the public, workmen, and materials, and provide for the security of the Work Site, both day and night.

2. Provide a 6-foot high temporary chainlink fence around the entire work site with a locked gate as specified.

E. Dust and Mud Control

1. The CONTRACTOR shall take all necessary precautions to control dust and mud associated with the work of this Contract.

2. If the CONTRACTOR does not meet the requirements of controlling dust and mud as determined by the ENGINEER, the OWNER shall make the necessary arrangements to control dust. The cost of such dust control will be deducted from any monies due or to become due to the CONTRACTOR.

3. Unless a pay item is included in the Schedule of Prices, the cost for Dust and Mud Control will be considered

incidental to the Contract and no additional compensation will be provided.

E. Temporary Service Road

1. The CONTRACTOR shall construct, maintain, and remove a temporary access road as needed.

G. Noise

1. The CONTRACTOR shall conduct all his operations so that they will cause the least annoyance to the residents in the vicinity of the work, and shall comply with all applicable local ordinances.

2. Compressors, hoists, and other apparatus shall be equipped with such mechanical devices as may be necessary to minimize noise. Compressors shall be equipped with silencers on intake lines. All gasoline or oil operated equipment shall be equipped with silencers or mufflers or intake and exhaust lines. Storage bins and hoppers shall be lined with material that will deaden the sounds.

H. Removal of Temporary Construction

1. Remove the various temporary facilities, services, and controls and legally dispose of them as soon as permissible. Portions of the Work Site used for temporary facilities shall be properly reconditioned and restored to a condition acceptable to the land owner and the OWNER.

1.13 WORK SEQUENCE

A. CONTRACTOR shall be solely responsible for the sequencing of the Work.

B. There will be time periods during which some Work will not be conducted. These periods are to allow time for performance test data evaluation and for laboratory analysis of water samples.

1.14 OPERATION AND EXISTING FACILITIES

A. The OWNER must be able to maintain the production of the existing West Oak Middle School well during normal operating hours when school is in session.

B. CONTRACTOR shall coordinate all construction and pump testing activities with the West Oak Middle School and OWNER. Work shall be done in accordance with the OWNER's work rules, and applicable Agency requirements.

C. CONTRACTOR shall cooperate with OWNER to provide continuous operation of the existing facilities during the construction period.

1.15 CONTRACTOR USE OF PREMISES

A. Confine operations at the site to areas designated by the OWNER and permitted by applicable laws, ordinances, permits, and by the Contract Documents. Do not unreasonably encumber the site with materials or equipment. CONTRACTOR shall assume full responsibility for protection and safekeeping of products stored on the site.

END OF SECTION

ITEM NO.	ITEM	UNIT	QTY	UNIT PRICE	TOTAL PRICE
BASE BID					
1	Mobilization for Well Drilling	LS	1	$	$
2	Provide Drilling Water and Associated Equipment	LS	1	$	$
3	Sieve Analysis of Test Boring Formation Samples	LS	1	$	$
4	Soil Erosion And Sedimentation Control During Drilling	LS	1	$	$
5	Drill 10-Inch Diameter Hole For Test Water Supply Well	VF	263	$	$
6	Install 8-Inch Diameter Steel Casing	VF	263	$	$
7	Provide Neat Cement Grout For Test Water Supply Well	CF	53	$	$
8	Cement Shoe (10-Inch)	LS	1	$	$
9	Grouting Equipment	LS	1	$	$
10	Provide Bentonite Seal For Test Water Supply Well	CF	53	$	$
11	Drill 7-7/8-Inch Diameter Hole For Test Water Supply Well (263’-276’)	VF	13	$	$
12	Plumbness And Alignment Of Test Water Well	LS	1	$	$
13	Development Of Test Water Supply Well	LS	1	$	$
14	Provide Test Pumping Equipment	LS	1	$	$
15	Provide Well Level Monitoring Equipment For Use During Pump Test	LS	1	$	$
16	Test Pumping	HR	48	$	$
17	Collection And Analysis Of Water Sample For Test Water Supply Well	LS	1	$	$
18	Additional Development- Air Or Gas Impulse Generation	LS	1	$	$
19	Additional Development - Acidization	LS	1	$	$
20	Video Logging Of The Water Supply Well	LS	1	$	$
21	Well Disinfection Per AWWA A100	LS	1	$	$
22	Closure And Abandonment Of Test Water Supply Well (If Test Fails)	LF	276	$	$

23	Demobilization	LS	1	$	$
24	Site Restoration And Seeding	LS	1	$	$
25	Record Drawing Information	LS	1	$	$

Total Base Bid Amount:

_____
Words

$_____
Figures

SECTION 01025

MEASUREMENT AND PAYMENT

1. GENERAL

1.01 MEASUREMENT AND PAYMENT ITEMS

A. The following Subsections describe the measurement of and payment for the Work to be done under the Unit Price Items listed on the Bid Form. Any and all Work required by the Contract Documents but not included in the Schedule of Prices shall be considered incidental and no additional compensation will be provided.

1.02 MOBILIZATION

A. Measurement

1. Mobilization will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for mobilization including but not limited to site improvements, moving equipment and materials to the site, temporary facilities, soil and erosion control measures and all other site preparation work for the project.

1.03 PROVIDE DRILLING WATER AND ASSOCIATED EQUIPMENT

A. Measurement

1. Drilling water provided by the contractor and provision of equipment to supply water will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

2. The Lump Sum Price for this item shall constitute full compensation for provision of drilling water including but not limited to water, tanks, hoses and connections, and all other work or equipment necessary to provide drilling water for the project.

1.04 SIEVE ANALYSIS OF TEST BORING FORMATION SAMPLES

A. Measurement

1. The sieve analysis of Test Boring formation samples will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for the sieve analysis including but not limited to all labor, equipment, materials and all other items for the completing this work as detailed in the Contract Documents.

1.05 SOIL EROSION AND SEDIMENTATION CONTROL

A. Measurement

1. The soil erosion and sedimentation control will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for the soil erosion and sedimentation control including but not limited to all labor, equipment, materials and all other items for the completing this work as detailed in the Contract Documents.

1.06 DRILL 10-INCH HOLE FOR THE 8-INCH TEST WATER SUPPLY WELL

A. Measurement

1. The drilling for the water supply well to be paid for under this Unit Price Item shall be measured by the vertical foot of the drilled hole for the test water supply well.

B. Payment

1. The drilling for the water supply well to be paid for under this Unit Price Item shall constitute full compensation for furnishing all labor, materials, equipment for drilling the hole to receive the steel casing and stainless steel screen, formation sampling and sieve analysis for the water supply well as detailed in the Contract Documents.

1.07 8-INCH DIAMETER STEEL CASING FOR TEST WATER SUPPLY WELL

A. Measurement

1. The steel casing for the water supply well to be paid for under this Unit Price Item shall be measured by the vertical foot of casing installed for the water supply well.

B. Payment

1. The steel casing the water supply well to be paid for under this Unit Price Item shall constitute full compensation for furnishing all labor, materials, equipment for providing and installing the steel casing in the hole drilled for the test water supply well as detailed in the Contract Documents.

1.08 NEAT CEMENT GROUT FOR TEST WATER SUPPLY WELL

A. Measurement

1. The neat cement grout for the water supply well to be paid for under this Unit Price Item shall be measured by the cubic foot of neat cement grout installed for the water supply well.

B. Payment

1. The Unit Price for this Unit Price Item shall include full compensation for all labor, materials, equipment, testing, and installation of the neat cement grout for the water supply well as detailed in the Contract Documents and all other work incidental thereto and not specifically included for payment under other unit Price Items.

1.09 CEMENT SHOE

A. Measurement

1. The cement shoe for the test water supply well to be paid for under this Unit Price Item will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Unit Price for this Unit Price Item shall include full compensation for all labor, materials, equipment, testing, and installation of the cement shoe for the test water supply well as detailed in the Contract Documents and all other work incidental thereto and not

specifically included for payment under other unit Price Items.

1.10 GROUTING EQUIPMENT

A. Measurement

1. The Grouting Equipment for the test water supply well will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for providing the grouting equipment including but not limited to furnishing, installing and removing the grouting equipment and power source. Includes operating equipment as needed to verify functionality, flow rates, integrity, and reliability before starting grouting of the test water supply well.

1.11 BENTONITE SEAL FOR TEST WATER SUPPLY WELL

A. Measurement

1. The bentonite seal for the water supply well to be paid for under this Unit Price Item shall be shall be measured by the cubic foot of bentonite seal installed for the test water supply well.

B. Payment

1. The Unit Price for this Unit Price Item shall include full compensation for all labor, materials, equipment, testing, and installation of the bentonite seal for the water supply well as detailed in the Contract Documents and all other work incidental thereto and not specifically included for payment under other unit Price Items.

1.12 DRILL 7-7/8 INCH HOLE FOR THE TEST WATER SUPPLY WELL

A. Measurement

1. The drilling for the water supply well to be paid for under this Unit Price Item shall be shall be measured by the vertical foot of the drilled hole for the test water supply well.

B. Payment

1. The drilling for the water supply well to be paid for under this Unit Price Item shall constitute full

compensation for furnishing all labor, materials, equipment for drilling the hole to receive the steel casing and stainless steel screen, formation sampling and sieve analysis for the water supply well as detailed in the Contract Documents.

1.13 PLUMBNESS AND ALIGNMENT OF TEST WATER SUPPLY WELL

A. Measurement

1. The Plumbness and Alignment testing of the test water supply well will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for performing the plumbness and alignment testing of the water supply well including but not limited to furnishing all labor, materials, equipment, and reports as detailed in the Contract Documents and all other work incidental thereto and not specifically included for payment under other unit Price Items.

1.14 DEVELOPMENT OF THE TEST WATER SUPPLY WELL

A. Measurement

1. The development of the test water supply well will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for the development of the water supply well including but not limited to bailing, surging, air lifting, and other methods intended to maximize well efficiency while minimizing concentration of sediment in water pumped from well. Includes removing fill after completing development.

1.15 TEST PUMPING EQUIPMENT

A. Measurement

1. The Test Pumping Equipment will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for providing the test pumping equipment including but not limited to furnishing, installing and removing test pumping equipment and power source. Includes operating equipment as needed to verify functionality, flow rates, integrity, and reliability before starting pumping test.

1.16 WATER LEVEL MONITORING EQUIPMENT FOR WATER SUPPLY WELLS

A. Measurement

1. The Water Level Monitoring Equipment for use during test pumping will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents. The lump sump includes equipment required to monitor the water level at both the existing school well and the new test well location.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for providing the data loggers and water level measurements including but not limited to furnishing, installing equipment, removing equipment, collecting measurement readings and all other labor, materials and equipment for the complete performance of this Work as required by the Contract Documents.

1.17 TEST PUMPING

A. Measurement

1. The Test Pumping of the water supply well to be paid for under this Unit Price Item shall be measured by the hour for the test pumping operation.

B. Payment

1. The Unit Price per each shall constitute full compensation for performing the test pumping of the test well and shall include but not limited to all materials, equipment and labor to operate test pumping equipment and record data.

1.18 COLLECTION AND ANALYSIS OF WATER SAMPLE FOR WATER SUPPLY WELL

A. Measurement

1. The Water Sample Collection and Analysis to be paid for under this Unit Price Item shall be measured by each water sample collected and analyzed.

B. Payment

1. The Water Sample Collection and Analysis to be paid for under this Unit Price Item shall constitute full compensation for furnishing all labor, materials, equipment, laboratory services and all other items for the providing the complete water sample collection and analysis for all required water samples from the water supply well as detailed in the Contract Documents.

1.19 ADDITIONAL DEVELOPMENT OF THE WATER SUPPLY WELL – AIR OR GAS IMPULSE GENERATION

A. Measurement

1. The additional development of the water supply well through air or gas impulse generation, if authorized, will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for the air or gas impulse development of the water supply well including but not limited to supply and positioning of air gun, provision of air or gas supply, and bursting and other methods intended to maximize well efficiency while minimizing concentration of sediment in water pumped from well. Includes removing fill after completing development.

1.20 ADDITIONAL DEVELOPMENT OF THE WATER SUPPLY WELL – ACIDIZATION

A. Measurement

1. The additional development of the water supply well through acidization, if authorized, will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for the acid development of the water supply well including but not limited to supply and application of acid to the well, and pumping and recirculating water

to remove the acid and return the well to a neutral pH level.

1.21 VIDEO LOGGING OF TEST WATER SUPPLY WELL

A. Measurement

1. The Video Logging of the water supply well will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for performing the video logging of the water supply well including but not limited to furnishing all labor, materials, equipment, and reports as detailed in the Contract Documents and all other work incidental thereto and not specifically included for payment under other unit Price Items.

1.22 DISINFECTION OF TEST WATER SUPPLY WELL

A. Measurement

1. The Disinfection of the water supply well will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for the disinfection of the water supply well including but not limited to all materials, equipment, labor and laboratory services to fully disinfect the water supply well as indicated on the Contract Drawings and including all work incidental thereto and not specifically included for payment under other Unit Price Items.

1.23 CLOSURE AND ABANDOMENT OF THE TEST WELL

A. Measurement

1. The Closure and Abandonment of the Test Well, if required, to be paid for under this Unit Price Item shall be shall be measured by the vertical foot of the closed test well.

B. Payment

1. The Unit Price for this Unit Price Item shall constitute full compensation for the closure and abandonment of the test well, including casing and screen removal, backfilling, grouting, materials, equipment, labor and all other items for the complete closure and abandonment as detailed in the Contract Documents and as per the Lake County Public Health Department requirements.

1.24 DEMOBILIZATION

A. Measurement

1. Demobilization will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for demobilization including but not limited to the removal of all equipment, materials, temporary facilities, soil and erosion control measures and all other work from the site.

1.25 SITE RESTORATION AND SEEDING

A. Measurement

1. The Site Restoration work will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for furnishing and performing the Site Restoration including all gravel/ pavement restoration, topsoil, mulching, seed, watering, fertilizer, plantings and erosion control blankets and other materials, equipment and labor necessary to fully restore the site as nearly as possible to its original conditions following the complete installation as indicated on the Contract Drawings and as specified including all work incidental thereto and not specifically included for payment under other Unit Price Items.

1.26 RECORD DRAWING INFORMATION

A. Measurement

1. Record drawing information will not be measured for payment, but will be paid for as a Lump Sum as detailed in the Contract Documents.

B. Payment

1. The Lump Sum Price for this item shall constitute full compensation for production and delivery of record drawings as required.

END OF SECTION

SECTION 0l700

CONTRACT CLOSEOUT

l. GENERAL

l.0l DESCRIPTION

A. Work Specified Herein and Elsewhere

l. Work under this Section includes:

a. Clean-up operations.
b. Closeout submittals.

2. Related work specified elsewhere:

a. Division 1 Specifications
b. Division 2 Specifications

l.02 CLEAN-UP OPERATIONS

A. The entire project site shall be thoroughly cleaned at the completion of the work, or portions thereof, or when directed by the OWNER. Clean-up operations shall consist of the removal and legal disposal of all excess dirt, broken concrete, wood scraps, wire, packaging materials, forms, scaffolds, and other objectionable rubble created during construction operations; washing and scrubbing areas which are dirtied by mud, oil, grease, and dust to a clean and finished appearance; cleaning of spilled mortar, concrete, and aggregate.

B. CONTRACTOR shall be responsible for the removal of excess dust and mud created by the construction project from all sidewalks, driveways, streets, and highways as directed by the OWNER. Equipment to clean these surfaces shall be subject to approval by the OWNER.

C. CONTRACTOR will restore site as per the direction of the OWNER and ENGINEER. The immediate drilling area shall be regraded and seeded. Vehicle ruts shall be filled and seeded. Efforts should be made to keep vehicle ruts to a minimum.

l.03 CLOSEOUT SUBMITTALS

A. Upon completion of the project, CONTRACTOR shall transfer to OWNER all record documents associated with the work performed.

END OF SECTION

SECTION 02260

FINISH GRADING

1. GENERAL

1.01 DESCRIPTION

A. Work Specified Herein and Elsewhere

1. Work under this Section includes topsoil placement and final grading of the Work Site.

B. Related Work specified elsewhere:

a. Utilities Trenching, Bedding and Backfilling - Section 02221
b. Compaction control - Section 02250

2. MATERIALS

2.01 TOPSOIL

A. Topsoil shall be fertile, friable, natural topsoil typical of the area, free from subsoil, stones, plants, roots or other extraneous material and shall not be used while muddy or frozen.

B. Topsoil shall contain not less than 8% organic matter (AASHTO T194). The topsoil shall consist of either natural topsoils typical of the locality and free from coarse stone aggregate or surface soils stripped from the Work Site and enriched with humus at a rate of 8% by volume. The soil mixture prepared by mixing surface soils and humus shall be free of oil, cinders, coarse stone, and woody root material.

3. EXECUTION

3.01 GENERAL

A. Provide all topsoil placement and finish grading and filling to achieve the lines and grades indicated on the Contract Drawings. All earthwork shall be done in a manner that provides drainage.

3.02 Topsoil Placement

A. Place topsoil in all areas of new grading. The compacted subgrade to receive topsoil shall be scarified to a depth of 3 inches. Topsoil shall be spread evenly and compacted to a thickness of not less than 6-inches, and

to the proposed elevations and grades. Grade flush with walks, curbs, and paving.

3.03 FINISH GRADING

A. All areas of the Work Site including all previously grassed areas that have been disturbed, borrow sites, excavated and filled sections and adjacent transition areas shall be uniformly smooth-graded. Depressions from settlement shall be filled and compacted. Tops of embankments and breaks in grade shall be rounded. All surfaces shall be finished to provide adequate drainage. Finished surfaces shall be reasonably smooth, compacted, free from irregular surface changes and comparable to the smoothness obtained by blade-grader operations.

B. Slope grades to drain away from structures at a minimum of 1/4-inch per foot for 10-feet.

C. Finished surfaces adjacent to paved or surfaced areas and within 10-feet of structures shall be within 1-inch of the proposed grade. All other areas shall be within 2-inches of the proposed grade.

D. Newly graded areas shall be protected from traffic and erosion. All settlement or washing away that may occur from any cause prior to seeding or acceptance shall be repaired and grades re-established to the required elevations and slopes at no additional cost to OWNER.

E. Unless otherwise indicated, all surplus material shall be disposed of by CONTRACTOR.

END OF SECTION

SECTION 02485

LAWN AND GRASSES

1. GENERAL

1.01 DESCRIPTION

A. Work Specified Herein and Elsewhere

1. Work under this Section includes:

a. Fine grading of topsoil
b. Seeding
c. Sodding
d. Care of grass during establishment period

2. Related Work specified elsewhere:

a. Section 02110 - Protection and Care of Trees and Shrubs
b. Section 02260 - Finish Grading
c. Section 02270 - Soil Erosion and Sediment Control
d. Section 02490 - Trees, Plants, and Ground Cover

1.02 REFERENCES

A. Illinois Urban Manual by the United States Department of Agriculture Natural Resources Conservation Service, revised 2002.

B. State of Illinois Department of Transportation Standard Specifications for Road and Bridge Construction (latest edition) referred to herein as the "STD. SPECS.".

C. Standard Specification for Geotextile Specification for Highway Applications (AASHTO M 288) by the American Association of State Highway and Transportation Officials, latest edition.

1.03 CONFLICTS

A. In the event of any conflicts between the Contract Documents and Referenced Standard Requirements, the more stringent, higher cost and quality requirement shall be included in the Bid.

1.04 SCOPE OF WORK

A. All excavations made in turf areas shall be restored to a grass cover by seeding.

B. All grade lines shall be restored to their existing pre-construction profile.

C. A minimum of 4-inches of topsoil shall be placed in all turf areas.

2. PRODUCTS

2.01 TOPSOIL

A. Topsoil shall be fertile, friable, natural topsoil typical of the area, free from subsoil, stones, plants, roots or other extraneous material and shall not be used while muddy or frozen.

B. Topsoil shall contain not less than 8% organic matter (AASHTO T194). The topsoil shall consist of either natural topsoils typical of the locality and free from coarse stone aggregate or surface soils stripped from the site and enriched with humus at a rate of 8% by volume. The soil mixture prepared by mixing surface soils and humus shall be free of oil, cinders, coarse stone, and woody root material.

2.02 LIME

A. Lime shall be agricultural grade dolomitic limestone, ground sufficiently fine so that at least 80 percent will pass through a No. 8 sieve, and it shall contain not less than 80 percent calcium carbonate equivalent. Moisture content at time of delivery shall not exceed 8 percent.

2.03 FERTILIZER

A. Fertilizer shall be a composition recommended by a local County Agricultural Agent or State Agricultural Extension Service or a preformulated 10-6-4 mixture.

2.04 EROSION CONTROL BLANKET

A. Erosion control blanket shall be selected for the appropriate application in accordance with the manufacturer's recommendations. Erosion control blanket shall be manufactured by North American Green or approved equal and meet the applicable sections of the IDOT Standard Specifications Section 1081.10(b) – Knitted Straw Mat, or equivalent control measure.

B. Install erosion control blanket in accordance with manufacturer's recommended installation procedures and as directed by ENGINEER.

C. Secure blankets to ground with 6-inch or 8-inch wire staples or approved equivalent stakes in accordance with manufacturer's recommended pattern/placement.

2.05 JUTE MATTING EROSION CONTROL

A. Jute matting for erosion control shall be of plain, uniform, open-weave, new and unbleached single jute yarn. The jute matting shall be of loosely twisted construction having an average twist of not less than one and one half turns per inch. The matting shall have approximately 1-inch square openings between strands and shall weigh approximately 1-pound per square yard. Fabric shall be non-toxic to vegetation.

B. Jute matting for erosion control shall only be used when specified elsewhere in the Contract Documents.

2.06 VEGETATIVE MULCH

A. Vegetative mulch for seeded areas shall be a high quality, air-dried straw of wheat, rye, oats, beans or other approved straw, and shall be free from Johnson grass, broom sedge, noxious weeds and weed seeds detrimental to growth of grass.

2.07 WATER

A. Water shall be free from oil, acid, alkali, salts, and other harmful substances.

2.08 SEED

A. Seed shall be IDOT Class 1 as called for on the Contract Drawings.

2.09 HYDROMULCH

A. Hydromulch shall only be allowed if approved by ENGINEER, and at no additional cost to the OWNER.

B. The composition and type of hydromulch mixture shall conform to the following:

Mulch:
Weyerhaeuser's Sylva-Fiber
1,200-1,500/lb./Acre

Adhesive
Terra-Tack

40 lbs/Acre

Fertilizer
10-10-10 Mix of Nitrogen
Phosphorous Potassium
400 lbs/Acre

Grass Seed
25% Perennial Ryegrass
25% Reubens Kentucky Bluegrass
25% Common Kentucky Bluegrass
25% Creeping Red Fescue
150 lb./Acre

Water
3,000 gals./Acre

C. Contractor may propose to use a hydromulch seed mixture other than that shown above. However, Contractor shall submit the mixture to the ENGINEER for approval prior to use.

3. EXECUTION

3.0l REGRADING OF TOPSOIL

A. Topsoil shall be graded reasonably smooth and level after final settlement. All humps shall be removed and depressions or eroded areas filled in with additional topsoil before proceeding with seeding or sodding.

3.02 PREPARATION FOR SODDING OR SEEDING

A. Preparation shall not be started until all other site work, and utility work, and finished grading within the areas to be seeded have been completed.

B. Loosen topsoil by tilling it to a depth of at least 3-inches and smooth out all surface irregularities resulting therefrom. Leave area free of rocks or hard soil clods which will not pass through the tines of a standard garden rake.

C. At least 7 days before applying fertilizer, spread lime uniformly in sufficient quantity to produce in the soil a pH of 6.5. Work lime thoroughly into topsoil to a depth of 3-inches.

D. Apply fertilizer uniformly at a rate of 20 pounds per 1,000 square feet. Work fertilizer into soil prior to seeding or sodding.

3.03 SEEDING

A. Seed all areas disturbed by construction operations and not receiving sod, and as indicated on Contract Drawings.

B. Seed shall be sown between September 1 and November 1, or in spring from time ground can be worked until May 15.

C. Apply seed during favorable climatic conditions. Do not seed in windy weather or when soil is very wet. Sow seed at the rate specified for each seed mixture. Sow seed either mechanically or by broadcasting in two directions at right angles to each other to achieve an even distribution of seed.

D. After seeding, rake seed lightly into ground and roll with a roller weighing between l00 and 200 pounds per foot of roller width.

3.04 EROSION CONTROL BLANKET

A. Immediately after rolling seeded areas, place erosion control blanket over all areas that have been seeded. Unless otherwise indicated, also place erosion control blanket at sides and bottom of ditches, swales, and all areas within l0 feet of catch basins in seeded areas.

B. Apply erosion control in accordance with Section 02270, Soil Erosion and Sediment Control.

3.05 MULCHING SEEDED AREAS

A. Immediately after rolling seeded areas, apply mulch at the rate of 2 tons per acre within 24 hours after seeding. Use vegetative mulch on all seeded areas unless otherwise approved or specified. Upon approval of the E/A, fragmented mulch may be substituted for straw mulch.

B. Apply mulch in accordance with the "STD. SPECS.".

3.06 WATERING

A. Sodded Areas

1. Within 2 hours after placement begin watering and continually keep moist until the sod has firmly knit itself to the topsoil and becomes well established. At a minimum, sod is to be watered three times per week for three weeks following sod installation. Water shall be applied at the rate specified in Section 252.08 of the Standard Specifications.

2. During periods exceeding 26°C (80°F) or subnormal rainfall, supplemental watering may be required after the initial and additional waterings and prior to acceptance of the work. Supplemental watering shall be performed when directed by the ENGINEER. Water shall be applied at the rate specified by the ENGINEER within 24 hours of notice.

B. Seeded Areas

1. Immediately after placing erosion control blanket or mulch, water seeded areas thoroughly with a fine mist spray. Keep soil thoroughly moist until seeds have sprouted and achieved a growth of l-inch.

3.07 PROTECTION OF WORK

A. Protect newly seeded and sodded areas from all traffic by erecting temporary fences and signs. Protect slopes from erosion. Properly and promptly repair all damaged Work when required.

3.08 APPLICATION OF FERTILIZER

A. Six weeks after completion of seeding or sodding apply granular fertilizer over all areas at the rate of two pounds of nitrogen nutrients per 1,000 square feet of area.

3.09 CLEAN-UP

A. At the time of final inspection of the Work, but before Final Acceptance, remove from seeded and sodded areas all debris, rubbish, excess materials, tools, and equipment.

3.10 GUARANTY

A. In addition to the guaranties specified in Section 00700, General Conditions, comply with the following requirements:

B. All seeding and sodding shall be guaranteed by Contractor to be true to name and in a vigorous growing condition through one growing cycle including one summer and one winter season.

C. Maintenance for lawns shall begin immediately after seeding or sodding. Provide watering, mowing and replanting and continue as necessary until a close healthy stand of specified grasses is established.

3.11 LAWN REPLACEMENT

A. Lawn not showing a close uniform stand of healthy specified grasses at the end of the guaranty period shall be replaced and maintained until acceptance. Scattered bare spots, none of which is larger than one square foot, will be allowed up to a maximum of 3% of the total area.

END OF SECTION

SECTION 02730

WATER WELL

1. GENERAL

1.01 DESCRIPTION

A. Work Specified Herein and Elsewhere

1. Work under this Section includes:

   a. Installation of a Water Supply Well
   b. Well drilling
   f. Keeping of records and samples
   g. Disinfection, testing and protection of finished water supply well
   i. Test Pumping
   h. Well development

2. Related work specified elsewhere:

   a. General Conditions
   b. Supplementary Conditions

1.02 PERMITS, CERTIFICATES, LAWS AND ORDINANCES

A. All permits, certificates and licenses required by law for the execution of the work shall be obtained in accordance with the County's General Conditions. All work shall be done in accordance with the following rules and regulations.

1. Illinois Department of Public Health, Title 77 Chapter 1, part 920 Illinois Water Well Construction Code

2. Environmental Protection Act, Title IV, Public Water Supplies [415 ILCS 5/Title IV]

3. Illinois Water Well and Pump Installation Contractor's License Act [225 ILCS 345]

4. Illinois Pollution Control Board Title 35 Procedural and Environmental Rules [35 ILL. ADM. Code 604]

5. Illinois Environmental Protection Agency

6. Lake County Health Department

7. All other federal, state, or local laws, ordinances, rules and regulations.

1.03 LOCATION

A. The proposed location for the installation of the test well be located at the West Oak Middle School on Acorn Lane in Mundelein, Illinois.

B. The test well and is to be located south of the school as indicated on the Drawings.

C. Information regarding sub-surface conditions was derived from logs of wells located in the vicinity of the proposed well and is intended to assist the CONTRACTOR in preparing his Bid. However, neither the OWNER nor the ENGINEER guarantees its accuracy nor that it is necessarily indicative of all conditions to be encountered in drilling the well. The information contained in this Section and derived from maps or drawings or from the OWNER or his agents or employees, shall not act to relieve the CONTRACTOR from any responsibility of fulfilling the terms and requirements of the Contract.

1.04 BOUNDARIES OF WORK

A. The OWNER will provide land or rights-of-way for the work specified herein. The CONTRACTOR shall conduct his work so as not to impede access to the site for West Oak Middle School students and staff and the public at large.

1.05 PROTECTION OF SITE

A. The OWNER will permit the CONTRACTOR to dig a suitable pit at the well site for storage of water necessary for drilling and for deposit of material excavated from the well. Topsoil shall be stockpiled separately. After completion of the well, this pit shall be cleaned of all cuttings, drillings, debris, etc., and filled, compacted graded to original condition. The pit shall not be located in the influence area of any planned structure, driveway or surface improvement without special written permission from the OWNER and special fill and compaction requirements at the CONTRACTOR's expense.

B. Except as otherwise noted, the CONTRACTOR shall protect all structures, trees, shrubbery, and lawns during the progress of his work; shall remove from the site all cuttings, drillings, debris and unused materials; and shall, upon completion of the work, restore the site as nearly as possible to its original condition. Water pumped from the well shall be conducted to a place approved by the OWNER where it will be possible to dispose of the water without damage to property or the

creation of a nuisance and where it cannot flow back into the well. Best management practices shall be employed to remove sediment in the water.

1.06 COMPETENT WORKMEN

A. The CONTRACTOR shall employ only competent workmen for the execution of his work, and all work shall be performed under the direct supervision of an experienced well driller satisfactory to the ENGINEER.

1.07 SAMPLES AND RECORDS

A. The CONTRACTOR shall furnish to the Illinois State Geological Survey, Illinois State Water Survey, and the Illinois EPA, the following information:

1. A driller's log recording all information encountered in drilling, including location or depth of opening, soft or broken ground, water bearing strata and static water level, and record of drilling procedures. Duplicate records shall be furnished to the ENGINEER.

2. Cementing and casing records. Duplicate records shall be furnished to the ENGINEER.

3. Sample cuttings from any drilling shall be saved at five foot intervals and shipped to the Illinois State Geological Survey.

B. All samples shall be clearly labeled with the well location, Owner's name, driller's name and depth of sample.

C. Addresses for submittal of information and samples:

Permit Section
Division of Public Water Supplies
Illinois Environmental Protection Agency
P.O. Box 19276
1021 N. Grand Avenue East
Springfield, IL 62794-9276

Groundwater Section
Illinois State Water Survey
2204 Griffith Drive
Champaign, IL 61820-7495

Illinois State Geological Survey
Natural Resources Building
615 E. Peabody Drive
Champaign, IL 61820-6964

D. This work shall be considered incidental to the contract, and will not be paid for separately.

1.08 WATER SAMPLES AND ANALYSES

A. Water Supply Well Sampling and Analyses: The water received during the pump test shall be sampled and a complete laboratory analysis provided. The water shall be analyzed by a certified laboratory approved by the ENGINEER and at the cost of the CONTRACTOR. One sample per pump test, collected approximately one hour before the end of the pumping test, shall be collected and analyzed. Each sample shall be analyzed for the Inorganic Chemical Constituents and Organic Chemical Constituents listed in Attachment 1 to the IEPA Schedule C-1 Well Construction Permit.

1.09 PROTECTION OF QUALITY OF WATER

A. The CONTRACTOR shall take precautions to prevent contaminated water or water having undesirable physical or chemical characteristics, gasoline, or any other contaminant from entering the well or the stratum from which the well is to draw its supply, either through the opening or by seepage from the ground surface.

B. In the event that the well becomes contaminated or that water having undesirable physical or chemical characteristics enters the well because of the neglect of the CONTRACTOR, he shall, at his own expense, perform such work or supply such casings, seals, sterilizing agents or other material as may be necessary to eliminate the contamination or shut off the undesirable water.

C. Exercise extreme care in order to prevent the breakdown or caving in of strata overlying that from which the water is to be drawn. Pump or bail the well by such methods as may be approved by the ENGINEER, until the water pumped from the well shall be substantially free from sand and until the turbidity is less than 5 NTU.

1.10 DESCRIPTION OF WELLS

A. A minimum 8-inch diameter water supply well shall be completed to an approximate depth of 276 feet into the limestone formation.

1.11 SCHEDULING

A. There will be time periods during which some Work will not be conducted. These periods are to allow time for performance test data evaluation and for laboratory analysis of water samples.

2. PRODUCTS

2.01 CASINGS

A. Casings used as part of the permanent well shall be new black prime steel. Casings with welded joints shall be provided in accordance with the more stringent standard for external and internal diameters, thickness and weight per foot as shown in the latest version of AWWA-A100 or "Recommended Standards for Water Works" (Ten States Standards) latest version.

B. For driven casing, protect the casing bottom with a drive shoe. Type and weight of the shoe to be seleceted by CONTRACTOR. Use drive shoes that withstand the pressures exerted when being driven for job site conditions.

2.02 GROUT

A. Concrete grout shall consist of equal volumes of sand and Portland cement and not more than 6 gallons of clean water per sack of cement.

B. Admixtures to improve workability and control shrinkage shall be approved by the ENGINEER.

2.03 BENTONITE

A. Bentonite shall be a manufactured grout product which is a mixture of sodium bentonite and water mixed at the manufacturer's recommended ratio; a mixture of granulated sodium bentonite and water which consists of a minimum of 20% solids bentonite clay and water that is equivalent to 9.4 pounds/gallon; a mixture of granulated sodium bentonite and clean drilling mud and water, weighing a maximum of 8.6 pounds/gallon, which consists of a minimum of 20% solids bentonite clay and clean drilling mud equivalent to 9.6 pounds/gallon; or sodium bentonite in the granulated or chip form. All bentonite products shall comply with NSF International requirements.

2.06 FINE SILICA SAND

A. Fine silica sand shall be composed of not less than 99.5 percent silica (SiO_2).

2.07 CHLORINE

A. Liquid sodium hypochlorite, 12.5 percent solution.

2.08 CHLORINE ENHANCER

A. Use one of the following:
   1. Chlora-Pal by Design Water Technologies
   2. NuWell 410 by Johnson Screens
   3. Oximate by Layne

3. EXECUTION

3.01 WELL CONSTRUCTION

A. Wells shall be constructed by the air rotary method. Reverse rotary will not be allowed.

B. See Drawing C-2 for the proposed well location and alternate location.

C. See Drawing C-3 for the limestone well profile and construction details.

D. A 10-inch diameter hole shall be drilled from grade, terminating at the limestone formation at a depth of approximately 263 feet from the ground surface.

E. An 8-inch diameter welded steel well casing shall be installed from 2-feet above the ground surface to the entire depth of the 10-inch hole.

F. A 7 7/8-inch diameter hole shall be drilled from the bottom of the 10-inch diameter casing into the limestone formation, terminating in the limestone formation at a depth of approximately 330 feet from the ground surface. If shale is encountered within the limestone foundation cease drilling at the depth the shale is encountered.

G. The annular space between the casing and the drill hole shall be sealed by pressure grouting. Grout shall be allowed to set before resuming drilling operations.

H. The well test pump and equipment shall be furnished and installed and the formation shall be test pumped, sampled, and analyzed. Upon satisfactory completion of the well test as determined by the OWNER and ENGINEER, the well test pump equipment shall be removed.

I. The OWNER shall evaluate the results of the well tests and will direct the CONTRACTOR to either finish the well, develop selective formations to modify water quantity and quality, or abandon the well and re-drill in an alternative location.

J. The OWNER may direct the CONTRACTOR to furnish and install well test pump equipment to test the finished well as appropriate following completion of the selected construction/development option. If so directed, the CONTRACTOR shall test pump the completed well and sample and analyze the water received during the pump test.

K. If caving materials are encountered, the CONTRACTOR will be allowed to install the largest diameter steel liner casing practical. Below the liner the hole size will be reduced as required for drilling through the liner and drilling shall continue to the depth set forth above.

L. Remove cuttings, debris and unused materials from site.

M. Limited water will be available from the existing well. The CONTRACTOR will supply water for drilling activities. Provide labor, materials and equipment needed to obtain water for drilling activities.

3.03 GROUTING

A. Notify ENGINEER at least 48 hours before grouting.

B. A suitable cement retainer, packer, or plug shall be provided at the bottom of the casing so that grout will not leak through the bottom of the well.

C. Circulate bentonite before grouting. Inject bentonite using conductor pipe in the manner to be used to inject grout. Pump until bentonite flows to ground surface.

D. Place grout using a conductor pipe. Terminate conductor pipe as close as practical to bottom of protective casing.

E. Use a pump to inject grout.

F. Pump grout down conductor pipe until density of grout flowing onto ground surface is same as grout being pumped. Measure grout density using a mud balance. ENGINEER will determine when grout pumping may be stopped.

G. Remove conductor pipe immediately after grout pumping stops. Do not flush grout from a conductor pipe inserted in the annular space until pipe is removed from well.

H. Complete grouting in one continuous operation.

I. Do no Work on the well until at least 72 hours after grouting.

J. If grout surface subsides while setting, add grout to bring grout level to ground surface. Apply additional grout through a conductor pipe terminating at the hardened grout surface. Use a pump to inject grout when the hardened grout surface is more than 20 feet below ground surface.

K. If grout is delivered to the site in ready mix transit trucks, provide ENGINEER with a copy of delivery ticket for each truck.

L. If grout is mixed on site, provide an accurate method to measure the grout mixture. The method shall be acceptable to ENGINEER.

M. The dimension shown for depth of well cement grout is typical only. Bidder shall meet current IEPA grouting

requirements for the well construction method proposed at no additional cost to the OWNER.

4. TESTING AND FINAL OPERATIONS

4.01 PLUMBNESS AND ALIGNMENT

A. All holes, casings, and liners shall be constructed round, plumb, and true to line. To demonstrate compliance, the CONTRACTOR shall make tests for plumbness and alignment after the complete construction of the well and before its acceptance.

B. Test hole alignment using a 40-foot long pipe or dummy pipe following Section 4.7 of ANSI/AWWA A100. The outer diameter of the plumb shall not be more than 1/2-inch smaller than the diameter of the casing or hole being tested. If a dummy is used, it shall consist of a rigid spindle with three rings, each ring being a true cylinder 12-inches long. The rings shall be positioned one at each end and one in the center of the dummy. The center shaft of the dummy shall be rigid to maintain the alignment of the axes of the rings.

C. Should the plum or dummy fail to move freely throughout the length of the casing or hole to the bottom of the well or should the well vary from the vertical in excess of two-thirds the smallest inside diameter of that part of the well being tested per 100-ft of depth, the plumbness and alignment of the well shall be corrected by the CONTRACTOR at his own expense. Should the CONTRACTOR fail to correct such faulty alignment or plumbness, the ENGINEER may refuse to accept the well.

D. The ENGINEER may waive the requirements for plumbness if, in his judgment: (a) the CONTRACTOR has exercised all possible care in constructing the well and the defect is due to circumstances beyond his control; (b) the utility of the completed well will not be materially affected; and (c) the cost of necessary remedial measures will be excessive. In no event will the provisions with respect to alignment be waived.

4.02 YIELD AND DRAWDOWN

A. Pumping tests are required. Before any test, the well shall be cleaned of construction debris and its depth accurately measured. Notify the ENGINEER at least 24 hours before beginning any pumping test.

B. Furnish and install necessary pumping equipment capable of pumping the following:

Maximum Pumping Capacity:	150 GPM
Minimum Pumping Capacity:	35 gpm
Approximate Test Pump Setting:	263 ft

The pumping unit shall be capable of being operated without interruption for a period of 24 hours.

C. Variation in pumping rate shall be controlled by the use of a gate valve, butterfly valve, or plug valve in the pump discharge line. The throttling valve shall be located a minimum of ten pipe diameters from the discharge point. The discharge line and flow control valve shall be sized so that the valve is approximately one-half to three-quarters open when pumping at the maximum specified rate.

D. Furnish all necessary discharge piping for the pumping unit which shall be of sufficient size and length to conduct the water being pumped to a discharge point approved by the ENGINEER. Furnish, install and maintain equipment of approved size and type for measuring the flow of water, such as a weir box, orifice, or water meter. Two (2) air lines complete with gauges, portable air supplies, and check valves shall be provided to measure the elevation of the water level in the both the new test well **and at the existing well at the school.**

E. At least 24 hours before constant-rate testing begins, perform a pre-test check of pump, valves, flow meters, pump discharge configuration and erosion control measures. Operate the test pump in the well for a sufficient length of time to determine that the pumping unit and well performance meets anticipated test conditions of water level and pumping rate. Pump at maximum yield rate to extract the maximum quantity of sand through the screen. Adjust valving so constant-rate test may begin at the maximum flow rate and without further valve adjustment.

F. The test shall consist of two parts: a constant rate test and a recovery test. Before the test is begun, the regional water level trend shall be established by measuring static water levels in the well every 10 minutes for a period of at least 1 hour before testing.

G. To demonstrate that the well will not impact any other wells in the vicinity, the water level at existing West Oak Middle School well shall be monitored throughout the constant rate test. Notify the ENGINEER if any drawdown is detected in the existing West Oak Middle School well.

H. The constant rate test shall consist of pumping the well continuously at a constant rate approved by the ENGINEER and measuring the water level decline with time for a period of a at least 7 hours and up to 48 hours. The water levels shall be measured according to the following schedule: every 1 minute up to 10 minutes, every 5 minutes up to 50 minutes, every 10 minutes up to 100 minutes, every 50 minutes up to 300 minutes, every 60 minutes to test completion.

Continuous Pump Time	Measurement Interval
0 - 10 minutes	Every minute
10 - 50 minutes	Every 5 minutes
50 - 100 minutes	Every 10 minutes
100 - 300 minutes	Every 50 minutes
300 minutes to end of test	Every 60 minutes

I. The recovery test shall begin immediately following the constant rate test. Water levels in the well shall be measured after pumping has stopped according to the schedule used in the constant rate test for a period of at least 1 hour.

J. During pumping tests, maintain desired pumping rate plus or minus 5 percent. Failure to maintain flow rate within plus or minus 5 percent of the desired rate may result in the need to repeat the pumping test, in which case CONTRACTOR will receive no payment for the entire test during which the desired flow rate was not maintained, not just the period of non-attainment. Pumping rate as measured at the orifice meter or in-line flow or totalizing meter will be used to determine whether the desired flow rate has been maintained. ENGINEER is the sole judge of whether the pumping test must be repeated because the desired flow rate was not maintained.

K. At the end of the pumping test the CONTRACTOR shall collect five one quart water samples and shall send one sample to the Illinois State Water Survey for mineral analysis. The remaining four one quart samples shall be

delivered to the OWNER for its use. See other test requirements included in paragraph 1.04 of this section.

L. The ENGINEER reserves the right to require additional pumping tests during and after construction, as is deemed necessary. All tests shall be conducted with similar equipment and in a manner similar to that described herein.

M. After completion of the final test, the CONTRACTOR shall remove by bailing, sand pumping, or other methods any sand, stones, or other foreign material that may have become deposited in the well.

N. Route discharged water to a suitable discharge location. Any storm inlets into which water discharges shall be outfitted with suitable sedimentation protection.

4.04 WELL DEVELOPMENT

A. If the specific capacity is not sufficient to achieve and sustain the design pumping rate during the pump test without impacting adjacent wells, well development will be considered. Acidizing, air impulse generation are well development items requiring authorization by the OWNER prior to implementation.

B. Design pumping rate:
1. Test Well: 35 to 150 GPM.

C. Submit description of proposed development methods and equipment to ENGINEER for review before starting development efforts. ENGINEER may reject proposed development methods which could have a long-term detrimental effect on the usability of the well.

D. Well development, using any technique, shall include bailing all debris, sand and sediment from the well resulting from development operations. Removal shall continue for a period sufficient to demonstrate complete removal of broken-loose material.

E. If, upon completion of the pumping test, the development criteria have not been achieved, continue development efforts. Conduct additional test pumping as required to demonstrate achievement of the development completion criteria.

F. CONTRACTOR will receive no payment for test pumping if the data collected shows development criteria have not been achieved.

G. Allow ENGINEER and OWNER up to five (5) days to analyze test pumping data to determine if development criteria have been achieved or if the well should be developed or re-drilled in an alternative location.

H. Air impulse generation, if required to achieve design flow rates and approved by the OWNER, shall employ the use of compressed air or nitrogen to surge and air lift pump and/or air pressurize the well. The CONTRACTOR shall furnish all equipment of adequate size and labor to effectively air develop the well. Surge and air lift pumping cycles shall continue in each development zone until the water is relatively clear.

I. Acidization of the well, if required to achieve design flow rates and approved by the OWNER, shall be done using full strength 28 percent commercial grade muriatic acid containing a stabilizer to help keep iron and manganese in solution.

1. Provide a packer suitable for containing increased pressure immediately below the casing for injecting the acid solution to isolate the casing and well bore.

4.05 VIDEO LOGGING - WATER SUPPLY WELL

A. Notify ENGINEER at least 48 hours before logging is scheduled to occur.

B. Before video logging, clear well of sediment by flushing with at least 2 well volumes of potable chlorinated water, or other similarly effective means.

C. Video log well using a down-hole closed circuit, color television camera specifically designed for performing well inspections. Camera shall have its own light source and ability to record images in the direction of, and perpendicular to, the well bore. Depth readings shall appear on the recorded image. Provide a mobile studio to allow viewing televised image while well is being recorded.

D. Mobile studio shall be capable of recording voice audio. Record the following information in audio before performing the log:

1. Well owner.
2. Well identification name and/or number.
3. Contractor name.
4. If logging is being performed by a subcontractor, subcontractor's name.
5. Name of operator performing log.
6. Date log performed.
7. Logging tool manufacturer name and model number.
8. Distance from tool-bottom to downhole-view camera lens.
9. Distance from tool-bottom to sideview camera lens.
10. Distance from casing top to sideview camera lens at the start of the log.

E. Furnish 2 copies of video log DVD to ENGINEER. Label media with the following information:

1. Well owner.
2. Well identification.
3. Contractor.
4. Subcontractors (if any).
5. Operator performing log.
6. Date log performed.

4.05 DISINFECTION

A. After the well has been completely constructed and test pumping completed, it shall be thoroughly cleaned of any remaining foreign substances, including tools, timbers, rope, debris of any kind, cement, oil, grease, joint dope, and scum. The casing pipe shall be thoroughly swabbed, using alkalis if necessary, to remove oil, grease, or joint dope. The well shall then be disinfected with a chlorine solution according to the Illinois Water Well Construction Code and the latest revision of AWWA-A100. The chlorine solution shall be sodium hypochlorite. Calcium hypochlorite will not be allowed. The method of application must be approved by the ENGINEER prior to disinfection.

B. The chlorine solution used for disinfecting the well shall be of such volume and strength and shall be so applied that concentration of at least 100 ppm of chlorine shall be obtained in all parts of the well. Chlorine solution shall remain in the well for a period of at least six hours.

C. The CONTRACTOR shall perform using a certified laboratory approved by the OWNER all bacteriological testing required in conformance with AWWA-A100 and AWWA-C654. Section 652.203 of 35 Illinois Administrative Code shall be followed.

D. In the event that the test pump is installed after the well has been disinfected, all parts of the test pump coming in contact with the water shall be dusted with a chlorine compound as directed by the ENGINEER.

4.06 TEMPORARY CAPPING

A. At all times during the progress of the work, the CONTRACTOR shall protect the well in such a manner as necessary to prevent either tampering with the well, or the entrance of foreign matter into it. Upon completion of the well, the CONTRACTOR shall provide and set a substantial screwed, flanged, or welded cap satisfactory to the ENGINEER.

4.07 ABANDONMENT OF WELL

A. In the event that the initially drilled well location does not produce sufficient flow and must be re-drilled at the alternative location, or if the CONTRACTOR shall fail to drill the well to the depth specified or to such lesser depth as ordered by the ENGINEER, or should abandon the well because of insufficient construction, loss of tools or for any other cause, he shall, if requested, and as directed by the ENGINEER, close the well as per the requirements of the Illinois Water Well Construction Code, 77 Il. Adm. Code Section 920.120 from the Illinois Department of Health, requirements of the Lake County Health Department, and Section 02750.

END OF SECTION

SECTION 02750

WELL CLOSURE AND ABANDONMENT

1. GENERAL

1.01 SUMMARY

A. This specification shall cover the procedures and requirements for the closure and abandonment of wells. The CONTRACTOR shall provide all labor, materials, and equipment for the complete closure and abandonment of the water wells. The CONTRACTOR shall comply with all federal, state, and local laws and ordinances relating to the performance of the work. All work is to be done in accordance with the requirements of the Illinois Department of Public Health and Lake County Health Department.

B. All equipment and materials removed under this project shall become the possession of the CONTRACTOR for removal and disposal.

C. Related Work Specified Elsewhere

1. Division 1 General Requirements

2. Division 2 Sitework

D. Reference Standards

1. Illinois Department of Public Health, Title 77 Chapter 1, Part 920.120

2. Environmental Protection Act, Title IV, Public Water Supplies [415 ILCS 5/Title IV])

4. Illinois Water Well and Pump Installation Contractor's License Act [225 ILCS 345]

5. Lake County Health Department

6. Illinois Environmental Protection Agency

7. All other federal, state, or local laws, ordinances, rules and regulations.

1.02 SUBMITTALS

A. Qualifications

1. CONTRACTOR shall be a licensed water well driller pursuant to the Illinois Water Well and Pump Installation Contractor’s License Act [225 ILCS 345].

2. CONTRACTOR shall meet the requirements of the Lake County Health Department.

B. Closure Procedures

Submit the following:

1. Shop drawings, catalog data, and manufacturer’s technical data showing complete information on proposed water well closure methods, materials, and equipment to be used.

2. Method of closure and restoration of water well. This shall include:

a. Detail drawings and written descriptions of the entire procedure for closure and abandonment of the wells.

b. Location and number of neat cement/bentonite grout plugs within each well.

c. Anticipated volume of material required to seal each well.

3. Materials to be used for backfilling and sealing of the water wells.

1.03 DELIVERY, STORAGE AND HANDLING

A. Transport, handle, and store materials as recommended by manufacturer.

2. PRODUCTS

2.01 BENTONITE GROUT

A. Bentonite grout shall be a manufactured grout product which is a mixture of sodium bentonite and water mixed at the manufacturer's recommended ratio; a mixture of granulated sodium bentonite and water which consists of a minimum of 20% solids bentonite clay and water that is equivalent to 9.4 pounds/gallon; a mixture of granulated sodium bentonite and clean drilling mud and water, weighing a maximum of 8.6 pounds/gallon, which consists of a minimum of 20% solids bentonite clay and clean

drilling mud equivalent to 9.6 pounds/gallon; or sodium bentonite in the granulated or chip form. All bentonite products shall comply with NSF International requirements.

2.02 NEAT CEMENT GROUT

A. Neat cement grout shall be a mixture consisting of one (1) bag of cement (94 pounds) to not more than six (6) gallons of clean water. Bentonite or other similar approved additives may be added up to 6% by dry weight to increase fluidity or to control shrinkage.

2.03 CEMENT

A. Cement shall be a mixture consisting cement, sand and water in the proportion of one (1) bag of cement (94 pounds) and an equal volume of dry sand to not more than six (6) gallons of clean water.

2.04 PEA GRAVEL

A. Pea gravel shall be of uniform gradation from 1/4" to 3/8" and shall be cleaned, washed, and disinfected prior to use.

2.05 LIMESTONE CHIPS

A. Limestone chips shall be of uniform gradation from 1/4" to 3/8" and shall be cleaned, washed, and disinfected prior to use.

3. EXECUTION

3.01 GENERAL REQUIREMENTS

A. CONTRACTOR shall provide a minimum of 14 days written notice to the Illinois Department of Public Health, Lake County Health Department, and OWNER prior to performing any work to seal the water well. The CONTRACTOR shall submit the well closure plan to Lake County Health Department and OWNER for review and approval prior to performing any work.

B. CONTRACTOR shall complete and submit the Lake County Health Department and Illinois Department of Public Health permit applications to the Lake County Health Department for approval prior to performing any work.

C. CONTRACTOR shall maintain a complete and accurate record of the well closure procedures. The following information at a minimum shall be recorded and submitted to the Illinois Department of Public Health, Lake County

Health Department and OWNER not more than 30 days after the well is sealed:

1. Date the well was drilled
2. Depth and diameter of the well
3. Static water level
4. Location of the well
5. Type of sealing method used
6. Original well permit
7. Date the well was sealed
8. Type of well
9. Whether the formation is clear of obstructions
10. Casing record
11. Well driller’s license number and name

3.02 PROTECTION OF PROPERTY

A. Provide all required sediment and erosion control measures to prevent bentonite grout, cement grout, pea gravel, limestone chips, or similar materials from entering adjacent storm drainage ditches or piping, public or private property, wetlands or utilities.

B. The CONTRACTOR shall make all provisions necessary for conveying any water encountered in performing the work away from adjacent wells and structures, and shall take measures necessary to prevent erosion and/or flooding of the site and adjacent properties.

C. The CONTRACTOR shall comply with all applicable laws and regulations governing the furnishing and use of safeguards, safety devices, and protection of equipment. The CONTRACTOR shall take all necessary precautions to protect the life and health of employees and the public in the performance of the work.

3.03 WELL CLOSURE PROCEDURES

A. Well Isolation

1. The CONTRACTOR shall coordinate the necessary work to isolate the water well with the Lake County Public Works Department staff.

B. Well Disinfection

1. The water wells which are to be abandoned shall be disinfected by introducing sufficient chlorine to produce 100 parts per million of chlorine in the water in the well prior to sealing the well.

C. Well Sealing

1. The well shall be sealed by placing the sealing materials from the bottom of the well to the surface by methods that will avoid segregation or dilution of material in accordance with the following requirements:

2. Unconsolidated formations. Wells extended into coarse sand and gravel formations with producing wells located nearby the well shall be sealed by filling with disinfected clean pea gravel or limestone chips to 10 feet below the top of the water bearing formation. Neat cement grout or bentonite product for water well sealing shall be placed for a minimum of 20 feet above this point. The upper part of the well to where the well casing is removed shall be sealed by neat cement grout or bentonite product for water well sealing provided the upper part of the well is dry.

3. Non-creviced, consolidated formations. Wells extending into non-creviced sandstone, or other water bearing consolidated formations shall be sealed by filling the well with disinfected clean pea gravel or limestone chips to within 10 feet below the top of the water bearing formation or to within 10 feet of the bottom of the casing, whichever is less. Neat cement grout or bentonite grout product manufactured for water well sealing shall be placed for a minimum of 20 feet above this point. The upper part of the well to where the well casing is removed shall be sealed by neat cement grout or any bentonite product manufactured for water well sealing. Concrete or cement may be used for such sealing, provided the upper part of the well is dry.

4. Creviced formations. Wells extended into creviced formations shall be sealed by filling with disinfected clean pea gravel or limestone chips to within 10 feet below the top of the water bearing formation or to within 10 feet below the bottom of the casing whichever is less. Neat cement grout or bentonite grout product manufactured for well sealing shall be placed for a minimum of 20 feet above this point. The upper part of the well to where the well casing is removed shall be sealed by neat cement grout or bentonite grout product manufactured for water well sealing. Concrete or cement may be used for such sealing, provided the upper part of the well is dry. Where the earth cover is less than 30

feet, the hole shall be grouted from 10 feet below the creviced formation to where the well casing is removed.

5. More than one water bearing formation. Where wells extend into more than one water bearing formation, each water bearing formation shall be sealed independently in the manner described in this Section. Neat cement grout or bentonite grout product manufactured for water well sealing shall be placed a minimum of 10 feet above and below at all intermittent water bearing formations. Disinfected clean pea gravel or limestone chips shall be placed in each water bearing formation between plugs. When the lower formation has an up flow of water into the upper formation, a pressure seal is required to shut off the up flow while a neat cement plug at least 50 feet in length is pumped in place and allowed to set. The upper part of the well to where the well casing is removed shall be sealed with neat cement grout or bentonite grout product manufactured for water well sealing. Concrete or cement may be used for such sealing provided the upper part of the well is dry.

6. In lieu of filling the well with disinfected clean pea gravel of limestone chips, wells may be sealed by grouting from the bottom up by using neat cement grout or bentonite product for water well sealing. This material shall be applied the full depth of the well and shall terminate within 2 feet of the ground surface. Concrete may be used in the upper part of the well, provided the upper part of the well is dry.

D. Well Casing Removal

1. The well casing shall be removed to at least 2 feet below final grade and sealed.

3.04 CLEAN-UP AND RESTORATION

A. Clean-Up

Upon completion of the work the CONTRACTOR shall remove from the site all materials, debris, tools, and equipment. Plugging materials and all other materials which have accumulated on-site shall be removed and disposed of by the CONTRACTOR.

B. Restoration

The CONTRACTOR shall restore the site to a condition that reasonably approaches the original condition of the property prior to the start of the work. Excavations and tire ruts shall be backfilled, graded, and seeded to conform to existing ground contours.

END OF SECTION

PROPOSED ENGINEERING IMPROVEMENT PLANS FOR:

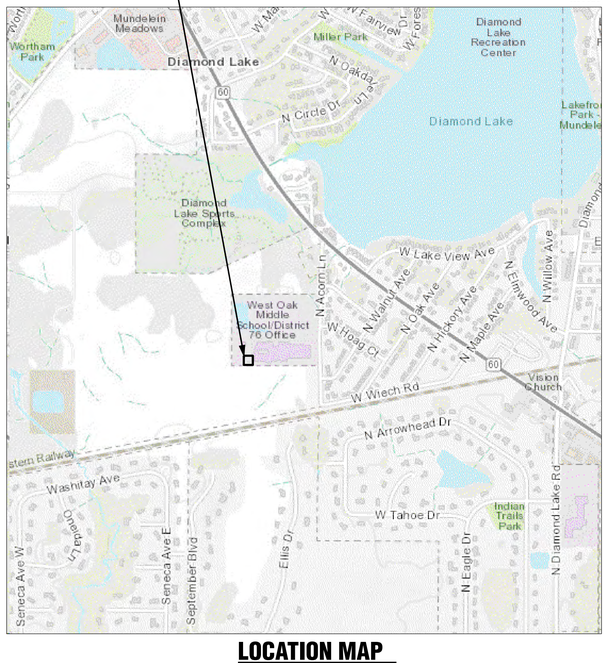
NEW WATER SUPPLY WELL DRILLING AND TESTING FOR OAK TERRACE WATER SYSTEM

PREPARED FOR:
LAKE COUNTY PUBLIC WORKS DEPARTMENT
650 W WINCHESTER ROAD
LIBERTYVILLE, IL 60048

PLANS PREPARED BY:
RHMG ENGINEERS, INC.
MUNDELEIN, ILLINOIS

PROJECT LOCATION:
WEST OAK MIDDLE SCHOOL
26156 N ACORN LN
MUNDELEIN, IL 60060

N.T.S.



LOCATION MAP
N.T.S.

LEGEND

EXISTING		PROPOSED
	STORM SEWER	
	STORM UNDERDRAIN	
	STORM MANHOLE	
	STORM CATCHBASIN	
	STORM FLARED END SECTION	
	STORM INLETS	
	SANITARY MANHOLE	
	SANITARY AIR RELEASE VALVE	
	SANITARY CLEANOUT	
	WELL	

Call Before You Dig
JULIE ILLINOIS ONE-CALL SYSTEM

CALL TWO WORKING DAYS
BEFORE YOU DIG
IT'S THE LAW
1-800-892-0123

EROSION CONTROL LEGEND

SILT FENCE

PROPOSED STORM INLET PROTECTION

EROSION CONTROL BLANKET

ABBREVIATIONS

AC	AIR CONDITIONER UNIT	INL	INLET
ADW	ASPHALT DRIVEWAY	LAP	LANDSCAPING
AGG	AGGREGATE	MH	MANHOLE
B	BUSH	PED	PEDESTAL
BWALL	BOTTOM OF WALL	PVC	POLYVINYL CHLORIDE PIPE
C&G	CURB AND GUTTER	R	RIM
CB	CATCH BASIN	RCP	REINFORCED CONC. PIPE
CDW	CONCRETE DRIVEWAY	ROW	RIGHT-OF-WAY
CE	COMED METER	RW	RETAINING WALL
℄	CENTERLINE	SAN	SANITARY SEWER
CMP	CORRUGATED METAL PIPE	ST	STORM SEWER
CONC	CONCRETE	SW	SIDEWALK
CPP	CORRUGATED PLASTIC PIPE	TB	TOP OF BANK
DIP	DUCTILE IRON PIPE	TRAN	TRANSITE PIPE
DS	DOWN SPOUT	TWALL	TOP OF WALL
FL	FLOW LINE	W	WATERMAIN
GM	GAS METER	WL	WATER LINE
GDW	GRAVEL DRIVEWAY	WT	WATER REMOTE METER
HDPE	HIGH DENSITY POLY PIPE	WW	WINDOW WELL
IE	INVERT ELEVATION		

INDEX OF DRAWINGS

WILLIAM R. RICKERT, P.E.
IL LICENSE #062-037106
EXPIRES 11/30/21

RHMG ENGINEERS, INC.

LIMITATION OF WARRANTY OF ENGINEER'S INSTRUMENTS OF SERVICE

The Engineer and his consultants do not warrant or guarantee the accuracy and completeness of the deliverables herein beyond a reasonable diligence. If any mistakes, omissions, or discrepancies are found to exist within the deliverables, the Engineer shall be promptly notified so that he may have the opportunity to take whatever steps necessary to resolve them. Failure to promptly notify the Engineer of such conditions shall absolve the Engineer from any responsibility for the consequences of such failure. Actions taken without the knowledge and consent to the Engineer, or in contradiction to the Engineer's deliverables or recommendations, shall become the responsibility not of the Engineer but of the parties responsible for taking such action.

REVISIONS:

COVER SHEET

OAK TERRACE WATER SYSTEM
WELL DRILLING AND TESTING
LAKE COUNTY PUBLIC WORKS DEPARTMENT

RHMG ENGINEERS, INC.
975 CAMPUS DR
MUNDELEIN, ILLINOIS 60060
847.362.5959

RHMG
www.rhmg.com
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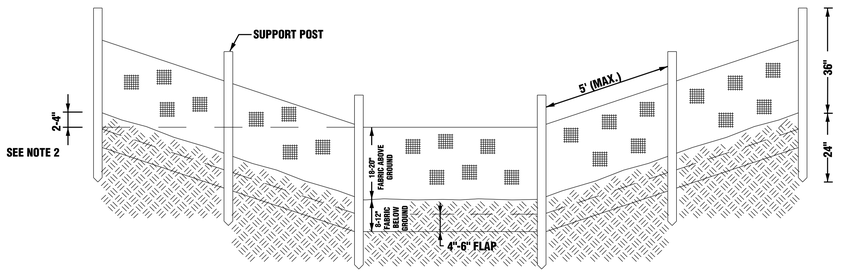
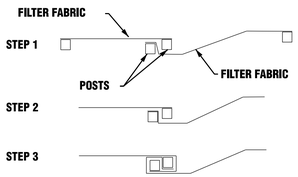
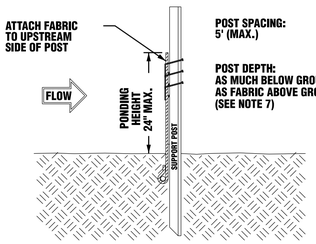
DESIGNED BY: PJL
DRAWN BY: PJL
CHECKED BY: SLV
24"x36" SCALE: N.T.S.
DATE: OCT., 2020
PROJECT NO.: 22002021
SHEET
G1



FRONT VIEW



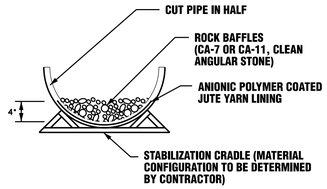
ATTACHING TWO SILT FENCES



CROSS SECTION

SILT FENCE

N.T.S.



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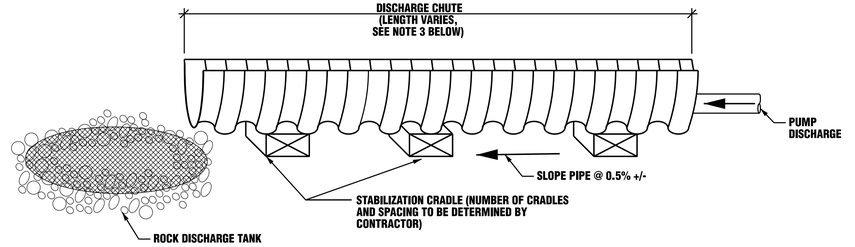
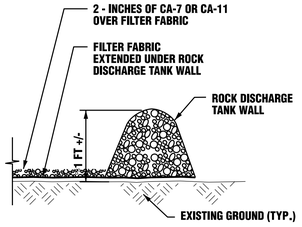


ORTHOGRAPHIC VIEW



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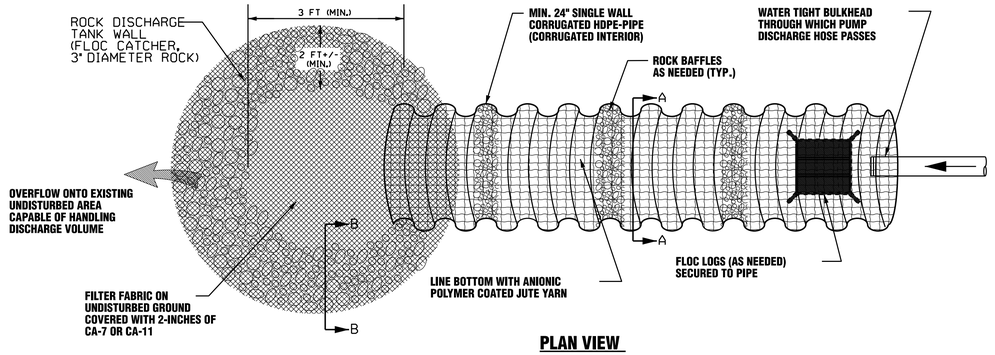


PLAN VIEW

POTENTIAL PORTABLE SEDIMENT CONTAINMENT SYSTEM

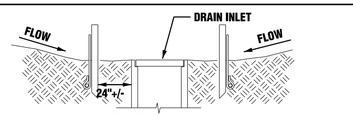
N.T.S.

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING APPROVAL FROM APPLICABLE REGULATORY AGENCY FOR PROPOSED PORTABLE SEDIMENT CONTAINMENT SYSTEM. PORTABLE SEDIMENT CONTAINMENT SYSTEM AS SHOWN IS AN EXAMPLE OF TYPE OF SYSTEM THAT MAY BE INSTALLED.
2. TYPE AND QUANTITY OF FLOC LOGS TO BE PROVIDED SHALL WORK IN CONJUNCTURE WITH SITE-SPECIFIC SOIL AND WATER CONDITIONS. CONTRACTOR TO COORDINATE WITH FLOC LOG MANUFACTURER / SUPPLIER.
3. LENGTH OF DISCHARGE CHUTE DICTATED BY CONTACT TIME AND TURBULENCE REQUIRED TO FORM FLOCS (DETERMINED BY BENCH TEST).
4. INSTALL ANIONIC POLYMER COATED JUTE YARN ON BOTTOM OF THE PIPE AS NEEDED.
5. ROCK BAFFLES TO BE COMPOSED OF CLEAN, ANGULAR STONE, CA-7 OR CA-11 (NO FINES). HEIGHT OF ROCK BAFFLES SHALL BE NOMINALLY 4 INCHES.
6. ROCK BAFFLES SHALL BE OF A SUFFICIENT DIAMETER AND HEIGHT TO TRAP FLOCCULENT. CONTRACTOR SHALL MAINTAIN AS NECESSARY.
7. DISCHARGE FROM POTABLE SEDIMENT CONTAINMENT SYSTEM SHALL BE LOCATED AS FAR FROM WETLANDS OR WATERWAYS AS PRACTICAL.
8. THE PORTABLE SEDIMENT CONTAINMENT SYSTEM(S) ARE INTENDED TO BE LOCATED IN CONJUNCTION WITH ANY/ALL CONSTRUCTION DEWATERING SYSTEMS. CONTRACTOR SHALL PROVIDE A NUMBER OF PORTABLE SEDIMENT CONTAINMENT SYSTEMS EQUAL TO THE NUMBER OF SEPARATE LOCATIONS WHERE DEWATERING IS BEING PERFORMED. CONTRACTOR WILL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE MOVING AND REASSEMBLING OF SAID SYSTEM(S) AS WORK PROGRESSES.
9. UNLESS A PAY ITEM IS INCLUDED IN THE SCHEDULE OF PRICES, THE COST FOR PORTABLE AND/OR SEMI-PERMANENT SEDIMENT CONTAINMENT SYSTEM(S), REGARDLESS OF THE NUMBER OF SAID UNITS OR THE NUMBER OF MOVES/REASSEMBLY REQUIRED, WILL BE CONSIDERED INCIDENTAL TO THE CONTRACT AND NO ADDITIONAL COMPENSATION WILL BE PROVIDED.

INSPECTION AND MAINTENANCE

10. REPLACE JUTE YARN WHEN CLOGGED OR AS NECESSARY.
11. ADD ADDITIONAL ANIONIC POWDER POLYMER AS DIRECTED BY MANUFACTURER OR AS NECESSARY.
12. ATTACH ADDITIONAL FLOC LOG WHEN CURRENT HAVE DISSOLVED APPROXIMATELY TO HALF ORIGINAL SIZE, AS NECESSARY, AND AS DIRECTED BY MANUFACTURER.
13. IF WATER LEVEL NEARS THE TOP OF THE DISCHARGE CHUTE, PUMP SHALL BE SHUT OFF WHILE THE DISCHARGE CHUTE DRAINS AND ADDITIONAL CAPACITY IS MADE AVAILABLE.



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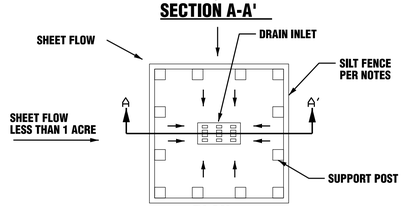


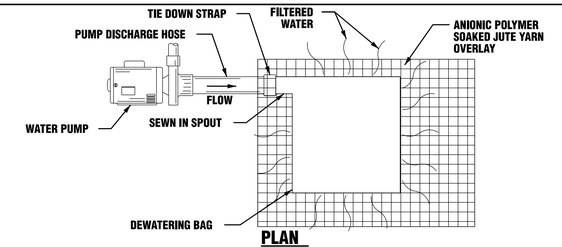
PLAN

STORM INLET (SILT FENCE) PROTECTION

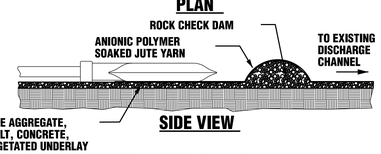
N.T.S.

NOTES:

1. USE WOVEN MONOFILAMENT FABRIC.
2. GRAB TENSILE STRENGTH 200 LB (MIN.)
3. TRAP TEAR STRENGTH 75 LB (MIN.)
4. PERCENT OPEN AREA 10%
5. WATER FLOW RATE 145 GPM/SQ.FT
6. INSTALL BY STATIC SLICED OR TRENCHING METHOD.
7. REFER TO STATIC SLICED SILT FENCE FOR OTHER CONSTRUCTION, INSPECTION, AND MAINTENANCE DETAILS.



PLAN



SIDE VIEW

DEWATERING BAG

N.T.S.

NOTES:

1. DEWATERING BAG TO BE APPROXIMATELY SIZED FOR DISCHARGE PUMP.
2. INSTALL ROCK CHECK DAM OF CLEAN, ANGULAR STONE, CA-7 OR CA-11 (NO FINES) PROPOSED HEIGHT IS 6 INCHES.
3. PERFORM MAINTENANCE WHEN BAG IS 1/3 FULL OF SEDIMENT OR WHEN WATER FLOW HAS BEEN GREATLY REDUCED.
4. REPLACE JUTE YARN WHEN CLOGGED OR AS NECESSARY.
5. ADD ADDITIONAL ANIONIC POWDER POLYMER AS DIRECTED BY MANUFACTURER OR AS NECESSARY.

REVISIONS:

SOIL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS

OAK TERRACE WATER SYSTEM
WELL DRILLING AND TESTING
LAKE COUNTY PUBLIC WORKS DEPARTMENT

RHMG ENGINEERS, INC.
975 CAMPUS DR
MUNDELEIN, ILLINOIS 60060
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info@rhmg.com

DESIGNED BY:	PJL
DRAWN BY:	PJL
CHECKED BY:	SLV
24"x36" SCALE:	N.T.S.
DATE:	OCT., 2020
PROJECT NO.:	22002021
SHEET	

G2

SOIL EROSION AND SEDIMENT CONTROL NOTES

1. EROSION AND SEDIMENT CONTROL MEASURES SHALL COMPLY WITH THE REQUIREMENTS OF LAKE COUNTY.

2. ON-SITE SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND FUNCTIONAL PRIOR TO INITIATING CLEARING, GRADING, STRIPPING, EXCAVATION, OR FILL ACTIVITIES ON THE SITE.

3. CONTRACTOR SHALL LIMIT SOIL DISTURBANCE SO AS TO MINIMIZE EROSION. SOIL STABILIZATION MEASURES SHALL CONSIDER THE TIME OF YEAR, SITE CONDITIONS, AND THE USE OF TEMPORARY OR PERMANENT MEASURES.

4. NO SEDIMENT SHALL BE ALLOWED TO ENTER EXISTING STORM SEWERS. PROPERTIES AND CHANNELS LOCATED DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION. AT POINTS WHERE CONCENTRATED FLOW LEAVES A SITE, STABLE DOWNSTREAM FACILITIES ARE REQUIRED. STREETS ADJACENT TO THE SITE SHALL BE KEPT FREE OF DIRT, MUD, AND DEBRIS.

5. ALL STORM SEWERS AND/OR CULVERTS THAT ARE OR WILL BE FUNCTIONING DURING CONSTRUCTION SHALL BE PROTECTED BY AN APPROPRIATE SEDIMENT CONTROL MEASURE, FILTERED, OR OTHERWISE TREATED TO REMOVE SEDIMENT.

6. SOIL EROSION CONTROL MEASURES IN ACCORDANCE WITH THESE SPECIFICATIONS SHALL BE FOLLOWED AT ALL TIMES, AND AS REQUIRED BY THE COUNTY, DISTRICT AND/OR ENGINEER, AND SHALL BE IMPLEMENTED IMMEDIATELY BY THE CONTRACTOR.

7. UNLESS SOIL EROSION CONTROL ITEMS ARE SPECIFICALLY REFERRED TO AS BID ITEMS (SUCH AS TOPSOIL RESPREAD, SEEDING, ETC.) THEY ARE TO BE CONSIDERED INCIDENTAL TO THE COST OF THE CONTRACT.

8. DISTURBED AREAS DRAINING LESS THAN ONE (1) ACRE SHALL BE PROTECTED BY A FILTER BARRIER (INCLUDING FILTER FENCES, OR EQUIVALENT CONTROL MEASURES) FOR ALL AREAS WHERE OFF-SITE RUNOFF WILL OCCUR. VEGETATED FILTER STRIPS, WITH A MINIMUM WIDTH OF TWENTY-FIVE (25) FEET, MAY BE USED AS AN ALTERNATIVE ONLY WHERE RUNOFF IN SHEET FLOW IS EXPECTED.

9. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION, MAINTENANCE, AND ANY NECESSARY CORRECTIVE ACTION ASSOCIATED WITH THE EROSION CONTROL MEASURES SO DESIGNATED. THE FOLLOWING ITEMS ARE TO BE PROVIDED BY THE CONTRACTOR:
   A. DITCH CHECKS SHALL BE INSTALLED AND MAINTAINED AT ALL DRIVEWAY CULVERTS, AROUND INLETS, CATCH BASINS, STORM SEWER STRUCTURES, IN SWALE AREAS, AND ALONG PROPERTY LINES PRIOR TO THE START OF CONSTRUCTION. THESE EROSION CONTROL MEASURES ARE TO BE MAINTAINED UNTIL ALL RESTORATION IS COMPLETE AND GRASS IS ESTABLISHED.

10. SOIL STOCKPILES SHALL NOT BE LOCATED IN A FLOOD PRONE AREA OR A DESIGNATED BUFFER PROTECTING WATERS OF THE UNITED STATES OR ISOLATED WATERS OF LAKE COUNTY. ALL SOIL STOCKPILES SHALL BE COMPLETELY ENCLOSED WITH SILT FENCE.

11. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DISTURBED AREAS WITHIN SEVEN (7) CALENDAR DAYS AT THE END OF INITIAL GROUND DISTURBANCE IF ADDITIONAL DISTURBANCE WILL NOT OCCUR WITHIN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED WITHIN SEVEN (7) DAYS OF COMPLETION OF FINAL GRADING OF THE SOIL. PERMANENT SOIL STABILIZATION MEASURES SHALL BE APPLIED TO CHANNELS (INCLUDING BED AND BANKS) WITHIN SEVEN (7) CALENDAR DAYS OF THE END OF PRIMARY DISTURBANCE OF THE CHANNEL. PERMANENT OR TEMPORARY VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL SUFFICIENT GROUND COVER IS MATURE ENOUGH TO CONTROL EROSION.

    A. THE COST FOR ANY AND ALL TEMPORARY SOIL STABILIZATION, INCLUDING ANY NECESSARY MAINTENANCE OF SAID SOIL STABILIZATION, SHALL BE CONSIDERED INCIDENTAL AND NO ADDITIONAL COMPENSATION WILL BE PROVIDED.

12. AREAS OR EMBANKMENTS HAVING SLOPES GREATER THAN OR EQUAL TO 3 HORIZONTAL TO 1 VERTICAL AND APPROVED BY THE ENFORCEMENT OFFICER, SHALL BE STABILIZED WITH SOD, MAT OR BLANKET IN COMBINATION WITH SEEDING.

13. UNLESS OTHERWISE INDICATED, NON DYED, STRAW SEWN FIBER EROSION CONTROL BLANKET SHALL BE REQUIRED ON ALL INTERIOR DETENTION BASIN SIDE SLOPES BETWEEN NORMAL WATER LEVEL AND HIGH WATER LEVEL.

14. UPON COMPLETION OF TOPSOIL RESPREAD OPERATIONS, ALL DISTURBED AREAS SHALL BE SEEDED, SODDED, OR LANDSCAPED AS NOTED ON THE PLANS.

15. ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES MUST BE MAINTAINED AND REPAIRED AS NEEDED.

16. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED.

17. IF DEWATERING SERVICES ARE USED, ADJOINING PROPERTIES AND DISCHARGE LOCATIONS SHALL BE PROTECTED FROM EROSION. DISCHARGES SHALL BE ROUTED THROUGH AN EFFECTIVE SEDIMENT CONTROL MEASURE (E.G. SEDIMENT TRAP, SEDIMENT BASIN, OR OTHER APPROPRIATE MEASURE).

18. UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS FOR LAKE COUNTY OR STATE OF ILLINOIS, WHICHEVER IS MORE STRINGENT.

19. A COPY OF THE APPROVED AND UPDATED NPDES PERMIT, SWPPP, AND EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES, IF APPLICABLE.

20. THE EROSION CONTROL MEASURES INDICATED ON THE PLANS ARE MINIMUM REQUIREMENTS. CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES TO THOSE SHOWN ON THESE PLANS NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE ENGINEER, OWNER, OR GOVERNING AGENCY.

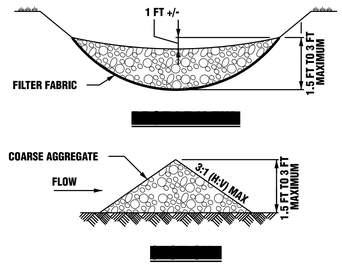
21. THE CONTRACTOR SHALL PROVIDE QUALIFIED PERSONNEL TO INSPECT DISTURBED AREAS OF THE CONSTRUCTION SITE WHICH HAVE NOT BEEN FINALLY STABILIZED, STRUCTURAL CONTROL MEASURES, AND LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE. SUCH INSPECTIONS SHALL BE CONDUCTED AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS AFTER THE END OF A STORM THAT IS 0.5 INCHES OR GREATER OR EQUIVALENT SNOWFALL. INSPECTIONS SHALL BE PERFORMED AND THE REPORT PREPARED IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.

22. THE COUNTY OF LAKE SHALL ALSO RESERVE THE RIGHT TO INSPECT ALL AREAS OF THE CONSTRUCTION SITE FOR COMPLIANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.

23. THE CONTRACTOR SHALL CORRECT ANY DEFICIENCIES OF THE EROSION AND SEDIMENT CONTROLS IDENTIFIED IN THE INSPECTION REPORTS AS SOON AS POSSIBLE.

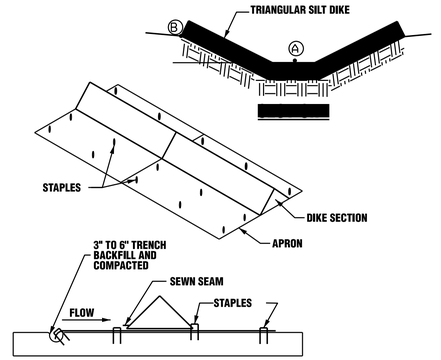
24. IF THE CONTRACTOR USES DEWATERING WELLS ON THIS PROJECT, THEN IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN PERMITS FOR THEIR USE FROM ALL APPLICABLE AGENCIES (i.e. COUNTY HEALTH DEPARTMENT, ETC.).

25. UNLESS OTHERWISE NOTED ILLINOIS DEPARTMENT OF TRANSPORTATION CLASS 1 SEED MIXTURE SHALL BE APPLIED ON ALL DISTURBED AREAS REQUIRING RE-SEEDING.



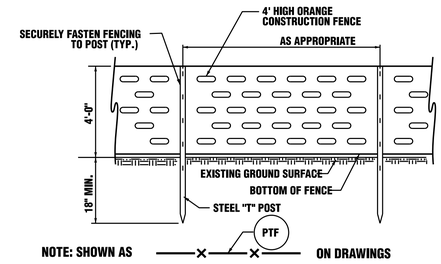
ROCK CHECK DAMS
N.T.S.

NOTES:
1. FILTER FABRIC SHALL MEET THE REQUIREMENTS AS DETAILED IN SPECIFICATIONS.
2. ROCK SHALL MEET IDOT COARSE AGGREGATE GRADATION, CA-1.



TRIANGULAR SILT DIKE
N.T.S.

NOTES:
1. TRIANGULAR SILT DIKES OR APPROVED EQUAL SHALL BE INSTALLED AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY THE OWNER OR ENGINEER.
2. TRIANGULAR SILT DIKES SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
3. ELEVATION OF POINT Ⓐ SHALL NEVER EXCEED ELEVATION OF POINT Ⓑ.



TEMPORARY PROTECTIVE TREE FENCE
N.T.S.

NOTES:
1. STEEL POSTS SHALL BE SPACED AS REQUIRED TO ADEQUATELY SUPPORT CONSTRUCTION FENCE.
2. SEE NOTES ON SHEET 42 FOR ADDITIONAL REQUIREMENTS.
3. TO BE INSTALLED ONLY IN THOSE LOCATIONS AS SHOWN ON THE DRAWINGS AND APPROVED BY THE OWNER AND E/A.

REVISIONS:

SOIL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS

OAK TERRACE WATER SYSTEM
WELL DRILLING AND TESTING
LAKE COUNTY PUBLIC WORKS DEPARTMENT

RHMG ENGINEERS, INC.
975 CAMPUS DR
MUNDELEIN, ILLINOIS 60060
847.362.5959

RHMG
www.rhmg.com
info@rhmg.com

DESIGNED BY:	PJL
DRAWN BY:	PJL
CHECKED BY:	SLV
24"x36" SCALE:	N.T.S.
DATE:	OCT., 2020
PROJECT NO.:	22002021
SHEET	

G3

WEST OAK MIDDLE SCHOOL CAMPUS
26156 N ACORN LN.,
MUNDELEIN, IL 60060
PARCEL NUMBER: 1036300007
OAK TERRACE SUBDIVISION
LOT SIZE: 432,752.28 SQ. FT.
ELEVATION DATUM NAVD88

NOTES

1. **THE EXISTING CHEMICAL FEED POINTS AND FLOW METERS ARE TO BE MAINTAINED.**
2. **CONTRACTOR SHALL FIELD LOCATE ALL EXISTING WATERMAIN(S) BEFORE STARTING THE WORK.**

REVISIONS:

EXISTING SITE PLAN

OAK TERRACE WATER SYSTEM
WELL DRILLING AND TESTING
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SHEET	

C1

GRAPHIC SCALE
0′ 40′ 80′
1″ = 80′

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26156 N ACORN LN.,
MUNDELEIN, IL 60060
PARCEL NUMBER: 1036300007
OAK TERRACE SUBDIVISION
LOT SIZE: 432,752.28 SQ. FT.
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NOTES

1. **THE EXISTING CHEMICAL FEED POINTS AND FLOW METERS ARE TO BE MAINTAINED.**
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REVISIONS:

PROPOSED NEW WELL DRILLING LOCATION SITE PLAN

OAK TERRACE WATER SYSTEM WELL DRILLING AND TESTING LAKE COUNTY PUBLIC WORKS DEPARTMENT

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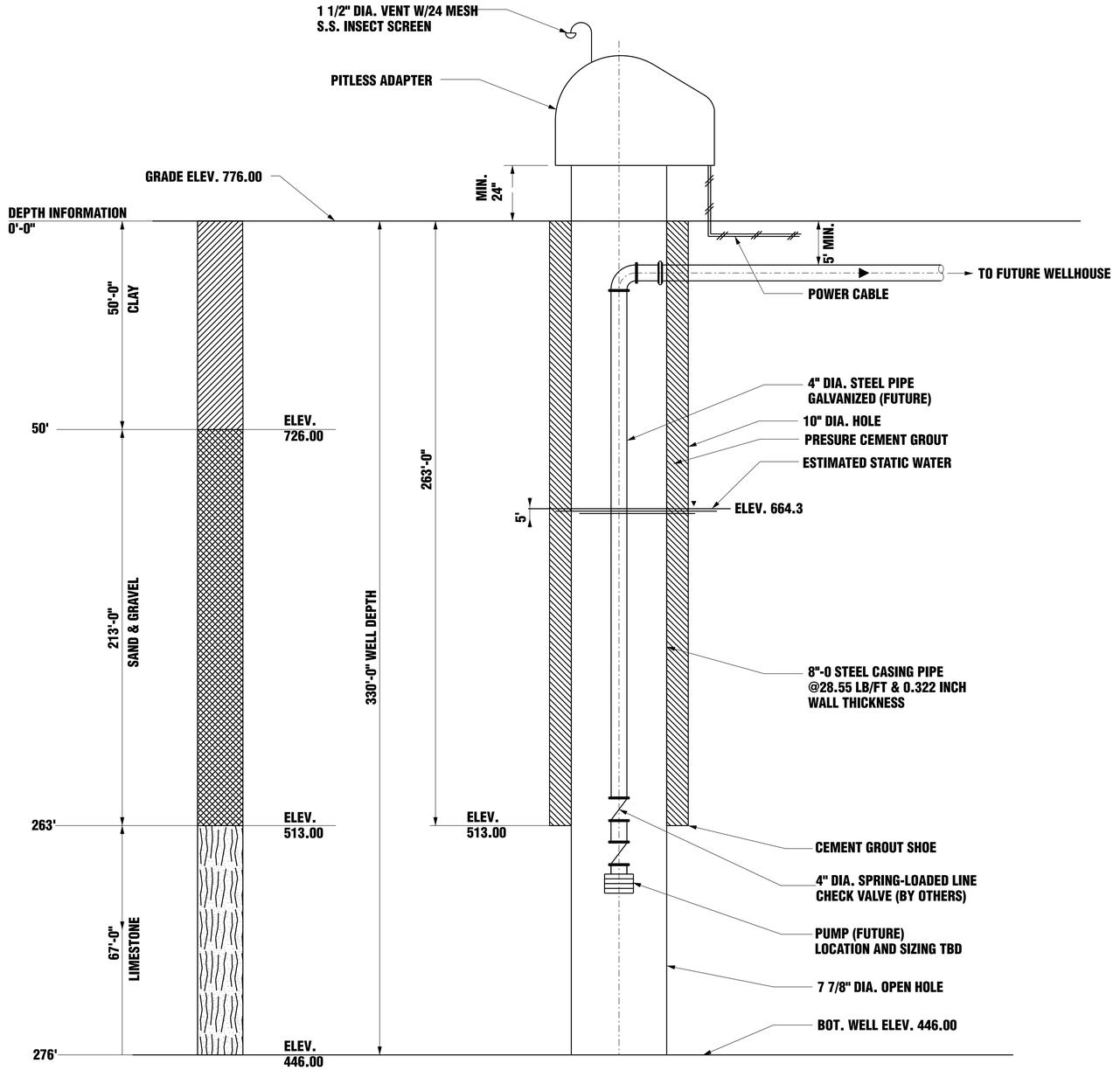
C2



WELL PROFILE
N.T.S.

REVISIONS:

WELL PROFILE

OAK TERRACE WATER SYSTEM
WELL DRILLING AND TESTING
LAKE COUNTY PUBLIC WORKS DEPARTMENT

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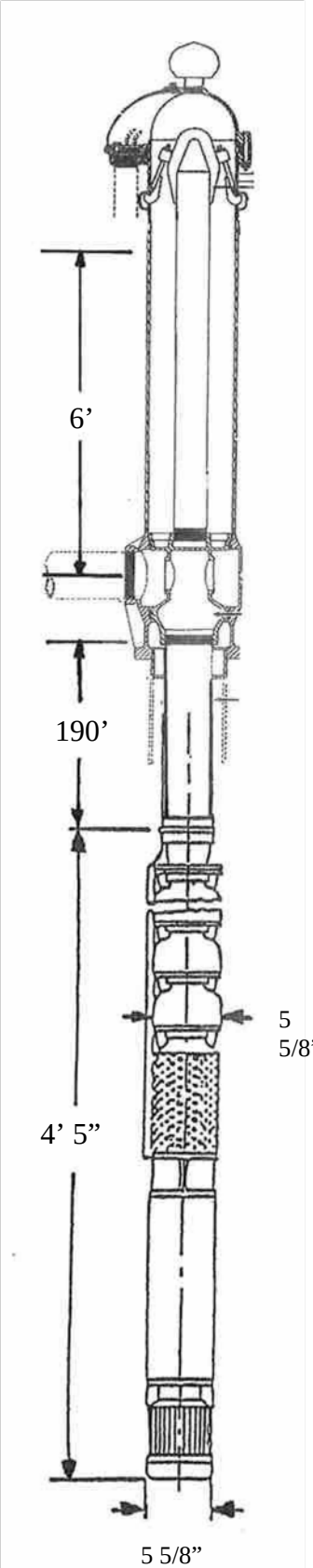
SHEET	

C3

Water Well Solutions

Toll Free: (888) 769-9009 www.waterwellsolutions.com



SUBMERSIBLE PUMP DATA

Customer	Lake County Public Works
Well No	West Oak Middle/Diamond Lake Well No. 2
Project No.	147890
Date	August 19, 2019

PITLESS ADAPTER

Make	Baker
Size	8”
Depth of Discharge	6 Ft.

WELL SEAL

Type	N/A
Size	N/A

MOTOR

Make	Franklin		
HP	10	RPM	3450
Phase	3	FLA	14.2
Voltage	460		
Model #	2366029020		
Serial #	14D19-28-06308A		

CABLE

Size	#8-3 w/Grd.
Length	195 Ft.
Type	Flat 600 Volt

RISER

Size Pipe	3”
Section Lengths	9 @ 21’ & 1 @ 1’
Spec Coating	Galvanized
Check Valves	168 Ft.

K.O. Pins: Yes [ ] No [X]

Installer Jim & Kyle

SURFACE

Type	Open
Size	

PUMP

MFG.	Grundfos		
Model	85S	Stage	9
GPM	80	TDH	375’
Length	32”		
Bowl Material	304 Stainless		
Impeller	304 Stainless		
Bowl Bearings	Rubber		
Wear Rings	None		
Serial #	B12B6009-P1131985		
Airline Mat’l	Plastic		
Length	2 @ 190 Ft.		

WELL DATA

Inside Diameter	8”		
Well Depth from Grade	276 Ft.		
Pump Setting Above Grade	12”		
Diameter of Screen	N/A		
Screen Length	N/A		
Slot	N/A		
Gravel Pack	N/A	Tubular	N/A
Size of Gravel Pack	N/A		

PUMP TEST DATA

Pump Test Data Date: 8/19/2019

Static Level 111.7 Ft.

Capacity (GPM)	Pumping Level
80.6	126.5 Ft.
52.3	120 Ft.
35.4	116 Ft.

COMMENTS

Same pumping equipment installed from 2014 rehab.

Rehabilitated well with heavy dosage of chlorine and enhancer with surging

Toll Free: (888) 769-9009 www.waterwellsolutions.com

PUMPING TEST DATA SHEET

Project	LCPW West Oak Middle School	Date Tested	8/19/2019
Location	West Oak Middle/Diamond Lake	Tested By	Jim Cleary & Kyle S
Diameter of Well	8 Inch	Motor	10 HP Franklin, 460v
Depth of Well	272.7 Feet	Column Assembly	3" T&C galvanized
Airline Length	189 Feet	Bowls	Grundfos 85s-9stg rated 80gpm
Static Water Level	111.7 Feet	Orifice	4x2
Type of Well	Limestone	Discharge Head	Pitless Adaptor- Baker 8"

Time	Meter Reading	G.P.M.	Airline Reading	Pumping Level	Drawdown	Discharge Pressure (psi)	Total Dynamic Head	Specific Capacity	Remarks
	5.5	35.4	73	116	4.3	55	243.05	0.00	**Pump ran at 45.1 hz**
	5.5	35.4	73	116	4.3	55	243.05	8.23	
	5.5	35.4	73	116	4.3	55	243.05	8.23	
	12	52.3	69.7	119.3	7.6	40	211.70	6.88	
	12	52.3	69	120	8.3	40	212.40	6.30	
	12	52.3	69	120	8.3	40	212.40	6.30	
	28.5	80.6	63.5	125.5	13.8	0	125.50	5.84	
	28.5	80.6	62.5	126.5	14.8	0	126.50	5.45	
	28.5	80.6	62.5	126.5	14.8	0	126.50	5.45	

NOTE: startup water was red for 5 mins. Turned gray then cleared up after 1 hr

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PUMPING TEST DATA SHEET

Project	LCPW West Oak Middle School	Date Tested	8/19/2019
Location	West Oak Middle/Diamond Lake	Tested By	Jim Cleary & Kyle S
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	12	52.3	69.7	119.3	7.6	40	211.70	6.88	
	12	52.3	69	120	8.3	40	212.40	6.30	
	12	52.3	69	120	8.3	40	212.40	6.30	
	28.5	80.6	63.5	125.5	13.8	0	125.50	5.84	
	28.5	80.6	62.5	126.5	14.8	0	126.50	5.45	
	28.5	80.6	62.5	126.5	14.8	0	126.50	5.45	

NOTE: startup water was red for 5 mins. Turned gray then cleared up after 1 hr

Water Well Solutions

Closed Circuit TV Data Sheet

Project	Lake Co Public Works	Job No.	32141188	Date	8/8/2014
Location	Diamond Lake	Well Diameter	8"	Hole Depth	276 ft
Well #/Name	2	S.W.L	123 ft	Screen Type	N/A
Depth of Survey	265 ft	Case Depth	263 ft	Depth of Screen	N/A

DEPTH	DESCRIPTION AND REMARKS
0'	Top of 8" Baker Pitless Adapter
5'	Pitless Discharge
5.8'	Pitless Weld Joint
18', 30', 51'	Threaded and Coupled Casing Joint
220, 234 - 242	Large Amount of Scale on Casing
263	8" Steel Casing Drive Shoe
265	Top of Fill

COMMENTS:

- Well has about 11 feet of fill in bottom.
- Next servicing the well should be brushed and bailed.