SECTION 02222

EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Work Under this Sections Includes:

1. Excavation for - trenches for water, sanitary sewer, site drainage, and storm sewer lines to public utility.
2. Compacted bed and compacted fill over utilities to subgrade elevations.
3. Compaction.

1.2 SUBMITTALS

A. Submit samples in accordance with General Conditions of contract and Division 1 specification sections. Comply with submittal requirements of Section 02316 and 02318.

B. Submit 10 lb. sample of each type of fill to testing agency, in separate airtight containers.

C. LEED Submittals:

1. LEED Credit MR 4.1 and Credit MR 4.2: Submit product data for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
   a. Include statement indicating costs for each product having recycled content.
2. LEED Credit MR 5.1 and Credit MR 5.2: Submit product data for products that have extracted, harvested, or recovered, as well as manufactured within 500 miles of the Project site.
   a. Include a statement indicating the percentage by weight which is extracted, harvested, or recovered within 500 miles of the Project site.

1.3 TESTS

A. Tests and analysis of fill materials will be performed in accord with ASTM D1557, and with General Conditions and testing required by Section 02318 for acceptability as fill material.

1.4 REFERENCES

A. ASTM C136, - Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM D1556, - Density of Soil in place by Sand-Cone Method.

C. ASTM D1557, - Tests for Moisture-Density Relationship of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18 inch Drop.

D. 35 ILL ADM CODE 740 Site Remediation Program (SRP) Appendix A Target Compound List (TCL) parameters and 35 ILL ADM CODE 742 Tiered Approach to Corrective Action Objectives (TACO) Appendix B Tables A and B residential and construction worker objectives.Illinois Department of Transportation (IDOT):

1. IDOT 2007 Specifications for Road and Bridge Construction including all addenda.

1.5 PROTECTION

A. Protect excavations by shoring, bracing, sheet piling, underpinning or other methods or prevent cave-in or loose soil from falling into excavation.

B. Underpin adjacent structures which may be damaged by excavation work, including service utilities and pipe chases.

C. Notify Architect immediately of unexpected subsurface conditions. Confirm notification in writing. Discontinue work until Architect issues written notification to resume work.

D. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

E. Grade excavation tip perimeter to prevent surface water runoff into excavation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. In accordance with the soil report the Owner's testing agency representative shall determine if the excavated material is suitable for backfill. The suitable trench excavated material shall be used for trench backfill. Backfill operations must be consistent with Sections 02316, 02317 and 02318 as applicable and the Owner's Managing Environmental consultant.

B. Granular Fill Type A:

1. Bedding Material: Material for bedding shall be CA-11, CA-16 or CA-7 as defined in the project documents and shall be in compliance with IDOT 2007, Article 704.01 and 703.5 and with Section 02318. Recycled material is also permitted for use providing the above gradation and requirements are met.
2. Backfill Material: Material for backfill shall be FA-6, CA-16 or CA-7 as defined in the project documents and shall be in compliance with IDOT 2007, Article 703.1 and 703.5 and with Section 02318. Recycled material is also permitted for use providing the above gradation and requirements are met.

C. Fill Material Type D: Fill material shall be cohesive soil obtained from on-site required excavations and approved by the Owner testing agency representative as suitable backfill material in accordance with ASTM D 2487, Uniform Soils Classification System 1 and 703.5 and with Section 02318 It shall be used to backfill excavations where the excavated material is unsuitable for backfill.

D. Fill Material Type E: Fill under landscaped areas shall be free from alkali, salt shall not exceed Appendix B, Section 742,Table A; Tiered Approach to Corrective Action objectives (Taco); Ill Adm .Code 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters and shall be obtained from on-site required excavations when conforming to the specifications. This fill shall be approved by the Owner's testing agency representative as suitable material.

E. Fill Material Type X: Off-site borrow material shall comply to soil types GP, GW, SC and CL in accordance with ASTM D 2487, Uniform Soils Classification System and with Section 02318. It shall be used where needed under structural slabs, roads, pavement and landscaped areas.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify stockpiled fill to be reused as approved in writing by Architect.

B. Verify foundation perimeter drainage installation has been inspected and approved in writing by Architect.

C. Verify and confirm in writing that areas to be backfilled are free of debris, snow, ice or water, and surfaces are not frozen.

3.2 PREPARATION

A. Identify specified lines, levels, contours and data.

B. Compact subgrade surfaces to density specified for backfill materials.

3.3 EXCAVATION

A. Cut trenches wide enough to enable utility installation and allow inspection.

B. Hand trim excavation and leave free of loose matter. Hand trim for bell and spigot pipe joints.

C. Excavation shall not interfere with normal 45 degree bearing splay of foundations.

D. Sides, walls or faces of all trenches shall be sloped and maintained in a safe manner and in the required condition until completion of backfilling. Excavations shall be braced or sloped in compliance to the latest Occupational Safety and Health Administration (OSHA) requirements or as instructed by the testing agency on-site representative.

E. Locate and retain reusable excavated materials away from the edge of excavation.

3.4 BACKFILLING

A. Support pipes, and conduits during placement and compaction of bedding fill.

B. Backfill trenches to contours and elevations shown. Backfill systematically, as early as possible to allow maximum time for natural settlement. Do not backfill over porous, wet or spongy subgrade surfaces.

C. Place compact fill materials in continuous layers as specified in Section 02300.

D. Use a placement method that will not disturb or damage utilities in trenches, perimeter drainage.

E. Maintain optimum moisture content of backfill materials, determined by laboratory analysis, to obtain specified compaction density.

F. Remove surplus backfill materials and materials unsuitable for backfill from the site to state and local permitted/licensed facilities.

3.5 FILL TYPES AND COMPACTION

A. Compact all fill and backfill to specified values based on Modified Proctor Test in accordance with section 02300.

3.6 COLD WEATHER PROTECTION

A. Quality Control Testing During Construction: An independent inspection and testing agency employed by the Owner shall inspect and approve each subgrade and fill layer before further backfill and fill work is performed.

1. The inspection and testing agency shall perform field and laboratory density tests in accordance with either ASTM D 1556 (sand cone method) and ASTM D 1557 as applicable.

2. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922. The calibration curves shall be periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, the calibration curves furnished with the moisture gauges shall be checked in accordance with ASTM D 3017.

3. If field tests are performed using nuclear methods, the inspection and testing agency shall make calibration checks on both density and moisture gauges at beginning of work, on each different type of material encountered, and at intervals as specified by the equipment manufacturer.

4. If, in the opinion on the Owner testing agency representative, based on the inspection and testing agency reports and inspections, subgrade or fills have been placed by specified density, the Contractor shall perform additional compaction and retesting until specified density contractor to pay for all retesting work.

5. The Contractor shall assist the inspection and testing agency by providing access to the excavation and fill areas, and by removing loose materials from compacted soil layers prior to testing.

3.7 STORAGE AND REMOVAL OF EXCAVATION MATERIALS

A. Remove surplus backfill materials and materials unsuitable for backfill from the site to a permitted Subtitle D Landfill as per Section 02316.

B. Locate and retain reusable excavated materials away from the edge of excavation.

C. Remove excess and deleterious materials. The hauling of materials to designated areas shall be at the Contractor's expense.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Earthwork required to complete the Project except as specified in related work.

B. Related Sections
1. Section 01014 – Erosion and Sedimentation Control
2. Section 01352 – LEED Requirements
3. Section 02222 – Excavation, Backfilling and Compaction for Utilities:
4. Section 02318 – Acceptance of Backfill, Top Soil & CU Structural Soil

1.2 SUBMITTALS

A. Samples
1. Submit 10 lb samples of each material to be used. Identify source, type (use) of each material and gradation. Forward to Owner's testing agency packed tightly in containers to prevent contamination. Submit copy of transmittal to Architect.
2. The Contractor shall also collect sufficient amounts of representative (no composite samples) backfill samples for analytical testing sufficient to verify that these materials do not exceed 35 ILL ADM CODE 742 Tiered Approach to Corrective Action Objectives (TACO) Appendix B Tables A and B residential and construction worker objectives for 35 ILL ADM CODE 740 Site Remediation Program (SRP) Appendix A Target Compound List (TCL) parameters per Specification 02318. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 1,000 tons of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The contractor is responsible for payment of all backfill sampling and analytical fees.

B. Submit directly to General Contractor invoices and delivery tickets indicating the amount and type of off-site materials delivered.

C. Submit sediment and erosion plan, specific to the site, that complies with EPA 832/R-92-005 "Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices" or City of Chicago requirement where more restrictive.

D. LEED Submittals:
1. LEED Credit MR 4.1 and Credit MR 4.2: Submit product data for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
   a. Include statement indicating costs for each product having recycled content.
2. LEED Credit MR 5.1 and Credit MR 5.2: Submit product data for products that have extracted, harvested, or recovered, as well as manufactured within 500 miles of the Project

site.

a. Include a statement indicating the percentage by weight which is extracted, harvested, or recovered within 500 miles of the Project site.

E. Product Data: For the following:

1. Each type of plastic warning tape.
2. Drainage fabric.
3. Separation fabric.

F. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 698 for each on-site or borrow soil material proposed for fill and backfill.
3. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform Work in compliance with applicable requirements of governing authorities having jurisdiction including the City of Chicago.

B. Soil Testing and Inspection Service:
1. The Owner will engage a soil testing and inspection service, to include testing soil materials proposed for use in the Work and initial quality control testing during earthwork operations.
2. Furnish soil survey for satisfactory soil materials and samples of soil materials to the testing service.
3. The Contractor shall supply only backfill the does not exceed backfill that does not exceed the 35 ILL ADM CODE 742 Tiered Approach to Corrective Action Objectives (TACO) Appendix B Tables A and B residential and construction worker objectives for 35 ILL ADM CODE 740 Site Remediation Program (SRP) Appendix A Target Compound List (TCL) parameters per Specification 02318. The date of the environmental analysis of the backfill shall be within 60 days of importing such materials to the site.

1.4 PROJECT CONDITIONS

A. Site Information
1. The Owner has had a subsurface investigation performed, the results of which are contained in a report. The report presents conclusions on the subsurface conditions based on the consultant's interpretation of the data obtained in the investigation.
2. The Contractor acknowledges that they have reviewed the report and any addenda thereto.
3. It is recognized that a subsurface investigation may not disclose all conditions as they actually exist and other conditions may change, particularly groundwater conditions, between the time of a subsurface investigation and the time of earthwork operations.
4. The data on indicated subsurface conditions are not intended as representations or warranties of the continuity of such conditions. It is expressly understood that the Owner and Architect will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. The data are made available for the convenience of the Contractor.
5. Additional test borings and other exploratory operations may be made by the Contractor at no cost to the Owner.

B. Traffic: Conduct operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

C. Protection of Existing Improvements:
   1. Provide barricades, coverings, or other types of protection necessary to prevent damage to existing improvements to remain in place.
   2. Restore damaged improvements to their original condition, as acceptable to the Owners and other parties or authorities having jurisdiction.

D. Protection of Existing Vegetation:
   1. Protect existing vegetation to remain in place against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Protection shall be done in accordance with Section 02231.
   2. Water as required to maintain health during the course of construction operations.
   3. Repair or replace vegetation damaged by construction operations, in a manner acceptable to the Architect.

E. Improvements on Public Property: Obtain authority for performing removal and alteration Work on public property.

F. Existing Utilities:
   1. Locate existing underground utilities in the areas of Work before starting earthwork operations. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
   2. Contact D.I.G.G.E.R (312-744-7000) to verify locations of existing underground utilities before starting evacuation.
   3. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Architect immediately for directions as to procedure.
   4. Cooperate with the Owner and public and private utility companies in keeping their respective services and facilities in operation.
   5. Demolish and completely remove from the site underground utilities indicated to be removed. Coordinate with local utility companies for shutoff of services if lines are active.

G. Use of Explosives: The use of explosives will not be permitted.

H. Protection:
   1. Protect existing improvements on and off the site from damages caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. All Materials: Comply with Section 02318.

B. General Fill: Provide soil materials conforming to ASTM D2487 soil groups GW, GR, GM, SW, SP or SM or a combination that are free of debris, waste, frozen materials, vegetable, organic and other deleterious matter and having maximum particle size of 2" in all dimensions.

In addition to ASTM requirements, general fill shall shall not exceed 35 ILL ADM CODE 742 Tiered Approach to Corrective Action Objectives (TACO) Appendix B Tables A and B residential and construction worker objectives for 35 ILL ADM CODE 740 Site Remediation Program (SRP) Appendix A Target Compound List (TCL) parameters.

C. Select Fill: Clean natural or crushed stone or gravel conforming to State of Illinois, Department of Transportation Gradation CA 6. In addition to State of Illinois Depart of Transportation Gradation requirements, select fill shall not exceed 35 ILL ADM CODE 742 Tiered Approach to Corrective Action Objectives (TACO) Appendix B Tables A and B residential and construction worker objectives for 35 ILL ADM CODE 740 Site Remediation Program (SRP) Appendix A Target Compound List (TCL) parameters.

D. Underbed Material: Naturally or artificially graded mixture of natural or crushed stone or gravel conforming to State of Illinois, Department of Transportation Specifications for Gradation CA 8, or CA 7. In addition to State of Illinois Department of Transportation Specifications, Underbed material shall not exceed 35 ILL ADM CODE 742 Tiered Approach to Corrective Action Objectives (TACO) Appendix B Tables A and B residential and construction worker objectives for 35 ILL ADM CODE 740 Site Remediation Program (SRP) Appendix A Target Compound List (TCL) parameters.

E. Use Contractor supplied off-site material except that general fill may be from excavation if found acceptable by the Owner's testing service provided that all off-site and general fill material shall not exceed 35 ILL ADM CODE 742 Tiered Approach to Corrective Action Objectives (TACO) Appendix B Tables A and B residential and construction worker objectives for 35 ILL ADM CODE 740 Site Remediation Program (SRP) Appendix A Target Compound List (TCL) parameters.

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

C. Drainage Fabric, if required: Non-woven geotextile, specifically manufactured as a drainage geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:

1. Grab Tensile Strength: 110 lbf (490 N); ASTM D 4632.
2. Tear Strength: 40 lbf (178 N); ASTM D 4533.
3. Puncture Resistance: 50 lbf (222 N); ASTM D 4833.
4. Water Flow Rate: 150 gpm per sq. ft. (100 L/s per sq. m); ASTM D 4491.

5. Apparent Opening Size: No. 50 (0.3 mm); ASTM D 4751.

D. Separation Fabric, if required: Woven geotextile, specifically manufactured for use as a separation geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:

1. Grab Tensile Strength: 200 lbf (890 N); ASTM D 4632.
2. Tear Strength: 75 lbf (333 N); ASTM D 4533.
3. Puncture Resistance: 90 lbf (400 N); ASTM D 4833.
4. Water Flow Rate: 4 gpm per sq. ft. (2.7 L/s per sq. m); ASTM D 4491.
5. Apparent Opening Size: No. 30 (0.6 mm); ASTM D 4751.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION CONTROL

A. Before mobilizing and starting Work on the site, institute, expand as necessary, and maintain throughout the project a sediment and erosion control system that complies with EPA 832/R-92-005 and as required by authorities having jurisdiction, City of Chicago.

B. Control erosion and sediment damage to roadways, adjacent properties and water resources through the use of basins, ditch checks, temporary ditches, mulch barriers, mulches, grasses, silt dikes, silt filter fences, hay or straw bales, aggregate barriers, inlet and pipe protection and other appropriate means.

C. Remove and legally dispose of debris resulting from the project when no longer required in accordance with Section 02316.

3.2 CLEARING

A. Environmental Hazards:
1. Before starting Work and thereafter as appropriate, report conditions indicative of environmental hazards to the Owner's Managing Environmental Consultant and the CPS Environmental Services Manager and proceed as directed.

B. General:
1. Comply with the requirements of Section 02316
2. Remove vegetation, improvements, or obstructions that interfere with installation of new construction. Removal includes new and old stumps and their roots.
3. Carefully and cleanly cut roots and branches of vegetation to be left standing, where such roots and branches obstruct new construction.
4. Comply with the environmental protection and safety requirements of all authorities having jurisdiction. Keep dust to a minimum. Maintain streets free of mud, dirt and debris.

C. Topsoil Removal:
1. Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects, and without weeds, roots, and other objectionable material.

2. Strip topsoil to whatever depths encountered, and in such manner so as to prevent intermingling with the underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping.
3. Where vegetation is to be left standing, stop topsoil stripping a sufficient distance from such vegetation to prevent damage to the main root system.
4. Stockpile top soil in storage piles for reuse or remove from the site as per Section 02316 and furnish acceptable topsoil that does not exceed topsoil 35 ILL ADM CODE 742 Tiered Approach to Corrective Action Objectives (TACO) Appendix B Tables A and B residential and construction worker objectives for 35 ILL ADM CODE 740 Site Remediation Program (SRP) Appendix A Target Compound List (TCL) parameters at no cost to Owner. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent windblown dust.

D. Removal of Improvements:
1. Remove improvements that interfere with construction.
2. Cap and remove abandoned underground piping or conduit.
3. Where uncharted or incorrectly charted below grade improvements are discovered, obtain approval of Architect before removal.

3.3 EXCAVATION

A. General:
1. Comply with the requirements of section 02316.
2. Excavation consists of the removal and disposal of materials encountered when establishing the required grade elevations. Such excavation is unclassified regardless of the materials encountered and all material is to be disposed of in accordance with Section 02316.
3. Unauthorized excavation consists of removal of materials beyond indicated or required elevations. Replace unauthorized excavation by backfilling and compacting as specified for select fill at no cost to Owner.
4. Excavate under Building to the extent required to establish subgrades.
5. Excavate under pavements as required to comply with cross sections, elevations and grades.
6. Excavate elsewhere as required to establish new finish grades, allowing not less than 4" for topsoiling.

B. Dewatering:
1. Prior to commencing work, the Contractor shall provide a storm water management plan. This plan shall stipulate provisions for dewatering, pumping, collection, temporary storage, and discharge or disposal of storm water , perched water and other liquids, contaminated and/or uncontaminated, at the site so as to facilitate soil removal and minimize disposal costs for contaminated fluids.
2. Do not allow water to accumulate in excavations. Remove water from excavations to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey the water away from the site.
3. Convey water removed from excavations and rainwater to collecting or run-off areas acceptable to authorities having jurisdiction. Do not use trench excavations for site utilities as temporary drainage ditches.

4. Comply with requirements of authorities having jurisdiction, including but not limited to, the City of Chicago and the water Reclamation District of Greater Chicago.
5. The Contractor shall dewater site excavations and maintain these excavations in dry conditions for installation of sheet piling, concrete footings and slabs, including subgrade and foundation drainage layers, and in accordance with the Earthwork Specification, Section 02300, Temporary Sheet Piling Specification, Section 02160, and as recommended in the Geotechnical Soils Report.

C. Stability of Excavations:
   1. Slope the side of excavations to comply with local codes, authorities having jurisdiction, and the City of Chicago, and maintain same. Secure, shore, and brace where sloping is not possible either because of space restrictions or stability of material excavated.
   2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

D. Shoring and Bracing:
   1. Provide shoring and bracing to comply with local codes, authorities having jurisdiction and the City of Chicago.
   2. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross braces, in good serviceable conditions.
   3. Maintain shoring and bracing in excavations regardless of the time period excavations will be open. Carry down shoring and bracing as the excavation progresses.

E. Material Storage: Stockpile excavated materials classified as satisfactory soil material in accordance with Section 02316 until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

F. Excavation for Structures:
   1. Excavate to the subgrade elevations required within a tolerance of plus or minus 0.10' to balance, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction required, and for inspection.
   2. Take care not to disturb the bottom of the excavation. Excavate by hand to final grade just before concrete is placed. Trim bottoms to the required lines and grades to leave a solid base to receive concrete.

G. Excavation for Pavements: Cut the surface under pavements to comply with cross sections, elevations and grades.

H. Removal of Unsatisfactory Soil Materials:
   1. Excavate unsatisfactory soil materials encountered that extend below the required elevations, to the additional depth established by the Owner's testing service and approved by Owner.
   2. If excavated unsatisfactory materials are to be removed form the property, all such materials shall b e disposed of in accordance with section 02316.
   3. Such additional excavation, provided it is not due to the fault or neglect of the Contractor, will be measured and paid for as a change in the Work if approved by Owner.

I. Closing Abandoned Underground Utilities: Close open ends of abandoned underground utilities, which are to remain permanently, and with sufficiently strong closures to withstand pressures which may result after closing.

J. Cold Weather Protection: Protect excavation bottoms against freezing when the atmospheric temperature is less than 35 degrees F. Maintain excavation free of water, ice and snow.

3.4 PROOF ROLLING

A. Proof Roll entire area under building and pavements with a pneumatic roller or heavily loaded dump truck (minimum 25 tons).

B. Make at least two (2) passes (second at right angle to first) in the presence of a representative of the Owner's testing service.

C. Excavate unsatisfactory soil materials encountered to the additional depth established by the Owner's testing service and approved by Owner.

D. Perform no further Work until slab subgrades are acceptable to the representative of the Owner's testing service.

3.5 COMPACTION

A. General: Control soil compaction during construction, providing the minimum percentage of density specified.

B. Percentage of Maximum Density Requirements: Provide not less than the following percentages of density of soil material compacted at $\pm$ 2% optimum moisture content, for the actual density of each layer of soil material-in-place:
   1. Compact top 12" of subgrade and each layer of backfill or fill material to 85% relative density for cohesionless soils (ASTM D 4253 & D 4254) and 95% maximum density for cohesive soil (ASTM D 1557).

C. Moisture Control:
   1. Where the subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to the surface of subgrade, or layer of soil material, to prevent free water appearing on the surface during or subsequent to compaction operations.
   2. Remove and replace, to scarify and air dry, soil material that is too wet to permit compaction to specified density.

3.6 BACKFILL AND FILL

A. Prior to Backfill Placement: Backfill excavations as promptly as the Work permits, but not until completion of the following:
   1. Review of construction below finish grade.
   2. Code required inspection, testing, approval, and recording locations of underground utilities.
   3. Removal of concrete formwork.

4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
5. Removal of trash and debris.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

B. Ground Surface Preparation:
1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
2. When the existing ground surface has a density less than that specified under "Compaction" for the particular area classification, break up the ground surface, pulverize, bring moisture condition to the optimum moisture content, and compact to the required depth and percentage of maximum density.

C. Placement and Compaction:
1. Place backfill and fill materials to required grades in layers not more than 8" in loose depth for materials compacted by heavy compaction equipment and not more than 4" in loose depth for materials compacted by hand operated tampers. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the soil material. Compact each layer to the required percentage of density.
2. Place backfill and fill materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
3. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
4. Backfill and fill under Building slabs to an elevation required to allow for thickness of underbed shown or a minimum of 6" if not shown.
   a. Use select fill material.
5. Backfill and fill under pavements as required to comply with cross sections, elevations and grades shown.
   a. Use select fill material, except below 3-foot, general fill may be used.
6. Fill and backfill under footings where not on undisturbed ground using select fill material.
7. Backfill and fill elsewhere as required to establish new finished grades, allowing not less than 4" for top soiling using select fill except below 3-foot, general fill may be used.

D. Under Bed: Place and compact underbed material under all slabs-on-grade.

3.7 GRADING

A. General: Uniformly grade the area, including adjacent transition areas. Smooth finished surfaces within specified tolerances, compact with uniform levels or slopes between elevation points, or between such points and existing grades.

B. Grassed Areas: Finish areas to receive topsoil to within not more than 0.10' above or below the required subgrade elevations, compacted as specified, and free from irregular surface changes.

C. Walks: Shape the surface of areas under walks to line, grade and cross section, with the finish surface not more than 0.00' above or 0.10' below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains.

D. Pavements: Shape the surface of the areas under pavement to line, grade and cross section, with the finish surface not more than 1/4" above or below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains.

3.8 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction:
   1. The Owner's testing service must inspect and approve sub-grades and fill layers before further construction work is performed thereon.
   2. If, in the opinion of the Owner's testing service, based on reports of the testing service and inspection, the subgrade or fills which have been placed are below the specified density, additional compaction and testing will be required until satisfactory results are obtained at no additional cost to Owner. In such event, retesting will be paid by the Contractor.

B. Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during earthwork operations.

C. Contractor’s Responsibilities
   1. Notify Agency sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
   2. Coordinate with Agencies’ personnel; provide access to Work, to manufacturer’s operations.
   3. Provide preliminary representative samples of materials to be tested, in required quantities.
   4. Furnish casual labor and facilities to provide access to Work to be tested to obtain and handle samples at the site to facilitate inspections and tests, and storage and curing of tests.
   5. Arrange with laboratory, pay for, additional samples and tests required when initial tests indicate Work does not comply with Contract Documents.

D. Tests for Proposed Soil Materials:
   1. Test soil materials proposed for use in the Work and promptly submit test result reports. Soil samples will be provided by Contractor.
   2. Provide one optimum moisture-maximum density curve for each type of cohesive soil. Determine maximum densities in accordance with ASTM D 1557.
   3. Determine the suitability of materials to be used as fill and backfill.
   4. Perform a mechanical analysis (AASHO T88), plasticity index (AASHO T91), and frost susceptibility analysis.
   5. Supply only soil materials that do not exceed 35 ILL ADM CODE 742 Tiered Approach to Corrective Action Objectives (TACO) Appendix B Tables A and B residential and construction worker objectives for 35 ILL ADM CODE 740 Site Remediation Program (SRP) Appendix A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 1,000 tons of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The date of the environmental analysis of any soil proposed for use shall be within 60 days of importing such material to the site.

E. Verification of Footing Subgrades:
   1. Provide one optimum moisture-maximum density curve for each type of soil encountered.
   2. For each strata of soil on which footings will be placed, conduct at least one test to verify the required design bearing capacities. Subsequent verification and approval of each

footing subgrade may be based on a visual comparison of each subgrade with the related tested strata.

F. Compaction Testing:
1. Inspect, test, and approve each lift of fill and backfill before next lift is placed. Test in accordance with ASTM D1556 or D2167 as appropriate.
2. Take a field density test for each 2,000 sq. ft. of backfill and fill under slabs and pavements.
3. Take a field density test at 100 foot intervals along the inside of continuous footings, but not less than one (1) test per 20 foot run.
4. Take a field density test for each four (4) isolated footings.
5. Take a field density test at 50 foot intervals along utility trench backfill under slabs and pavements.

G. Proofrolling Observation:
1. Provide continuous observation of proofrolling of entire building area. Four passes will be made.
2. Approve subgrade or make recommendations for removal.

H. Submittals: Submit copies of the following reports:
1. Report and certification of granular fill and drainage fill.
2. Test reports on fill and backfill material.
3. Verification of each footing subgrade.
4. Field density test reports.
5. One optimum moisture-maximum density curve for each type of soil encountered.
6. Report of actual unconfined compressive strength and/or results of plate bearing tests of each strata tested.
7. Other tests' and materials' certificates, as required.

3.9 MAINTENANCE AND RESTORATION

A. Protection of Graded Areas:
1. Protect newly graded areas from traffic and erosion, and keep free of trash and debris and growth of weeds.
2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.

B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather scarifies the surface, reshape, and compact to the required density prior to further construction.

C. Restoration: Restore all areas affected by construction both on and off Owner's property to original condition.

3.10 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Burning is not permitted on the Owner's property.

B. Remove waste materials, excess excavated materials, excavated materials classified as unsatisfactory soil material from the Owners property and legally dispose of all materials at state and local permitted facilities and in accordance with section 02316.

C. Provided the excess soil materials do not exceed APPENDIX B; SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO); 35 ILL. ADM. CODE 742 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters, remove excess soil materials to spoil area, spread and compact to provide drainage. Strip top soil before spoiling and respread after.

D. If the excess soil materials exceed APPENDIX B; SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO); 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters, dispose of all materials at a permitted Subtitle D landfill per section 02316.

END OF SECTION

SECTION 02550

PERMEABLE PAVERS

PART 1 – MATERIALS

1.1 SUMMARY

A. This section includes all ungrouted and mortarless exterior permeable unit paving for the extent of unit paving indicated on the drawings.

1.2 RELATED DOCUMENTS

A. Drawings

B. Book 1: Project Information, Instructions to Bidders, and Execution Documents

C. Book 2: Standard Terms and Conditions for Construction Contracts

D. Book 2a: Standard Terms and Conditions Procedures Manual

1.3 REFERENCES

A. The American Society of Testing and Materials (ASTM):

1. ASTM D698 - Tests for Moisture-Density Relationship of Soils and Soil-Aggregate Mixtures, Using 5 Lb. Rammer and 12 in. Drop.

B. Illinois Department of Transportation:

1. Standard Specifications for Road and Bridge Construction, January 2007, including all addenda.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract.

B. Product data for the following products:

1. Concrete unit pavers

2. Joint and Bedding Layer

C. Samples for initial selection purposes in form of actual units or sections of units showing full range of colors, textures, and patterns available for each type of unit paver indicated. Include similar samples of material for joints and accessories involving color selection.

D. Qualification data for firms and persons specified in "Quality Assurance" Article 1.05 to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, plus other information specified.

E. Shop Drawings: showing detailed paving patterns and proposed cuts within concrete banding modules. Concrete banding shall be designed so that minimum cuts are required for the unit pavers.

F. LEED

1. LEED Credit MR 4.1 and Credit MR 4.2: Submit product data for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.

a. Include statement indicating costs for each product having recycled content.

2. LEED Credit MR 5.1 and Credit MR 5.2: Submit product data for products that have extracted, harvested, or recovered, as well as manufactured within 500 miles of the Project site.

    a. Include a statement indicating the percentage by weight which is extracted, harvested, or recovered within 500 miles of the Project site.

3. LEED Credit SS Credit 7.1: Product Data stating the solar reflectance index (SRI) is 29 or greater.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has successfully completed permeable unit paver installations similar in material, design and extent to that indicated for Project.

B. Single-Source Responsibility: Obtain each color, type and variety of unit pavers, from a single source with resources to provide products and materials of consistent quality in appearance and physical properties without delaying progress of the work.

C. Field-Constructed Mock-Up: Prior to installation of unit pavers, erect mock-ups for each form and pattern of unit pavers required to verify selections made under sample submittals. Build mock-ups to comply with the following requirements, using materials and same base construction including special features for expansion joints and contiguous work as indicated for final unit of work.

1. Locate mock-ups on site in location and size indicated or, if not indicated, as directed by Owner’s Representative and/or Architect/Engineer.

2. Notify Owner’s Representative and Architect/Engineer one week in advance of the dates and times when mock-ups will be erected.

3. Demonstrate quality of workmanship that will be produced in final unit of work.

4. Retain and maintain mock-ups during construction in undisturbed condition as a standard for judging completed unit of work. Accepted mock-ups in undisturbed condition at time of Substantial Completion may become part of completed unit of work.

5. Paving is to show the proposed color, crevice fill material, surface finish and workmanship. Consult Architect for paver color.

6. Panel size shall be a minimum of 10' -0" wide x 10' -0" long in the presence of the Architect/Engineer prior to the installation of these materials on the site.

7. Do not start paving site work until the Architect has given written approval of all components of the sample panel.

8. This sample panel will be used as a standard of comparison for all site concrete constructed of same materials.

D. Visual Inspection

1. All units shall be sound and free of defects that would interfere with proper placing of the unit or impair the strength or permanence of the construction. Minor cracks incidental to the usual methods of manufacture, or minor chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.

1.6 DELIVERY, STORAGE AND HANDLING

A. Protect unit pavers and aggregate during storage and construction against wetting by rain, snow, or ground water and against soil or contamination from earth and other materials.

1.7 PROJECT CONDITIONS

A. Cold Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

B. Weather Limitations: Protect unit paver work against freezing when atmospheric temperature is 40 deg F (4 deg C) and falling. Heat materials and provide temporary protection of completed portions of unit paver work. Comply with International Masonry All-Weather Council's "Guide Specification for Cold-Weather Masonry Construction."

1.8 LEED REQUIREMENTS:

1. Maximize the use of recycled concrete aggregate for aggregate in the design mixes.
2. Obtain recycled concrete aggregate within 500 miles of the project.
3. Obtain non-recycled concrete aggregate within 500 miles of the project.
4. Obtain ready-mix concrete within 500 miles of the project.

PART 2 - PRODUCTS

2.1 PERMEABLE PAVING UNITS

A. All permeable pavers shall comply with the quality specifications for solid concrete interlocking paving units as set out in ASTM Specifications C 936-01. Shall be in accordance with Section 02318.

B. Manufacturer

1. Unilock Chicago (or approved equal)

   301 Sullivan Rd.

   Aurora, IL 60505

   Contact: Brad Swanson

C. Permeable Paver Type 1: Unilock Eco-Optiloc – Parking Lot

1. Color: Natural (SRI >29).
2. Finish: Standard
3. Chamfer: 3 mm bevel
4. Size: Manufacture the sizes indicated with a maximum tolerance of plus or minus 1/16 in all directions.

   a. L-shape

   Note: Imperial dimensions are nominal equivalents to the metric dimensions.

D. Physical Requirements

1. Compressive Strength

a. At the time of delivery to the work site, the average compressive strength shall not be less that 8,000 psi, with no individual strength less than 7,200 psi as per ASTM Specifications C 936-01.

b. Testing procedures shall be in accordance with ASTM Specifications C 140.

2. Absorption

a. The average absorption shall not be greater that five percent (5%) with no individual unit absorption greater that seven percent (7%) as required by ASTM Specification C 936-01.

3. Resistance to Freezing and Thawing

a. The manufacturer shall satisfy the purchaser either by proven field performance of laboratory freezing and thawing test that the paving units have adequate resistance to freezing and thawing. If a laboratory test is used, when testing in accordance with ASTM Specification C 67-02, Section 8, specimens shall have no breakage and not greater that 1 % loss in dry weight of any individual unit when subjected to 50 cycles of freezing and thawing.

2.2 AGGREGATE MATERIALS

A. Aggregates shall conform to ASTM Specifications C 33 for normal weight concrete aggregate (no expanded shale or lightweight aggregates) except that grading requirements shall not necessarily apply. Shall be in accordance with Section 02318.

B. Joint Material:

1. Color to be selected by architect to match paver selected.
2. The grading requirements for the material shall be in compliance with the grain size distribution envelope presented in the following chart.

Eco-Optiloc Vehicular Use Paver (CA-16)

Sieve Size	Percentages Passing Weight Specified
1/2"	100
3/8"	94-100
No. 4	15-45
No. 16	0-4

C. Bedding Layer:

1. The Bedding Layer shall consist of crushed stone (CA-16) meeting the grading requirements specified in IDOT Section 1004 and meeting requirements of Section 02318.
2. The grading requirements for the material shall be in compliance with the grain size distribution envelope presented in the following chart.

Sieve Size	Percentages Passing Weight Specified
1/2"	100
3/8"	94-100
No. 4	15-45
No. 16	0-4

D. Drainage Course:

1. The Drainage Course shall consist of crushed stone (CA-7) meeting the grading requirements specified in IDOT Section 1004 and meeting the requirements of Section 02318.
2. The grading requirements for the material shall be in compliance with the grain size distribution envelope presented in the following chart.

Sieve Size	Percentages Passing Weight Specified
1-1/2"	100
1"	90-100
1/2"	30-60
No. 4	0 - 10

3. The percentage of Voids in Dry Bulk shall be 38.0.

E. Base Course

1. The Base Course shall consist of crushed stone (CA-1) meeting the grading requirements specified in IDOT Section 1004 and meeting the requirements of Section 02318.
2. The grading requirements for the material shall be in compliance with the grain size distribution envelope presented in the following chart:

Sieve Size	Percentages Passing Weight Specified
3"	100
2 - 1/2"	90-100
2"	45-75
1 - 1/2"	0-30
1"	0-6

3. The percentage of Voids in Dry Bulk shall be 38.0.

PART 3 - EXECUTION

3.1 SUBGRADE

A. Under this section the Contractor shall perform the final shaping and compaction of earth to provide for the construction of the permeable pavement structure, to conform to the lines, grades and cross-sections shown on the plans.

B. Site grades can be elevated to the design sub grade elevation using clean native earth fill (free of deleterious material). This fill should be placed in lifts not exceeding 6 inches and compacted to a minimum of 90 percent Standard Proctor Density per ASTM D 698. The final sub grade profile should be (1) uniformly compacted to a minimum of 90 percent Standard Proctor Density and (2) proof-rolled using a heavy rubber tired vehicle (such as a loaded tandem) to delineate soft (wet and “spongy”) areas. These areas should be repaired by removing the unstable soil and replacing with clean dry compacted earth fill.

3.2 PLACEMENT OF BASE COURSE

A. The base course of CA-1 shall consist of a thickness as indicated in drawings and shall be compacted to a minimum of 95 percent Standard Proctor Density.

3.3 PLACEMENT OF DRAINAGE COURSE

A. The base course of CA-7 shall consist of a thickness as indicated in drawings and shall be compacted to a minimum of 95 percent Standard Proctor Density.

3.4 BEDDING LAYER

A. Spreading

1. The bedding aggregate shall be spread loosely in a uniform layer to provide a finished layer of 1.5 inches after compaction of the paving units.

B. Screeding

1. The spread aggregate shall be carefully maintained in a loose condition and protected against precompaction by traffic or rain both prior to and following screeding. Under no circumstances shall the bedding aggregates be screeded in advance of the laying face to an extent to which paving will not be completed on that day. Any screeded bedding aggregate which is precompacted prior to laying of paving units shall be brought back to profile in a loose condition. Neither pedestrian nor vehicular traffic shall be permitted on the screeded bedding aggregates.

2. The contractor shall screed the bedding aggregates using either an approved mechanical spreader (e.g. an asphalt paver) or by the use of screed guides and boards.

3.5 INSTALLATION OF PERMEABLE PAVERS

A. General

1. Pavers with excessive chips, cracks, voids, discoloration’s or other defects shall not be installed. Permeable pavers should be produced with spacer lugs which maintain consistent joint spacing.

B. Patterning

1. Vehicular pavers are to be laid in a basket weave patterning.

C. Edge Restraints

1. Provide edge restraints as indicated.

D. Initial Compaction of permeable pavers

1. After placement, the pavement surface shall be compacted to achieve consolidation of the bedding aggregates and brought to design levels and profiles by not less than three passes of a suitable plate compactor.

2. Compaction shall be accomplished by the use of a plate compactor capable of a minimum of a 4500-pound compaction force.

3. Initial compaction should proceed as closely as possible following installation of the paving units and prior to acceptance of any traffic or application of additional Joint and bedding aggregate.

4. Compaction should not be attempted within 3 feet of an unrestrained laying edge.

E. Inspection of Paver Surface

1. Any units, which are structurally damaged during compaction, shall be immediately removed and replaced.

F. Infilling of Joints and Surface Voids with Additional Bedding Aggregates

1. The joint and bedding aggregates shall be spread over the pavement after initial compaction has been completed. This aggregate material shall be spread as soon as is practical after initial compaction and prior to the termination of work on that day.

2. The joint and bedding aggregates shall be broomed or shoveled to fill the surface voids. Excess aggregate material shall then be removed from the pavement surface and the pavers shall be compacted again to settle the aggregates. A second application of the aggregates may be required to completely fill the surface voids.

G. Final Compaction of permeable pavers

1. After the joint and bedding aggregates has been installed, the pavement surface shall be swept clean and final compaction shall be accomplished by not less than two passes of the plate compactor.

2. Final compaction shall proceed as closely as possible following installation of the joint and bedding aggregates and prior to the acceptance of any traffic.

3. Inspection by the owner or consultant shall determine whether and additional aggregate application is required.

3.6 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit paver work being without damage or deterioration at time of Substantial Completion.

3.7 CLEAN-UP

1. Sweep clean all paved areas of excess aggregate and dirt.

2. Pick up and removed from the site all surplus materials, equipment and debris resulting from this section of the work.

3. Off-site disposal shall be in accordance with Section 02316.

END OF SECTION

SECTION 02700

SEWERAGE AND DRAINAGE

PART 1 - GENERAL

1.1 SUMMARY

A. The work covered in this section consists of furnishing all labor, materials, tools, and equipment required to install the storm and sanitary sewer systems as established by the Contractor in continuity to the plans and specification for the complete system. The work shall include but is not limited to excavation for sewer pipes and structures, sewer pipe and structure installation, backfilling trenches, and testing of the complete systems as required.

B. Definitions:

1. Drainage Piping: System of sewer pipe, fittings, and appurtenances for gravity flow of storm drainage.

2. Sewerage Piping: System of sewer pipe, fittings, and appurtenances for gravity flow of sanitary sewage

C. Related Sections include the following:

1. Division 1 Section "Product Substitutions."

2. Division 2 Section "Excavation, Backfilling, and Compaction for Utilities."

1.2 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Shop drawings for precast concrete manholes and other structures. Include frames, covers, and grates.

C. Inspection and test reports specified in the "Field Quality Control" Article.

D. LEED Submittals:

1. LEED Credit MR 4.1 and Credit MR 4.2: Submit product data for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.

a. Include statement indicating costs for each product having recycled content.

2. LEED Credit MR 5.1 and Credit MR 5.2: Submit product data for products that have extracted, harvested, or recovered, as well as manufactured within 500 miles of the Project site.

a. Include a statement indicating the percentage by weight which is extracted, harvested, or recovered within 500 miles of the Project site.

1.3 QUALITY ASSURANCE

A. Environmental Agency Compliance: Comply with regulations pertaining to sanitary sewerage and storm drainage systems.

B. Utility Compliance: Comply with regulations pertaining to sanitary sewerage and storm drainage systems. Include standards of water and other utilities where appropriate.

C. Product Options: Drawings indicate sizes, profiles, connections, and dimensional requirements of system components and are based on specific manufacturer types indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Division 1 Section "Product Substitutions."

1.4 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Non-pressure Piping Pressure Ratings: At least equal to system test pressure.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect pipe, pipe fittings, and seals from dirt and damage.

B. Handle precast concrete manholes and other structures according to manufacturer's rigging instructions.

1.6 PROJECT CONDITIONS

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.

B. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted under the following conditions and then only after arranging to provide acceptable temporary utility services.

1. Notify Architect not less than 48 hours in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without receiving Architect's written permission.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate with interior building drainage systems.

B. Coordinate with other utility work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements of Division 1 Specification Sections.

2.2 PIPES AND FITTINGS

A. Extra Strength Vitrified Clay Pipe (ESVCP) and Fittings: Extra strength and fittings ASTM C700-88, Compression - Type Gasket and Gasketed Joints ASTM C425-86.

B. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end, unless grooved or flanged ends are indicated.

1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

2. Gaskets: AWWA C111, rubber.

C. Perforated pipe: ASTM D 3034; PVC-SDR-35. Joints ASTM D 2855 or ASTM D 3212.

2.3 MANHOLES

A. Precast Concrete Manholes: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasket joints.

1. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent floatation.

2. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100-mm) minimum thickness for walls and base riser section, and having a separate base slab or base section with integral floor.

3. Riser Sections: 4-inch (100-mm) minimum thickness, 48-inch (1220-mm) diameter, and lengths to provide depth indicated.

4. Top Section: Eccentric cone type, unless concentric cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.

5. Gaskets: ASTM C 443 (ASTM C 443M), rubber.

6. Grade Rings: Include 2 or 3 reinforced-concrete rings, of 6- to 9-inch (152- to 229-mm) total thickness, that match a 24-inch- (610-mm-) diameter frame and cover.

7. Steps: ASTM C 478 (ASTM C 478M) individual steps or ladder. Omit steps for manholes less than 60 inches (1500 mm) deep.

8. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.

B. Frames and Covers: ASTM A 536, Grade 60-40-18, heavy-duty ductile iron. Include 24-inch (610-mm) inside diameter by 7- to 9-inch (178- to 229-mm) riser with 4-inch (100-mm) minimum width flange, and 26-inch- (660-mm-) diameter cover. Include indented top design with lettering, equivalent to the following, cast into cover:

1. Sanitary Sewerage Piping Systems: SANITARY SEWER.

2. Storm Drainage Piping Systems: STORM SEWER.

3. Dry Well: INFILTRATION BASIN.

4. Frames and covers on City property must be cast-iron, complying with City of Chicago requirements.

2.4 CATCH BASINS/ DRYWELLS

A. Precast Concrete Catch Basins: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasket joints.

1. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100-mm) minimum thickness for walls and base riser section, and having a separate base slab or base section with integral floor.

2. Riser Sections: 4-inch (100-mm) minimum thickness; 48-inch (1220-mm) diameter, and lengths to provide depth indicated.

3. Top Section: Eccentric cone type, unless concentric cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.

4. Gaskets: ASTM C 443 (ASTM C 443M), rubber.

5. Grade Rings: Include 2 or 3 reinforced-concrete rings, of 6- to 9-inch (152- to 229-mm) total thickness, that match a 24-inch- (610-mm-) diameter frame and grate.

6. Steps: ASTM C 478 (ASTM C 478M) individual steps or ladder. Omit steps for catch basins less than 60 inches (1500 mm) deep.

7. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.

8. Drywell aggregate: CA-1

B. Frames and Grates:

1. Catch Basin: ASTM A 536, Grade 60-40-18, heavy-duty ductile iron, 24-inch (610-mm) inside diameter by 7- to 9-inch (178- to 229-mm) riser with 4-inch (100-mm) minimum width flange, and 26-inch- (660-mm-) diameter flat grate having small square or short-slotted drainage openings. Include indented top design with lettering, equivalent to the following, cast into cover:

a. Storm Drainage Piping Systems: STORM SEWER.

b. Dry Well: INFILTRATION BASIN.

2.5 AREA DRAIN:

A. Extra Strength Vitrified Clay Pipe (ESVCP) and Fittings: Extra strength and fittings ASTM C700-88, Compression - Type Gasket and Gasketed Joints ASTM C425-86.

B. Lid: Neenah Foundry R-4380-4A or equal; square foot opening 0.2 or better.

2.6 TRENCH DRAIN:

A. Grate to be NEENAH HEAVY DUTY #R-4990-CX or equal

1. Type C lid

2. Rated for Heavy Duty Vehicular Loading

2.7 CLEANOUTS

A. Extra Strength Vitrified Clay Pipe (ESVCP) and Fittings: Extra strength and fittings ASTM C700-88, Compression - Type Gasket and Gasketed Joints ASTM C425-86.

B. Cap to be ASTM 3034 SDR 26, PVC Gasketed End Cap except where clean out rim is depressed under playing field cap is to be steel.

C. PVC-SDR-26. Joints ASTMD 2855 or ASTMD3212.

2.8 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:

1. Cement: ASTM C 150, Type II.

2. Fine Aggregate: ASTM C 33, sand.

3. Coarse Aggregate: ASTM C 33, crushed gravel.

4. Water: Potable.

B. Structures: Portland-cement design mix, 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cement ratio.

1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.

2. Reinforcement Bars: ASTM A 615, Grade 60 (ASTM A 615M, Grade 400), deformed steel.

2.9 PROTECTIVE COATINGS

A. General: Include factory- or field-applied protective coatings to structures and appurtenances according to the following:

B. Coating: 1- or 2-coat, coal-tar epoxy, 15-mil (0.381-mm) minimum thickness, except where otherwise indicated.

1. Manholes: On exterior and interior surfaces.

2. Manhole Frames and Covers: On interior surfaces.

3. Catch Basins: On exterior and interior surfaces.

4. Catch Basin Frames and Grates: On interior surfaces.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 2 Section "Excavation, Backfilling, and Compaction for Utilities."

3.2 IDENTIFICATION

A. Install green warning tapes directly over piping and at outside edges of underground structures.

1. Use warning tapes or detectable warning tape over ferrous piping.

2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.3 SEWERAGE PIPING APPLICATIONS

A. General: Include watertight joints.

B. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to the following applications.

1. Pipe Size 6 and 10 Inches (150 and 250 mm): Hub-and spigot, extra strength vitrified clay pipe, and fittings; compression type gaskets; and gasketed joints for pipe outside of buildings or structures

2. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end for pipe below buildings or structures.

3.4 INSTALLATION, GENERAL

A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of underground sewerage and drainage systems piping. Location and arrangement of piping layout take into account many design considerations. Install piping as indicated, to extent practical.

B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's recommendations for

use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.

C. Install gravity-flow-systems piping at constant slope between points and elevations indicated. Install straight piping runs at constant slope, not less than that specified, where slope is not indicated.

D. Extend piping and connect to building's drains, of sizes and in locations indicated. Terminate piping as indicated.

E. Install piping pitched down in direction of flow, at minimum slope of 1 percent (1:100) and 36-inch (1000-mm) minimum cover, except where otherwise indicated.

3.5 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to the following.

1. Hub-and-Spigot, Vitrified Clay Pipe and Fittings: With rubber compression gaskets according to ASTM C12-86. Use gaskets that match class of pipe and fittings.

3.6 MANHOLE INSTALLATION

A. General: Install manholes, complete with accessories, as indicated.

B. Set tops of frames and covers flush with finished surface where manholes occur in pavements. Set tops 3 inches (76 mm) above finished surface elsewhere, except where otherwise indicated.

C. Place precast concrete manhole sections as indicated, and install according to ASTM C 891.

1. Provide rubber joint gasket complying with ASTM C 443 (ASTM C 443M), at joints of sections.

2. Apply bituminous mastic coating at joints of sections.

3.7 CATCH BASIN

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

3.8 TAP CONNECTIONS

A. Make connections to existing piping and underground structures so finished work conforms as nearly as practical to requirements specified for new work.

B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch (150-mm) overlap, with not less than 6 inches (150 mm) of 3000-psi (20.7-MPa), 28-day, compressive-strength concrete.

C. Make branch connections from side into existing piping, sizes 4 to 20 inches (100 to 500 mm) by removing a section of existing pipe and installing a wye fitting into existing piping. Encase entire wye with not less than 6 inches (150 mm) of 3000-psi (20.7-MPa), 28-day, compressive-strength concrete.

1. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi (20.7 MPa), unless otherwise indicated.

2. Use epoxy bonding compound as an interface between new and existing concrete and piping materials.

D. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.9 FIELD QUALITY CONTROL

A. Clear interior of piping and structures of dirt and superfluous material as the work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.

1. In large, accessible piping, brushes and brooms may be used for cleaning.

2. Place plug in end of incomplete piping at end of day and whenever work stops.

3. Flush piping between manholes and other structures, if required by authorities having jurisdiction, to remove collected debris.

B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of the Project.

1. Submit separate reports for each system inspection.

2. Defects requiring correction include the following:

a. Alignment: Less than full diameter of inside of pipe is visual between structures.

b. Deflection: Flexible piping with deflection that prevents passage of a ball or cylinder of a size not less than 92.5 percent of piping diameter.

c. Crushed, broken, cracked, or otherwise damaged piping.

d. Infiltration: Water leakage into piping.

e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials and repeat inspections until defects are within allowances specified.

4. Reinspect and repeat procedure until results are satisfactory.

C. Test new piping systems and parts of existing systems that have been altered, extended, or repaired for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.

2. Test completed piping systems according to authorities having jurisdiction.

3. Schedule tests, and their inspections by authorities having jurisdiction, with at least 24 hours' advance notice.

4. Submit separate reports for each test.

5. Where authorities having jurisdiction do not have published procedures, perform tests as follows:

a. Sanitary Sewerage: Perform hydrostatic test.

1) Allowable leakage is a maximum of 50 gallons per inch nominal pipe size, for every mile of pipe, during a 24-hour period.

2) Allowable leakage is a maximum of 4.6 L per mm dimension nominal pipe size, for every km of pipe, during a 24-hour period.

3) Close openings in system and fill with water.

4) Purge air and refill with water.

5) Disconnect water supply.

6) Test and inspect joints for leaks.

7) Option: Test ductile-iron piping according to AWWA C600, Section 4 "Hydrostatic Testing." Use test pressure of at least 10 psig (69.0 kPa).

b. Sanitary Sewerage: Perform air test according to UNI-B-6.

1) Option: Test Poly Vinyl Chloride (PVC) according to ASTM-D1785-86.

c. Storm Drainage: Perform hydrostatic test.

1) Allowable leakage is a maximum of 200 gallons per inch nominal pipe size, for every mile of pipe, during a 24-hour period.

2) Allowable leakage is a maximum of 18.4 L per mm dimension nominal pipe size, for every km of pipe, during a 24-hour period.

3) Close openings in system and fill with water.

4) Purge air and refill with water.

5) Disconnect water supply.

6) Test and inspect joints for leaks.

7) Storm Drainage: Perform hydrostatic test. Close openings in system and fill with water to not less than 10-foot (3-m) head of water. Disconnect water supply. Water level must not drop for 15 minutes. Inspect joints for leaks.

d. Storm Drainage: Perform air test according to UNI-B-6.

END OF SECTION

SECTION 02707 - WATER SERVICE

PART 1 - GENERAL

1.1 SUMMARY

A. This item shall include furnishing all labor, materials, tools, and equipment required to install the water service as established by Contractor in continuity to the plans and specifications for the complete systems. The work shall include excavation for water pipes, water service installation, backfilling trenches, and testing and disinfecting of the complete water systems as required.

B. Ductile or other slip-joint connected pipe is to be made electrically continuous with exothermically welded bonds across joints. Dielectrics are to be installed at street connection.

1.2 RELATED DOCUMENTS

A. Drawings

B. Section 02222 – Excavating, Backfilling, and Compacting for Utilities

1.3 SUBMITTALS

A. In accordance with Division 1 specification sections.

B. Manufacturers' literature, installation instructions, dimensions, materials, standards, certifications and guarantees.

C. Shop drawings for precast concrete manholes and other structures. Include frames, covers, and grates.

D. Inspection and test reports specified in the "Field Quality Control" Article.

E. LEED Submittals:
   1. LEED Credit MR 4.1 and Credit MR 4.2: Submit product data for products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
      a. Include statement indicating costs for each product having recycled content.
   2. LEED Credit MR 5.1 and Credit MR 5.2: Submit product data for products that have extracted, harvested, or recovered, as well as manufactured within 500 miles of the Project site.
      a. Include a statement indicating the percentage by weight which is extracted, harvested, or recovered within 500 miles of the Project site.

1.4 QUALITY ASSURANCE

A. In accordance with General Requirements, Division 1.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Water service piping shall be as specified in project documents.

B. Tap to city water main by City of Chicago. The contractor shall reimburse the City for their costs at the rate per tap.

C. Stops and fittings shall be fabricated of brass and provided with outlets suitable for copper connections.

D. Bedding and backfill material shall meet project documents and Chicago Department of Water Management Requirements and shall conform to 02318.

2.2 FIRE HYDRANTS

A. All hydrants must be a Chicago Standard Hydrant as manufactured by East Jordan Iron Works, Inc., and comply with AWWA C502 standards. Hydrants are to be of a self draining dry barrel design, with two 4 1/2 –inch pumper nozzles spaced 90 degrees apart, and have a 9-inch mechanical joint inlet fitting. The top flange of the hydrant must be color coded per Chicago Department of Water Management Requirements.

PART 3 - EXECUTION

3.1 HORIZONTAL SEPARATION - WATER MAINS AND SEWERS

A. The work under this section will be performed in accordance with applicable sections of the City of Chicago Building and Plumbing Code, latest edition.

B. Water mains shall be located at least ten feet horizontally from any existing or proposed drain, storm sewer, sanitary sewer, combined sewer or sewer service connection.

C. Water mains may be located closer than ten feet to a sewer line when:
   1. Local conditions prevent a lateral separation of ten feet; and
   2. The water main invert is at least 18 inches above the crown of the sewer; and
   3. The water main is either in a separate trench or in the same trench on an undisturbed earth shelf located to one side of the sewer.

D. When it is impossible to meet (1) or (2) above, both the water main and drain or sewer shall be constructed of slip-on mechanical joint cast or ductile iron pipe. The drain or sewer shall be pressure tested to the maximum expected surcharge head before backfilling.

3.2 VERTICAL SEPARATION - WATER MAINS AND SEWERS

A. A water main shall be separated from a sewer so that its invert is a minimum of 18 inches above the crown of the drain or sewer whenever water mains cross storm sewers, vertical separation shall be maintained for that portion of the water main located within ten feet horizontally of any sewer or drain crossed. A length of water main pipe shall be centered over the sewer to be crossed with joints equidistant from the sewer or drain.

B. Both the water main and sewer shall be constructed of slip-on or mechanical joint cast or ductile iron pipe, prestressed concrete pipe, when:
   1. It is impossible to obtain the proper vertical separation as described in (A) above; or
   2. The water main passes under a sewer or drain.

C. A vertical separation of 18 inches between the invert of the sewer or drain and the crown of the water main shall be maintained where a water main crosses under a sewer.Support the sewer or drain lines to prevent settling and creaking the water main, as shown on the plans or as approved by the Engineer.

D. Construction shall extend on each side of the crossing until the perpendicular distance from the water main to the sewer or drain line is at least ten feet.

3.3 WATER SERVICE LINES

A. The horizontal and vertical separation between water service lines and all storm sewers, sanitary sewers, combined sewers or any drain or sewer service connection shall be the same as water main separation described above.

B. Water pipe above shall be used for sewer service lines when minimum horizontal and vertical separation cannot be maintained.

3.4 CONSTRUCTION PROCEDURES

A. EXCAVATION: The Contractor shall do all excavation of whatever unclassified material is encountered to the depths established by Contractor. Trench depths, not established, shall be figured to allow a minimum of 5'-0" cover over the top of the pipe.
   1. In open cut excavation, the Contractor shall keep the trench width at the top of the pipe not wider than established, unless the angle or repose of the soil is unsuitable.
   2. Excavation and removal of excess unsuitable spoils shall conform to Sections 02222 and 02316.

B. PUMPING: The contractor shall remove, by pumping or other means, any water accumulated in the excavation and keep the trench dry during the pipe laying period. The contractor shall provide adequate pumps, well points, or other dewatering method at no extra cost to the Owner.

C. BEDDING: All water mains shall be laid on crushed limestone conforming to the gradation requirements in the project documents.
   1. As established by Contractor, or where necessary because of soil conditions, concrete cradles or concrete encasement shall be built. The pad section of a cradle or encasement shall be built at least twelve (12) hours before pipe laying. A sufficient number of No. 9 annealed iron pipes shall be embedded in the pad and subsequently tied around the pipe to prevent the pipe from moving off line and/or grade.

D. INSTALLATION OF PIPE: Before lowering the pipe into the trench and while suspended, each pipe shall be inspected by the Contractor for defects. Defective, damaged or unsound pipe shall be immediately removed from the site. The interior of each pipe shall be inspected for cleanness and cleared of all dirt and foreign matter before being lowered into the trench.
   1. Unless otherwise directed, pipe shall be laid with bell ends facing in the direction of laying. After a length of pipe is placed in the trench, the spigot shall be centered in the bell of the preceding pipe, the pipe shoved into position and brought to true alignment and

there secured with sand tamped under and on each side of the pipe, excepting at bell holes. No earth or other foreign matter shall be allowed to enter into the joint space.

2. The bells, spigots and rubber gaskets shall then be thoroughly washed in soapy water so that no particles of sand of grit can damage the gasket. Slip-on joints shall be constructed in strict accordance with the manufacturer's recommendations.
3. Crushed limestone shall be tamped into place to the spring line of the pipe.

E. CUTTING OF PIPE: Where necessary to cut pipe, cutting shall be done with proper tools and cut end of pipe shall be square and regular. Cutting shall be done in strict conformance with manufacturer's instructions.

F. INSTALLATION OF VALVES AND FITTINGS: Before connecting valves or fitting to the pipe, such valves shall be cleaned and inspected by the Contractor for defects. Defective, damaged or unsound valves shall have a mechanical joint and be placed as established by contractor. All bolts, valves or fittings shall have thrust blocks as required set to undisturbed earth. All bolts shall be sufficiently tightened to manufacturer's recommendation.

G. BACKFILLING:
1. Backfill of auxiliary valves and line valves shall be carefully tamped to insure proper alignment. Contractor shall properly align and set to grade all valve boxes after completion of curb and gutter construction.
2. PIPE ZONE: Crushed limestone granular backfill shall be carefully placed and thoroughly tamped and compacted around the pipe with hand tools up to the spring line of the pipe.
3. GRANULAR TRENCH BACKFILL: All trenches and the excavation around fire hydrants, valves and other appurtenances which occur within the limits of existing or proposed pavements, sidewalks and curb and gutters, or where the edge of the trench shall be within two feet (2') of said improvements shall be backfilled with compacted granular backfill.
4. GUARANTEE: The contractor shall guarantee all work for a period of one year after acceptance by the Owner. Any trenches improperly backfilled or where settlement occurs shall be reopened and properly compacted. The cost of any corrections and/or repair of any damages to other facilities shall be the responsibility of the Contractor.\

H. TESTING, DISINFECTION, AND FLUSHING OF DOMESTIC WATER LINES
1. Procedures shall be submitted to the local authorities for approval prior to testing. Tests shall be conducted using the more stringent procedures as approved by local authorities and as mandated by the City of Chicago Department of Water Management, Design Guidelines for Water Main Installations, dated January 2007.
2. Testing of the newly laid piping or any valved section of piping shall be accomplished after the lines are laid, the joints and accessories installed, and the trench partially backfilled, leaving the joint exposed for examination. The piping shall be subjected for a minimum of two hours to a pressure of one and one-half times the working pressure, but in no case less than l00 psi (689 kPa). Examine all exposed pipe, joints, fittings and accessories during the test period. Replace or repair defective portions of the system, and repeat tests until results are satisfactory. Allowable leakage shall be as specified in AWWA C-600, Table 3.

I. TAPPING
1. Connection to the water main shall be made by the City of Chicago Water Department. Contractor shall coordinate final connection with the city.

END OF SECTION

SECTION 01352 - LEED REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements and procedures for compliance with certain USGBC LEED prerequisites and credits needed for Project to obtain LEED Silver certification based on LEED for Schools.

1. A copy of the LEED Project checklist is attached at the end of this Section for information only.

1.2 DEFINITIONS

A. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.

B. LEED: Leadership in Energy & Environmental Design.

C. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

D. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.

1. "Post-consumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
2. "Pre-consumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

1.3 SUBMITTALS

A. General: Submit additional LEED submittals required by other Specification Sections.

B. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.

C. Project Materials Cost Data: Provide statement indicating total cost for building materials used for Project, excluding mechanical, electrical, and plumbing components, and specialty items such as elevators and equipment. Include statement indicating total cost for wood-based materials used for Project.

D. LEED Action Plans: Provide preliminary submittals within thirty days of date established for the Notice to Proceed (NTP) indicating how the following requirements will be met, except where otherwise indicated:

1. Prerequisite to SS P1: Provide sediment and erosion control plan, specific to the site, that complies with the construction activities requirements listed in Phase I and Phase II of the National Pollutant Discharge Elimination System (NPDES) program or local requirement where more restrictive. Submit plan within fifteen days of NTP.
2. Credit MR 2.: Waste management plan complying with Division 1 Section "Construction Waste Management." Submit plan within fifteen days of NTP.
3. Credit MR 4.: List of proposed materials with recycled content. Indicate cost, post-consumer recycled content, and pre-consumer recycled content for each product having recycled content.
4. Credit MR 5.: List of proposed regional materials. Identify each regional material, including its source, cost, and the fraction by weight that is considered regional.
5. Credit MR 7: List of proposed certified wood products and list of all wood products. Indicate each product containing certified wood, including its source and cost of certified wood products. Include total cost of all wood products.
6. Credit EQ 3.1: Construction indoor-air-quality management plan.
7. Credit EQ 4: List of proposed low-emitting materials. Identify which options (Option 1: Adhesives and Sealants, Option 2: Paints and Coatings, Option 3: Flooring Systems, Option 4: Composite wood and agrifiber, Option 5: Furniture and Furnishings and/or Option 6: Ceiling and Wall systems) will meet the requirements. Choose a minimum of four options.

E. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:

1. Prerequisite SSp1: Construction Activity Pollution Prevention photos illustrating compliance.
2. Credit MR 2.: Waste reduction progress reports complying with Division 1 Section "Construction Waste Management."
3. Credit MR 4.: Recycled content.
4. Credit MR 5.: Regional materials.
5. Credit MR 7: Certified wood products.
6. Credit EQ 3.1: Photographs demonstrating compliance with IAQ plan
7. Credit EQ 4: Low-Emitting materials

F. LEED Documentation Submittals:

1. Consult with CxA to obtain copies of the following required documentation sheets:

a. Materials Credits Documentation Sheet
b. Low-Emitting Materials Credits Documentation Sheet
c. LEED Checklist
d. LEED Materials Table in Excel Spreadsheet Format

2. Refer to Attachment “A” for LEED Project Checklist.
3. Credit SS 7.2: Product Data for roofing materials indicating Solar Reflectance Index compliance for non-vegetated roof systems.
4. Credit SS 8.0: Product Data for interior and exterior lighting fixtures that stop direct-beam illumination from leaving the building site.
5. Prerequisite EA P3.0: Product data on HVAC equipment indicating absence of CFC refrigerants.
4. WE 3.1/3.2/3.3: Product Data for plumbing fixtures indicating flow.
5. Credit EA 4.: Product Data for new HVAC equipment indicating compliance with credit and use of refrigerants with low ozone depletion and global warming potential.

6. Credit EA 5: Product data and wiring diagrams for sensors and data collection system used to provide continuous metering of building energy-consumption performance.
7. Credit MR 2.: Comply with Division 1 Section "Construction Waste Management."
8. Credit MR 4.: Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
9. Credit MR 5.: Product data for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

10. Credit MR 7: Product data and chain-of-custody certificates for products containing certified wood. Include statement indicating cost for each certified wood product. Include statement indicating total cost of wood products.
11. Credit EQ 1.0: Product Data and Shop Drawings for carbon dioxide monitoring system and outdoor air flow measuring devices.
12. Credit EQ 3.1:

    a. Construction indoor-air-quality management plan based on SMACNA IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3.
    b. Product data for temporary filtration media.
    c. Product data for filtration media used during occupancy.
    d. Construction Documentation: At least six photographs at six different times during the construction period, for a total of at least 36 photos, along with a brief description of the SMACNA approach employed, documenting implementation of the indoor-air-quality management measures, such as protection of ducts and on-site stored or installed absorptive materials. All applicable SMACNA approaches described in the IAQ plan must be documented.
    e. Provide documentation confirming that smoking was not allowed inside the building during construction.

13. Credit EQ 3.2:

    a. Signed statement describing the building air flush-out procedures including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
    b. Product data for filtration media used during flush-out and during occupancy.

14. Credit EQ4.: Low-Emitting Materials

a. Option 1: Adhesives & Sealants (1 point): Submit Certification demonstrating that all adhesives and sealants installed in the building interior (defined as inside of the weatherproofing system and applied on-site) shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for the Testing Of Volatile Organic Emissions From Various Sources using Small-Scale Environmental Chambers,* including 2004 Addenda.

b. Option 2: Paints & Coatings (1 point): Submit Certification Demonstrating that all paints and coatings installed in the building interior shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for The Testing Of Volatile Organic Emissions From Various Sources using Small-Scale Environmental Chambers,* including 2004 Addenda.

c. Option 3: Flooring Systems (1 point): Submit Certification demonstrating that all flooring elements installed in the building interior shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for The Testing Of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers,* including 2004 Addenda.

d. Option 4: Composite Wood and Agrifiber Products (1 point): Submit Certification demonstrating that all composite wood and agrifiber products installed in the building interior shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for The Testing Of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers,* including 2004 addenda.

e. Option 5: Furniture & Furnishings (1 point): Submit Certification demonstrating that Classroom furniture including all student and teacher desks, tables, and seats introduced into the project space that has been manufactured, refurbished or refinished within one year prior to occupancy must meet one of the requirements below. Salvaged and used furniture that is more than one year old at the time of occupancy is excluded from the credit requirements.

Method A: GREENGUARD Children & Schools Certified

OR

Method B: Calculated indoor air concentrations that are less than or equal to those established in table 1 for furniture systems and seating determined by a procedure based on the U.S. Environmental Protection Agency's Environmental Technology Verification (ETV) Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol conducted in an independent air quality testing laboratory.

Table 1: Indoor Concentrations

Chemical Containment	Emission Limits Classroom Furniture	Emission Limits Seating
TVOC	0.5 mg/m^3	0.25 mg/m^3
Formaldehyde	50 parts per billion	25 parts per billion
Total Aldehydes	100 parts per billion	50 parts per billion
4 – Phenylcyclohexene (4-PCH)	0.0065 mg/m^3	0.00325 mg/m^3

OR

Method C: Calculated indoor air concentrations that are less than or equal to those established in Table 1 for furniture systems and seating determined by a procedure based on BIFMA M7.1-2005 and X7.1-2005 testing protocol conducted in an independent third party air quality testing laboratory.

f. Option 6: Ceiling and Wall Systems (1 point): Submit Certification demonstrating that all gypsum board, insulation, acoustical ceiling systems and wall coverings installed in the building interior shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for the Testing Of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers,* including 2004 Addenda.

15. Credit EQ 5: Product data demonstrating use of MERV 13 filters.

16. Credit EQ 6.2: Product Data and Shop Drawings for sensors and control system used to provide individual airflow and temperature controls for minimum 50 percent of non-perimeter, regularly occupied space.

17. Contractor will provide LEED documentation and input LEED documents Online to demonstrate compliance with the following LEED credits: MRc2.1/2.2, MRc4.1/4.2, MRc5.1/5.2, MRc7, EQc3.1/3.2, EQc4.1/4.2/4.3/4.4.

1.4 QUALITY ASSURANCE

A. LEED Coordinator: Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

PART 2 - PRODUCTS

2.1 RECYCLED CONTENT OF MATERIALS

A. Credit MR 4.: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 20 percent of cost of materials used for Project.

1. Cost of post-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.
2. Cost of post-consumer recycled content plus one-half of pre-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.
3. Do not include mechanical and electrical components in the calculation. Include only Div 2 through 10 in the calculation. If furniture is included in the materials calculations, also include Div 12.

2.2 REGIONAL MATERIALS

A. Credit MR 5.: Provide a minimum of 20 percent of building materials (by cost) that are regional materials. Goal is 30%.

2.3 CERTIFIED WOOD

A. Credit MR 7: Provide a minimum of 50 percent (by cost) of wood-based materials that are produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

2.4 LOW-EMITTING MATERIALS

A. Comply with a minimum of four of the following six options:

B. Option 1: Adhesives & Sealants (1 point): all adhesives and sealants installed in the building interior (defined as inside of the weatherproofing system and applied on-site) shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for the Testing Of Volatile Organic Emissions From Various Sources using Small-Scale Environmental Chambers,* including 2004 Addenda.

C. Option 2: Paints & Coatings (1 point): all paints and coatings installed in the building interior shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for The Testing Of Volatile Organic Emissions From Various Sources using Small-Scale Environmental Chambers,* including 2004 Addenda.

D. Option 3: Flooring Systems (1 point): all flooring elements installed in the building interior shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for The Testing Of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers,* including 2004 Addenda.

E. Option 4: Composite Wood and Agrifiber Products (1 point): all composite wood and agrifiber products installed in the building interior shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for The Testing Of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers,* including 2004 addenda.

F. Option 5: Furniture & Furnishings (1 point): Classroom furniture including all student and teacher desks, tables, and seats introduced into the project space that has been manufactured, refurbished or refinished within one year prior to occupancy must meet one of the requirements below. Salvaged and used furniture that is more than one year old at the time of occupancy is excluded from the credit requirements.

Method A: GREENGUARD Children & Schools Certified

OR

Method B: Calculated indoor air concentrations that are less than or equal to those established in table 1 for furniture systems and seating determined by a procedure based on the U.S.

Environmental Protection Agency's Environmental Technology Verification (ETV) Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol conducted in an independent air quality testing laboratory.

Table 1: Indoor Concentrations

Chemical Containment	Emission Limits Classroom Furniture	Emission Limits Seating
TVOC	0.5 mg/m^3	0.25 mg/m^3
Formaldehyde	50 parts per billion	25 parts per billion
Total Aldehydes	100 parts per billion	50 parts per billion
4 – Phenylcyclohexene (4-PCH)	0.0065 mg/m^3	0.00325 mg/m^3

OR

Method C: Calculated indoor air concentrations that are less than or equal to those established in Table 1 for furniture systems and seating determined by a procedure based on BIFMA M7.1-2005 and X7.1-2005 testing protocol conducted in an independent third party air quality testing laboratory.

G. Option 6: Ceiling and Wall Systems (1 point): all gypsum board, insulation, acoustical ceiling systems and wall coverings installed in the building interior shall meet the testing and product requirements of the California Department of Health Services *Standard Practice for the Testing Of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers,* including 2004 Addenda.

PART 3 - EXECUTION

3.1 MEASUREMENT AND VERIFICATION

A. Credit EA 5: Support measurement and verification plan data collection by ensuring that all devices installed under the contract operate properly during the measurement and verification period.

B. Measurement and verification period shall cover at least one year of post construction occupancy.

3.2 CONSTRUCTION WASTE MANAGEMENT

A. Credit MR 2.: Comply with Division 1 Section "Construction Waste Management."

3.3 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

A. Credit EQ 3.1: Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3."

1. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Division 1 Section "Temporary Facilities and Controls," install filter media having a MERV 8 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.
2. Replace all air filters immediately prior to occupancy.
3. No smoking is allowed within the building and within 25 feet of building entrances once the building is closed.

B. Credit EQ 3.2: Comply with one of the following requirements:

1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14000 cu. ft. (4 300 000 L) of outdoor air per sq. ft. (sq. m) of floor area while maintaining an internal temperature of at least 60 deg F (16 deg C) and a relative humidity no higher than 60 percent.

2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. (1 070 000 L) of outdoor air per sq. ft. (sq. m) of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq. ft. (1.52 L/s per sq. m) of outside air or the design minimum outside air rate determined in EQ Prerequisite 1, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14000 cu. ft./sq. ft. (4 300 000 L/sq. m) of outside air has been delivered to the space.

3. Air-Quality Testing:

   a. Conduct baseline indoor-air-quality testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in the USGBC's LEED-NC: Reference Guide." This EPA standard is available from NTIS by calling (800) 553-6847 with PB90200288 ordering number.
   b. Demonstrate that the contaminant maximum concentrations listed below are not exceeded:

      1) Formaldehyde: 50 ppb.
      2) Particulates (PM10): 50 micrograms/cu. m.
      3) Total Volatile Organic Compounds (TVOC): 500 micrograms/cu. m.
      4) 4-Phenylcyclohexene (4-PH): 6.5 micrograms/cu. m.
      5) Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.

   c. For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met. When retesting noncomplying building areas, take samples from same locations as in the first test.
   d. Air-sample testing shall be conducted as follows:

      1) All measurements shall be conducted prior to occupancy but during normal occupied hours, and with building ventilation system starting at the normal

daily start time and operated at the minimum outside air flow rate for the occupied mode throughout the duration of the air testing.

2) Building shall have all interior finishes installed including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings such as workstations and partitions are encouraged, but not required, to be in place for the testing.
3) Number of sampling locations will vary depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 25,000 sq. ft. (2300 sq. m) or for each contiguous floor area, whichever is larger, and shall include areas with the least ventilation and greatest presumed source strength.
4) Air samples shall be collected between 3 and 6 feet (0.9 and 1.8 m) from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

3.4 MATERIAL AND CONSTRUCTION PROTECTION

A. Deliver, store and handle products and materials using methods that will prevent damage and deterioration and in accordance with manufacturer's recommendations. Deliver to minimize long term storage in undamaged condition in manufacturer's original unopened, undamaged containers complete with labels and instructions. Store products and materials subject to damage by the elements under cover in a weather tight enclosure above ground with ventilation adequate to prevent condensation. Protect from freezing and moisture intrusion.

B. Inspect materials and products promptly upon arrival at the site for damage, soiling, contaminates and dampness and reject as appropriate.

C. Provide protection during the construction process to prevent moisture intrusion, freezing, dirt and debris within assemblies and extremes in temperature not common to the in-place use environment of the element. Do not allow food and drink or food and drink containers or material protective wrapping to be incorporated into the Work.

D. Install Work in sequence with sufficient time for curing and drying of each element before subsequent work upon which such work depends.

E. Promptly take measures to dry or remove and replace materials products and portions of the project that evidence absorption of moisture or are wet before incorporation proceeding with the work and incorporation or of such materials or products into the project.

END OF SECTION 01352

Attachment "A"

LEED-NC

LEED-Schools Registered Project Checklist

Sauganash Elementary
Chicago, IL

Yes	?	No			
11		**3**	**Sustainable Sites**		**16** Points
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
Y			Prereq 2	**Environmental Site Assessment**	Required
1			Credit 1	**Site Selection**	1
1			Credit 2	**Development Density & Community Connectivity**	1
		1	Credit 3	**Brownfield Redevelopment**	1
1			Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
		1	Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
1			Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	1
1			Credit 4.4	**Alternative Transportation**, Parking Capacity	1
1			Credit 5.1	**Site Development,** Protect or Restore Habitat	1
		1	Credit 5.2	**Site Development,** Maximize Open Space	1
1			Credit 6.1	**Stormwater Management,** Quantity Control	1
1			Credit 6.2	**Stormwater Management,** Quality Control	1
1			Credit 7.1	**Heat Island Effect,** Non-Roof	1
1			Credit 7.2	**Heat Island Effect,** Roof	1
1			Credit 8	**Light Pollution Reduction**	1
		1	Credit 9	**Site Master Plan**	1
1			Credit 10	**Joint Use of Facilities**	1

Yes	?	No			
3		**2**	**Water Efficiency**		**7** Points
1			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
1			Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1

Yes	?	No			
		1	Credit 2	**Innovative Wastewater Technologies**	1
1			Credit 3.1	**Water Use Reduction**, 20% Reduction	1
		1	Credit 3.2	**Water Use Reduction**, 30% Reduction	1
		1	Credit 4	**Proces Water Use Reduction**	2

Energy & Atmosphere — 17 Points

Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required
4			Credit 1	**Optimize Energy Performance**	1 to 10
		1	Credit 2	**On-Site Renewable Energy**	1 to 3
1			Credit 3	**Enhanced Commissioning**	1
1			Credit 4	**Enhanced Refrigerant Management**	1
1			Credit 5	**Measurement & Verification**	1
		1	Credit 6	**Green Power**	1

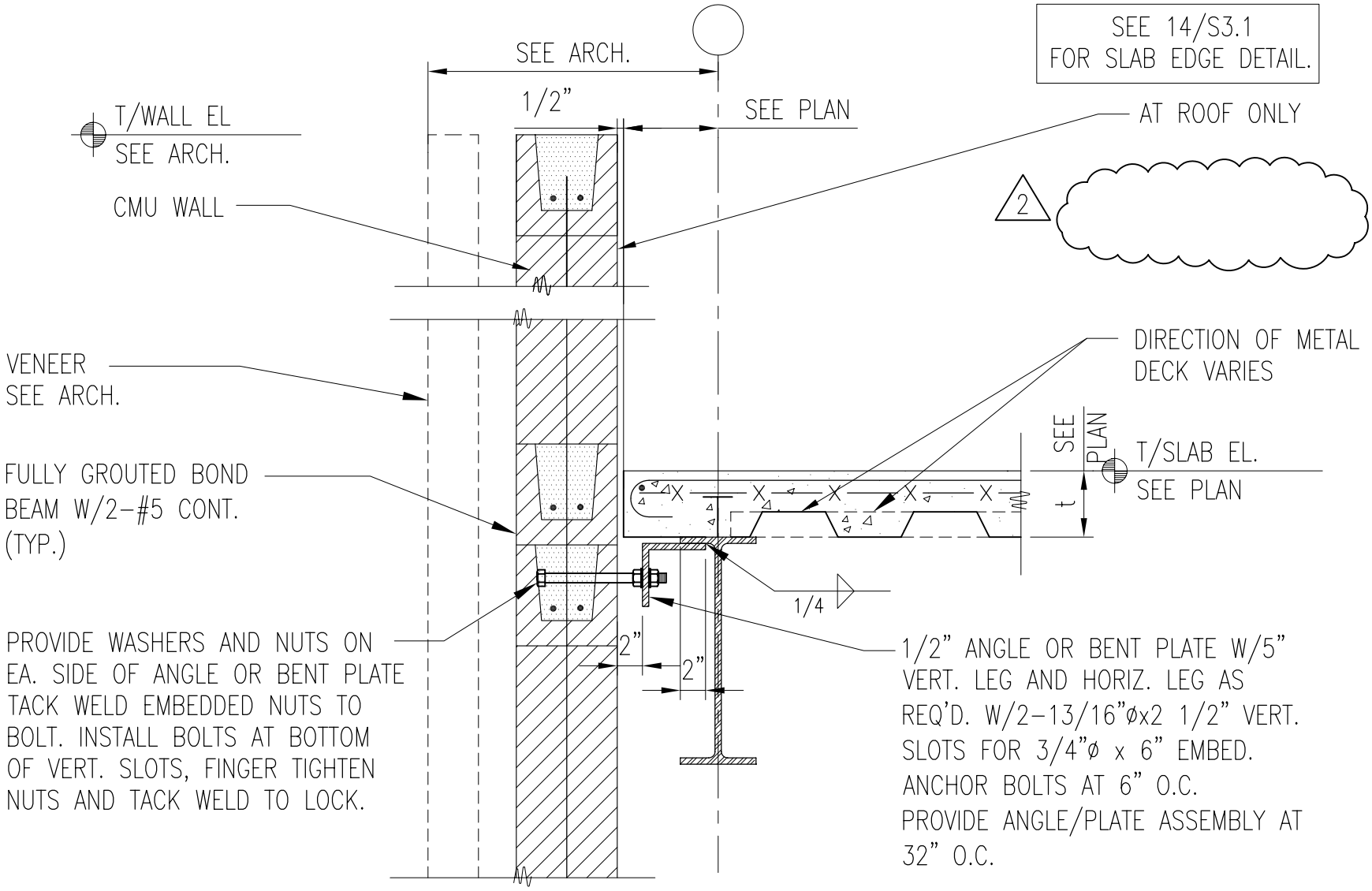
continued…

Materials & Resources — 13 Points

Y			Prereq 1	**Storage & Collection of Recyclables**	Required
	1		Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1
		1	Credit 1.2	**Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof	1
		1	Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1
1			Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
1			Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
1			Credit 3.1	**Resource Reuse**, 5%	1
		1	Credit 3.2	**Resource Reuse**,10%	1
1			Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
1			Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1
1			Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regionally	1
1			Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regionally	1
1			Credit 6	**Rapidly Renewable Materials**	1
		1	Credit 7	**Certified Wood**	1

Yes	?	No			
13		2		**Indoor Environmental Quality**	**20** Points
Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
Y			Prereq 3	**Minimum Acoustical Performance**	Required
1			Credit 1	**Outdoor Air Delivery Monitoring**	1
		1	Credit 2	**Increased Ventilation**	1
1			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
1			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
1			Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1
1			Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1
1			Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
1			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
1			Credit 6.1	**Lighting System Design & Controllability**	1
1			Credit 6.2	**Thermal comfort Controllability**	1
1			Credit 7.1	**Thermal Comfort**, Design	1
1			Credit 7.2	**Thermal Comfort**, Verification	1
1			Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
		1	Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1
		1	Credit 9	**Enhanced Acoustical Performance**	2
		1	Credit 10	**Mold Prevention**	3
1		4		**Innovation & Design Process**	**6** Points
		1	Credit 1.1	**Innovation in Design**: Provide Specific Title	1
		1	Credit 1.2	**Innovation in Design**: Provide Specific Title	1
		1	Credit 1.3	**Innovation in Design**: Provide Specific Title	1
		1	Credit 1.4	**Innovation in Design**: Provide Specific Title	1
1			Credit 2	**LEED® Accredited Professional**	1
1			Credit 3	**School as a Teaching Tool**	1
43	1			**Project Totals (pre-certification estimates)**	**79** Points

Certified 29-36 points **Silver** 37-43 points **Gold** 44-57 points **Platinum** 58-79 points



9 / S3.2

TYP. SLAB EDGE DETAIL AT EXTERIOR WALL

1"=1'-0"

MATRIX
Matrix Engineering Corporation
Structural Engineers
33 W. Jackson Blvd 4th floor
Chicago Illinois 60604-3901
v 312 427 1200
f 312 427 4220

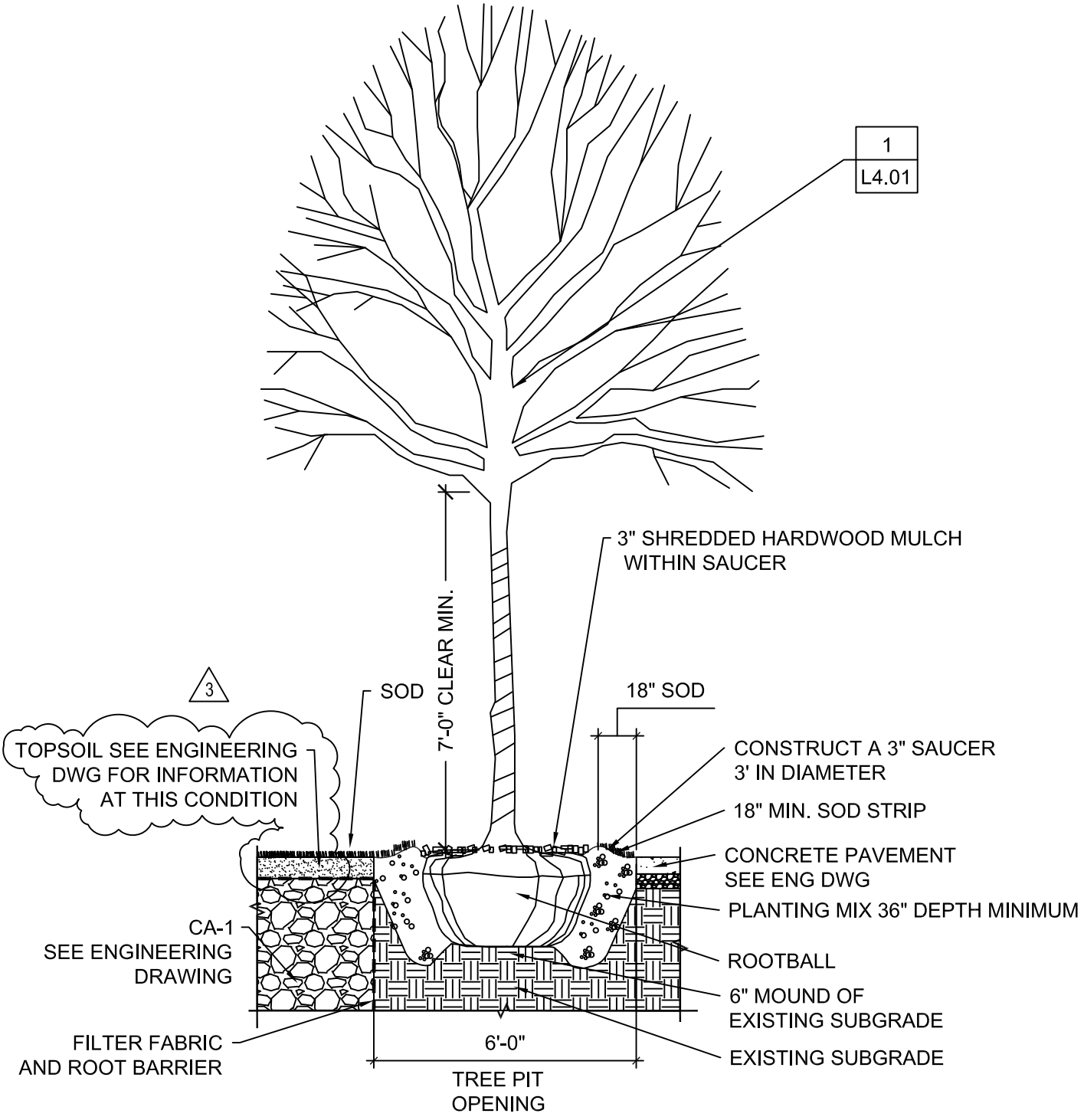
PROJECT: SAUGANASH ELEMENTARY SCHOOL
MATRIX #: 09028.2

ISSUE: ADDENDUM #3
TITLE: DETAIL 9/S3.2
REFERENCE: DRAWING S3.2

COMMENTS:

DATE: 05/20/10

SSK-1



5 TREE PLANTING DETAIL AT LAWN ADJACENT TO CA-1

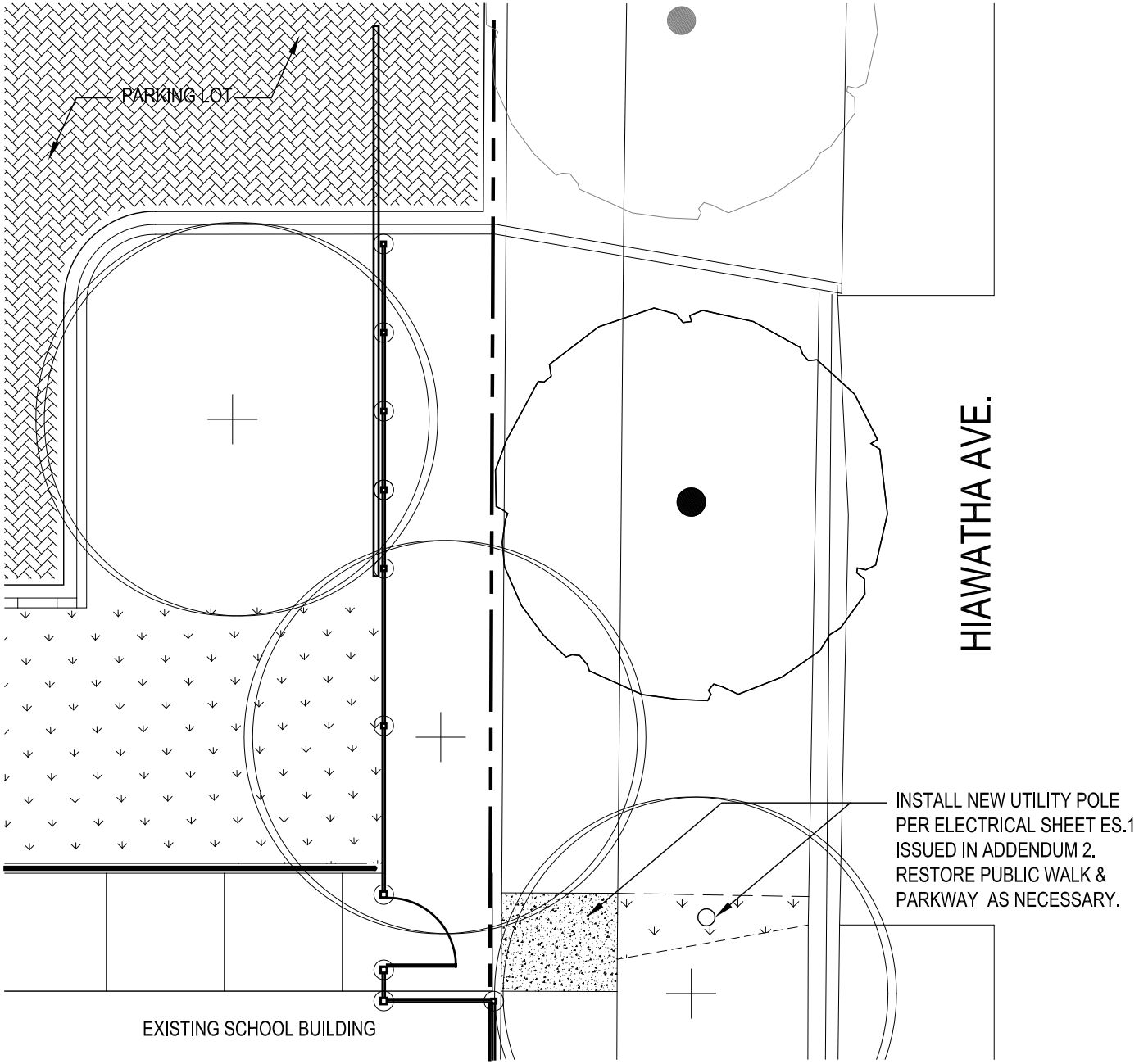
L4.01 **SCALE: Not to Scale**

Altamanu
landscape: architecture + art + sculpture + urban design
1700 w. irving park road, suite 202, chicago, illinois 60613
773.528.7492 ph 773.305.0805 fax info@altamanu.com

SAUGANASH ELEMENTARY SCHOOL ADDITION
6040 N. KILPATRICK CHICAGO, IL
ADDENDUM 3

REF SHEET: L4.01
DATE: 5.20.2010

LSK-1



1 / SK-1

PARTIAL SITE PLAN

SCALE: 1/8" = 1'-0"

PLAN NORTH

S▫W▫W▫B Ltd.
architects
203 north wabash street
suite 1304
chicago illinois 60608
ph: 312 236-0528
fx: 312 236-0965

SAUGANASH ELEMENTARY SCHOOL

6040 NORTH KILPATRICK AVENUE
CHICAGO, IL 60646

PROJ NO. 05370

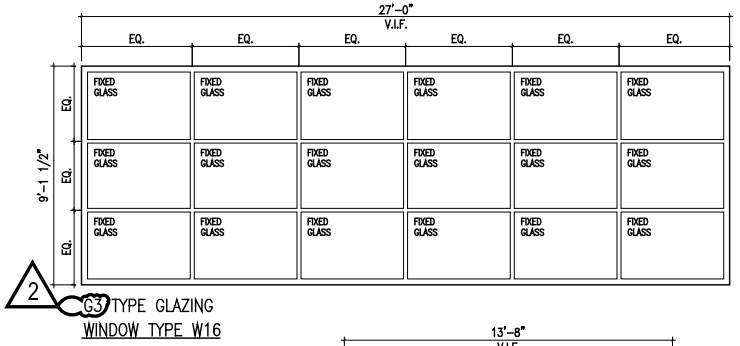
PARTIAL SITE PLAN

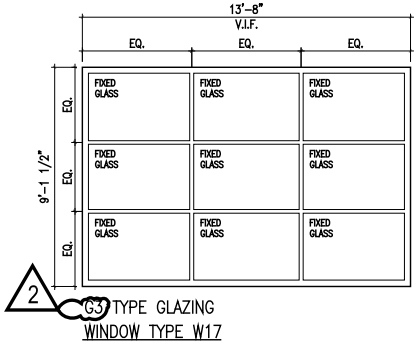
SK-1

date: 05/17/10 proj. no. 09-238

WINDOW SCHEDULE

OPNG NO	SIZE		TYPE	MAT	GLAZING	NOTE
	WIDTH	HT				
W1A	6'-8"	8'-0"	VENTED	AL		
W1B	6'-8"	8'-0"	VENTED	AL		
W2A	10'-3 3/4"	8'-0"	VENTED	AL		
W2B	10'-3 3/4"	8'-0"	VENTED	AL		
W3	3'-4"	3'-4"	VENTED	AL		
W4	5'-2"	11'-3 7/8"	FIXED	AL		
W5	5'-0"	11'-3 7/8"	FIXED	AL		
W6	5'-2"	13'-9 3/8"	FIXED	AL		
W7	5'-8"	9'-6 1/2"	FIXED	AL		
W8	10'-8"	9'-6 1/2"	FIXED	AL		
W9	6'-8"	8'-0"	FIXED	AL		
W10	9'-10 1/2"	8'-0"	FIXED	AL		
W11	9'-8 1/2"	9'-4"	FIXED	AL		
W12A	10'-4"	8'-0"	FIXED	AL		
W12B	6'-5"	8'-0"	FIXED	AL		
W13A	10'-8"	18'-8"	FIXED	AL		
W13B	7'-0"	18'-8"	FIXED	AL		
W14	6'-4 1/4"	16'-10"	FIXED	AL		
W15	12'-8"	12'-0"	FIXED	AL		
W16	27'-0"	9'-1 1/2"	FIXED	AL		
W17	13'-8"	9'-1 1/2"	FIXED	AL		





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CHICAGO, IL 60646

PROJ NO. 05370

WINDOW SCHEDULE

SK-2

date: 05/17/10 proj. no. 09-238