

Conditions of Use/ Responsibility of Data

These “guideline” specifications are to be used by the A/E as a base document in the development of project/site-specific Division 2 – SITE WORK specifications for Montgomery County Public Schools Construction Projects. They may or may not be complete, correct and/or appropriate for use for any given project. It is the responsibility of the A/E to review these “guideline” specifications and to edit and/or supplement them as required to ensure that they represent the full, complete, correct and code-compliant specifications required for all construction of the project to which they apply. The use of these “guideline” specifications, and/or any information herein, in no way releases the A/E from their Contractual responsibility to prepare and provide the full, complete and correct code-compliant Contract documents, plans and/or specifications required for construction.

Review and editing of these “guideline” specifications shall be performed by appropriately licensed Maryland professional engineer. Specifications are to be prepared in Microsoft Word, edited using the “Track Changes” feature of that software and submitted to MCPS electronically on a compact Disk for review.

SECTION 02200 – UTILITY STANDARDS

PART 1 - GENERAL:

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions, and Division 1, Specification Sections apply to work in this section.

1.2 DESCRIPTION OF WORK:

- A. Section specifies materials, work and standards for site and utility construction materials and work.

1.3 RELATED SECTIONS:

- A. Refer to Section 02100 "Earthwork and Grading"; Section 02226 "Water Distribution System", Section 02240 "Gravity Flow Sanitary Sewer System", Section 02230 "Storm Drainage System", Division 15 "Mechanical" and Division 16 "Electrical".

1.4 STANDARDS:

- A. Washington Suburban Sanitary Commission's (WSSC) current "General Conditions and Standard Specifications".
- B. Maryland Department of Transportation - State Highway Administration current "Standard Specifications for Construction and Materials", measurement and payment clauses do not apply.
- C. American Concrete Institute (ACI).

- D. Other utility purveyors' standards as applicable. Contractor to coordinate with other utility purveyors.
- E. Montgomery County Department of Permitting Services Requirements as applicable.

1.5 SUBMITTALS:

A. Products:

1. Submit typewritten list of selected products, when options are specified, within 10 calendar days after Contract execution. Submit detailed shop drawings of utility modifications required by selection of options.
2. Submit manufacturer's descriptive literature of structure castings.
3. Submit Portland cement concrete mix design formula for each class specified.
4. Submit certificates, signed by manufacturer or producer and Contractor, stating the following comply with this specification:
 - a. Portland cement.
 - b. Fine aggregates.
 - c. Coarse aggregates.
 - d. Portland cement concrete.
 - e. Concrete masonry units.
 - f. Brick.
 - g. Foundation materials.
 - h. Bedding materials.
5. Submit shop drawings, of the following, indicating concrete reinforcement locations, size and placement:
 - a. Cast in place reinforced concrete structures.
 - b. Pre-cast reinforced concrete structures.
6. Submit location of product manufacture and of extraction/recovery of primary raw materials.
7. Submit recycled-content data, designating percentages of post-consumer and post-industrial recycled material.
8. Submit certification of FSC-certified sustainably harvested wood formwork materials, if applicable.

B. Compaction Equipment: Submit compaction equipment data prior to start of controlled fill earthwork operations.

C. Testing: Submit test reports of testing specified.

D. "As-Built" Plans: Submit "as-built" plans for water, sanitary sewer, storm drainage and stormwater management systems within 60 days of achieving substantial completion. Submit to Owner's Representative and to controlling utility agencies as required.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Delivery: Schedule delivery operations to avoid unnecessary re-handling.

B. Storage:

1. General: Store in accordance with manufacturer's recommendations and as noted.
2. Portland cement: Store on platforms above ground and protect from adverse environmental conditions.
3. Aggregates: Store to prevent foreign material contamination.
4. Utility Joint Materials and Lubricants: Store in cool and dry location free of oil,

grease, excessive heat and direct sunrays.

C. Handling:

1. General: Comply with manufacturer's recommendations and as noted.
2. Aggregates: Handle to prevent segregation.
3. Pre-cast Concrete Structures: Handle to prevent damage. Utilize lifting holes provided by structure manufacturer.

1.7 DEFINITIONS:

- A. Refer to Section 02100 "Earthwork and Grading".

1.8 PROJECT CONDITIONS:

- A. Refer to Section 02100 "Earthwork and Grading" and as noted.
- B. Traffic: Maintain pedestrian and vehicular traffic during utility construction operations.
- C. Environmental Limitations: Do not place Portland cement products or erect masonry when ambient air temperature is below 40 degrees Fahrenheit or air temperature has been below 35 degrees Fahrenheit for three or more consecutive days or between 15 November and 01 March without written authorization from Owner's Representative or Architect.
- D. Certifications, Inspections and As-Built Documents: Contractor shall provide "as-built" plans of on-site water, sanitary sewer service and storm sewer work by a State of Maryland Licensed Surveyor, or Professional Engineer. Contractor shall notify Architect within 15 calendar days of signing Contract identity of Licensed Surveyor or Registered P.E. who will certify as-built water and sewer plan. Show any changes and include ties for location of valves, bends, manholes, fire hydrants, and laterals accompanied by qualifying air test date and certification of compliance. See Division One "Project Record Documents" for format of "as-built" drawings.
- E. Stormwater Management As-Built Inspections, Certifications and As-Built
1. General Contractor and/or Construction Manager (GC/CM) shall engage civil engineer of record (CER) and geotechnical engineer of record (GER) to perform and document inspections, observations, as-built surveys and measurements required to prepare complete and accurate As-Built Plans, provide required certifications and obtain approval thereof from Montgomery County Department of Permitting Services (MCDPS).
 2. Required services include providing and certifying accuracy and correctness of information and As-Built Plans in strict conformance with current applicable MCDPS "As-Built / Record Drawing Plan Review Checklist"
 3. Services must be performed by and/or under direct supervision of CER/GER and be based upon direct observations and field information obtained under their direct supervision.
 4. GC/CM shall collect and provide supporting certifications required by CER/GER to satisfy MCDPS checklist requirements. GC/CM shall provide certifications from suppliers for materials used in construction of facility (principal spillway, control structure, PVC pipe, aggregate, wetland plantings, etc.)

5. Under no circumstances shall any construction or materials deviate from approved stormwater management/sediment control plans without prior approval of MCPS, CER/GER and MCDPS.
6. Any changes to designs or construction shown on approved stormwater management plans must be appropriately pre-approved and permitted by CER, MCPS and MCDPS prior to being implemented and/or submitted for review and approval as an as-built condition.
7. CER/GER shall confirm and document to MCPS, via physical measurement and survey, that pipes, structures and facilities have been set to approved final design grade prior to being backfilled. If pipes, structures and facilities have not been set to approved elevations and configuration, GC/CM shall remove and reset structures, pipes and facilities to approved elevations at no additional cost to MCPS.
8. GC/CM shall be responsible for costs, damages and delays arising from or in connection with corrective measures, re-designs, re-approvals, re-reviews required for as-built approval by MCDPS.
9. Prior to preparing and/or submitting any as-built documentation to MCDPS, GC/CM shall arrange and attend a site meeting with CER/GER, County Sediment Control Inspector and representative(s) of MCPS Division of Construction to observe stormwater management facilities and site conditions/stabilization and to obtain MCDPS' Inspector's approval to prepare and submit as-built documents and certifications to MCDPS for review. All required documentation will be submitted to MCDPS for initial review within forty-five (45) days of that meeting
10. Corrections, either to plans or construction, identified during review of as-built documents shall be made, re-inspected and corrected as-built documentation at no additional cost to MCPS. Revised as built plans must be re-certified by CER and re-submitted to MCDPS such that final as-built approval will be obtained within two (2) weeks of the CER's receipt of MCDPS comments on initial submittal at no additional cost to Owner.
11. CER shall provide to MCPS Division of Construction (MCPS-DOC) electronic files, in .PDF formats, for submittals and of review comments received from County.
12. In addition to MCDPS requirements, GC/CM shall provide the following documentation to MCPS-DOC in hard copy and electronic format.
 - a) Date/Time-Stamped Digital (.jpg) photographs documenting the chronology of construction of stormwater management facilities from beginning to end.
 - b) Electronic files, AutoCAD and/or .PDF format, of stormwater management facilities as-built construction including Montgomery County signed/approved as-built drawings, plans, and certifications.

PART 2 - PRODUCTS:

2.1 MATERIALS:

- A. Provide products manufactured of primary raw materials extracted/recovered within a 500-mile radius of Project Site.
- B. Portland Cement Concrete: MDOT-SHA Section 902, Portland Cement Concrete and Related Products.

1. Water: Clean and free of oil, acid and injurious amounts of vegetable matter, alkalis and salts. River, stream or lake water is prohibited.
 2. Forms: Wood, steel or as specified. Form materials to produce smooth surfaces, free of irregularities. Nonrented wood formwork shall be made of FSC-certified sustainably harvested wood materials.
- C. Mixes:
1. Class "A" Concrete: MDOT-SHA Mix No. 4, Table 902 A. 28-Day compressive strength 3500 P.S.I. Maximum 50 percent GGBF slag replacement for Portland cement, per MDOT-SHA Specification 902.06.05.
 2. Class "B" Concrete: MDOT-SHA Mix No. 2, Table 902 A. 28-Day compressive strength 3000 P.S.I. Maximum 50 percent GGBF slag replacement for Portland cement, per MDOT-SHA Specification 902.06.05.
- D. Concrete Reinforcements:
1. Steel bars: ASTM A 615, Grade 60, deformed, designation as indicated or specified. Minimum 99 percent recycled-content, of which minimum 60 percent shall be post-consumer and the remainder may be post-industrial material.
 2. Steel Wire Mesh: ASTM A 185 welded wire mesh, roll type, size as indicated or specified.
- E. Brick:
1. Type A: ASTM C 55 Concrete Building Brick, type I, grade N, standard manufacture size.
 2. Type B: ASTM C 32 Clay or Shale Brick, grade SS or as specified, solid, 2-1/4 by 3-3/4 by 8 inches.
- F. Cement Mortar: SHA Section 902.05, Masonry Cement.
1. Water: As specified for Portland cement concrete.
- G. Cast-in-Place Reinforced Concrete Structures:
1. Structure Bases: Class "B" Portland Cement Concrete.
 2. Structure Walls and Top Slabs: Class "A" Portland Cement Concrete.
 3. Concrete Reinforcement, Structural Steel, Structure Castings and Appurtenances: As indicated and specified.
- H. Pre-Cast Reinforced Concrete Structures:
1. Square and Rectangular Structures: ASTM C 858.
 2. Structural Design Loading: ASTM C 858, live load designation A-16.
 3. Circular Structures: ASTM C 478.
 4. Structure Joints: ASTM C 443.
- I. Foundation Materials:
1. Type I: ASTM C 33 Coarse Aggregate, size No. 8 (3/8 inch to No. 8).
 2. Type II: MDOT-SHA Coarse Aggregate Size No. 57 stone (1 1/2 inch to No. 8).
 3. Type III: Earth material free of debris, waste materials, frozen materials, vegetable matter, clay, rocks or stones exceeding 1 inch in any dimension. Obtain Type III material from on-site excavations or off-site borrow areas approved by Soils

Engineer.

J. Bedding Materials:

1. Type A: ASTM C 33 Fine Aggregate.
2. Type B: ASTM C 33 Coarse Aggregate, size No. 6 (1 inch to No. 4).
 - a. Contractor's Option: MDOT-SHA Coarse Aggregate Size No. 57 stone (1 1/2 to No. 8.)
 - b. Recycled concrete RC-6 may, at Contractor's discretion, be used for bedding in locations approved by Architect and Soils Engineer.
3. Type C: Earth material free of debris, waste materials, frozen materials, vegetable matter, clay and rocks or stones exceeding one inch in dimension.

K. Bedding Material Schedule:

1. Storm drainage system: Type B, or as per manufacturers recommendations.
2. Water Distribution System: W.S.S.C. Standards, or Type A if there are no standards.
3. Sanitary Sewer System: W.S.S.C. Standards, or Type B if there are no standards.
4. All other utilities: Type C.

L. Backfill Materials: As specified for Fill or Backfill, Section 02100 "Earthwork and Grading", and as noted.

1. Utility Trenches:
 - a. Phase I: Earth material free of debris, waste materials, frozen materials, vegetable matter and rock or stones exceeding one inch in any dimension.
 - c. Phase II: Earth material free of debris, waste material, frozen material, vegetable matter and rock or stones exceeding one inch in dimension.
2. Utility Structures: Earth material free of debris, waste material, frozen material, vegetable matter and rock or stones exceeding two inches in any dimension. Obtain backfill material from the following: Excavated material approved by Soils Engineer or Owner's Representative.

PART 3 - EXECUTION:

3.1 PROTECTION AND RESTORATION:

- A. Refer to Section 02100 "Earthwork and Grading" and as noted.
- B. General: Provide support systems (e.g. sheeting, shoring, sheet piling, cribbing, etc.) at no increase to Contract Sum. Cut off timber when using timber support systems above top of utility to prevent utility displacement. Exercise care when using trench shields or boxes during shield movement to prevent utility displacement.

3.2 EXISTING UTILITIES:

- A. Refer to Section 02100 "Earthwork and Grading", and as noted. Contractor shall notify "Miss Utility" at least 48 hours prior to start of construction.
- B. Provide test pits at existing utility crossings prior to system construction. Verify utility inverts for review by Architect or Owner's Representative to determine potential conflicts prior to start of system construction.

3.3 DEWATERING:

- A. Refer to Section 02100 "Earthwork and Grading".

3.4 EXCAVATION:

- A. Refer to Section 02100 "Earthwork and Grading" and as noted.
- B. Trench Excavation: Open cut method or as specified. Excavate materials encountered to sub-grade elevations indicated or specified.
 - 1. Trench width below top of utility not to exceed the following clearances on each side of utility:
 - 2.

<u>Utility Exterior Width, Diameter or Span</u>	<u>Clearance</u>
1 thru 30 inches	24 inches
31 inches and higher	36 inches
 - 3. Excavate utility trenches to following depths:
 - a. Circular storm drainage pipe: Six inches below bottom of pipe.
 - b. Water distribution pipe: W.S.S.C. Standards or four inches below bottom of pipe.
 - c. Sanitary sewer pipe: W.S.S.C. Standards or six inches below bottom of pipe.
 - d. All other utilities: Bottom of utility.
- C. Structure Excavation:
 - 1. Utility structure excavation to produce 12-inch clearance between exterior structure walls and excavation walls or support systems.
 - 2. Extend excavation to following:
 - a. Cast in place reinforced concrete structures: Six inches beyond structure base.
 - b. Pre-cast reinforced concrete structures: Six inches below bottom of pre-cast structure base.
 - c. Pre-cast reinforced concrete structure with cast in place concrete base: Bottom of structure base.
 - d. Masonry structures: Bottom of structure base.

3.5 OVER-EXCAVATION:

- A. Refer to Section 02100 "Earthwork and Grading", except as noted.
- B. Utility Trenches:
 - 1. Correct over-excavation of water distribution, storm drainage and gravity flow sanitary sewer systems by backfilling over-excavated trenches with Type II foundation (Type B bedding) material and compacting.
 - 2. Correct over-excavation of other utilities by backfilling over-excavated trenches with Type III foundation (Type C bedding) material and compacting.
 - 3. Place material in loose lifts not exceeding eight inches. Compact each lift to 98 percent maximum dry density. Density test method: ASTM D 698.
- C. Structures: Correct utility structure over-excavation by backfilling over-excavation with Type II foundation (Type B bedding) material and compacting.
 - 1. Place material in loose lifts not exceeding eight inches. Compact each lift to 98 percent maximum dry density. Density test method: ASTM D 698.

3.6 UNSUITABLE EARTH:

- A. Refer to Section 02100 "Earthwork and Grading", except as noted.
- B. Restore unsuitable earth excavation as specified for over-excavation.

3.7 EXCAVATED MATERIAL STORAGE:

- A. Refer to Section 02100 "Earthwork and Grading" and as noted.
- B. Stockpile select excavated materials required for backfill operations.

3.8 PORTLAND CEMENT CONCRETE CONSTRUCTION:

- A. Mixing:
 - 1. Ready-Mixed Concrete: ASTM C 94.
 - 2. Project Site Batch Mixing: ACI 301, Chapter 7.
- B. Formwork: ACI 301, Chapter 4.
- C. Reinforcement: ACI 301, Chapter 5.
- D. Joints and Embedded Items: ACI 301, Chapter 6.
- E. Placement: ACI 301, Chapter 8.
- F. Surface Defects: ACI 301, Chapter 9.
- G. Finishes: ACI 301. Non-Exposed: Section 10.2.1. Exposed: Section 10.2.2.
- H. Curing and Protection: ACI 301, Chapter 12.
- I. Cold Weather Concreting: ACI 306R.
- J. Hot Weather Concreting: ACI 305R.

3.9 STRUCTURES:

- A. Cast in Place Reinforced Concrete Structures: Construct cast in place concrete structures as indicated and specified.
- B. Pre-cast Reinforced Concrete Structures:
 - 1. Pre-cast structure base: Place Type I foundation material, on excavation sub-grade, to bottom of structure base and compact to 98 percent of maximum dry density by ASTM D 698. Install pre-cast structure base, on compacted foundation material, level to 1/8 inch in 5 feet. Clean and lubricate structure joints, immediately prior to installation, in accordance with manufacturer's recommendation. Install pre-cast reinforced structure sections, on structure base, plumb to 1/4 inch in 10 feet. Position structure sections on previously installed section and push joints tightly together. Position concrete top slabs on structure as indicated. Plug lifting holes with cement mortar. Install frames and covers to finished grade with bricks and cement mortar.
- C. Masonry Structures:
 - 1. Erect structure walls with masonry materials specified. Wet each masonry unit

thoroughly before placement. Shove each unit into place in full bed of cement mortar. Horizontal and vertical joints not to exceed 1/2 inch.

2. Bond and Coursing: Brick Masonry - Common Bond.
3. Fill joints completely with cement mortar. Fit masonry units tightly around utilities projecting through structure walls. Space, set and bond structure appurtenances as indicated or specified during masonry erection. Point up interior structure joints and clean removing excess cement mortar. Parge exterior structure walls with 1/2 inch thick cement mortar and finish with smooth trowel. Masonry construction tolerances not to exceed 1/4 inch in 10 feet vertical from plumb.

D. Stormwater Management Facility Structures:

1. Provide MCDPS-approved stormwater management water quality structures. Approved water quality structures include:
 - a. Stormfilter as manufactured by Contech
 - b. Stormceptor as manufactured by Contech
 - c. Bayfilter as manufactured by Accubid, Inc.
 - d. Baysaver as manufactured by Accubid, Inc.

3.10 BEDDING:

- A. Storm drainage pipe: Place bedding material, on excavated trench sub-grade to bottom of pipe and compact. Upon completion of pipe installation, place and compact bedding material to springline of pipe.
- B. Other Utilities: Bedding not required. Install utilities on excavated trench sub-grade as indicated or specified.

3.11 BACKFILL:

- A. Backfill utility trenches in two consecutive phases as follows:
 1. Phase I - Backfill to 12-inch depth above top of utility. Place backfill material in loose lifts not exceeding six inches. Compact each lift to 98 percent maximum dry density. Density test method: ASTM D 698.
 2. Phase II - Unpaved Areas: Place backfill material to grade in loose lifts not exceeding 24 inches. Compact each lift to 90 percent maximum dry density. Density test method: ASTM D 698
 3. Phase II - Paved Areas: Place backfill material to grade in loose lifts not exceeding eight inches. Compact each lift to 98 percent maximum dry density. Density test method: ASTM D 698.
- B. Backfill utility structures as follows: Place backfill material carefully and in loose lifts not exceeding 12 inches (paved areas - 8 inches) in depth. Compact each lift to 95 percent maximum dry density. Density test method: ASTM D 1557. Do not backfill masonry structures until cement mortar parge attains initial set.

3.12 EXCAVATED MATERIAL DISPOSAL:

- A. Refer to Section 02100 "Earthwork and Grading".

3.13 WASTE MANAGEMENT:

- A. Recycle waste materials in accordance with Division 1 "Construction Waste Management" requirements.

END OF SECTION