PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install soil, waste, and vent piping systems within building and connect with outside utility lines 5 feet 1,500 mm out from building where applicable.
   2. Perform excavation and backfill required by work of this Section.

B. Related Sections:
   1. Sections Under 07 3000 Heading: Furnishing and installing of roof jacks and pipe flashing at roof.
   2. Section 07 8400: Quality of firestopping material.
   5. Section 31 2323: Criteria for performance of backfill.
   6. Section 33 3313: Sewage piping from 5 feet 1,500 mm out from building to main.

1.2 REFERENCES

A. American Society For Testing And Materials:
   1. ASTM A 74-03b, 'Standard Specification for Cast Iron Soil Pipe and Fittings.'
   2. ASTM C 564-03a, 'Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.'
   4. ASTM D 2321-00, 'Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.'
   6. ASTM D 3034-00, 'Standard Specification for Type PSM Poly Vinyl Chloride)(PVC) Sewer Pipe and Fittings.'

1.3 QUALITY ASSURANCE

A. Pre-Installation Conference: Participate in pre-installation conference specified in Section 03 3111.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Minimum size of waste piping installed under floor slab on grade shall be 2 inches 50 mm.
B. Piping And Fittings:
   1. Approved Type: PVC Schedule 40 cellular core plastic pipe and pipe fittings meeting requirements of ASTM F 891, joined using cement primer meeting requirements of ASTM F 656 and pipe cement meeting requirements of ASTM D 2564.

C. Piping And Fittings: ABS Schedule 40 cellular core plastic pipe and pipe fittings meeting requirements of ASTM F 628, joined with pipe cement meeting requirements of ASTM 2235.

D. Buried Piping:
   1. Approved Types: Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A 74.
   2. Joint Material:
      b. No-Hub:
         1) Category Four Approved Products. See Section 01 6000 for definitions of Categories.
         a) SuperGrip 304 American Brass & Iron (AB&I).
         b) Husky SD 4000 coupling by Husky Technologies
         c) Neoprene gaskets with type 304 stainless steel clamp and 24 ga type 304 stainless steel housing by Clamp-All Corp.
         d) MG Coupling by MG Piping Products.

E. Above Grade Piping And Vent Lines:
   1. Approved Types:
      a. Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A 74.
      b. Vent lines 2-1/2 inches 63 mm or smaller may be Schedule 40 galvanized steel.
   2. Joint Material:

F. Fittings:
   1. Cast Iron Pipe: Hub and spigot, except fittings for no-hub pipe shall be no-hub, and meet requirements of ASTM A 74.
      a. Joint Material: Rubber gaskets meeting requirements of ASTM C 564.
      b. Galvanized Pipe: Screwed Durham tarred drainage type.
   2. Traps installed on cast iron bell and spigot pipe shall be service weight cast iron. Traps installed on threaded pipe shall be recess drainage pattern type.
   3. P-Traps:
      a. Trap shall have clean out plug if installed in other than slab on grade.
      b. Type Two Acceptable Products.
         1) 7220 deep seal cast iron by JR Smith
         2) Zurn Z-1000 by Zurn Industries.
         3) Equal as approved by Architect before installation. See Section 01 6000.

G. Cleanouts:
   1. Furnish wall cleanouts with chrome wall cover and screw.
   2. Type Two Acceptable Products:
      a. Finish Floors:
         1) Josam: 56010.
         2) J. R. Smith: 4023.
         3) Mifab: C1100R-1.
         4) Wade: W-6000.
         5) Watts Drainage: CO-200-R.
         6) Zurn: Z-1402.
      b. Resilient Flooring:
         1) Josam: 56010-12.
         2) J. R. Smith: 4140.
         3) Mifab: C1100R-1-T.
         4) Wade: W-6000-T.
5) Watts Drainage: CO-200-TS.
6) Zurn: Z-1400-6.
c. Finished Wall:
1) Josam: 58790.
2) J. R. Smith: 4530.
3) Mifab: C2462R-1.
4) Wade: W8460R.
5) Watts Drainage: CO-460-RD.
6) Zurn: Z-1446.
d. Exposed Drain Lines:
1) Josam: 58910.
2) J. R. Smith: 4510.
3) Mifab: C1462.
4) Wade: W8560A.
6) Zurn: Z-1440-4.
e. General Purpose:
1) Josam: 58900.
2) J. R. Smith: 4400.
3) Mifab: C1453.
4) Wade: W8550A.
6) Zurn: Z-1440-4.
f. Equal as approved by Architect before installation. See Section 01 6000.

2.2 MANUFACTURERS

A. Contact Information:

PART 3 - EXECUTION

3.1 INSTALLATION

A. Excavate and backfill as specified in Sections 31 2316 and 31 2323 with following additional requirements:
1. Runs shall be as close as possible to those shown on Drawings.
2. Excavate to required depth and grade to obtain fall required. Grade soil and waste lines within building perimeter 1/4 inch 6 mm fall in one foot 300 mm in direction of flow.
3. Bottom of trenches shall be hard. Tamp as required.
4. Remove debris from trench before laying of pipe.
5. Do not cut trenches near footings without consulting Architect.

B. Metal Pipe And Fittings:
1. Provide depression under bell of each joint to maintain even bearing of sewer pipe.
2. Connect to street main as required by local authorities.
3. Use jacks to make-up gasketed joints.
4. Do not calk threaded work.
5. Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.

C. Thermoplastic Pipe And Fittings:
1. General: Piping and joints shall be clean and installed according to Manufacturer's recommendations. Break down contaminated joints, clean seats and gaskets and reinstall.
2. Above Grade: Locate pipe hangers every 4 feet 200 mm on center maximum and at elbows.
3. Below Grade:
   a. Install in accordance with Manufacturer's recommendations and ASTM D 2321.
   b. Stabilize unstable trench bottoms.
   c. Bed pipe true to line and grade with continuous support from firm base.
      1) Bedding depth: 4 to 6 inches 100 to 150 mm.
      2) Material and compaction to meet ASTM standard noted above.
   d. Excavate bell holes into bedding material so pipe is uniformly supported along its entire length. Blocking to grade pipe is forbidden.
   e. Trench width at top of pipe:
      1) Minimum: 18 inches 450 mm or diameter of pipe plus 12 inches 300 mm, whichever is greater.
      2) Maximum: Outside diameter of pipe plus 24 inches 600 mm.
   f. Do not use backhoe or power equipment to assemble pipe.
   g. Initial backfill shall be 12 inches 300 mm above top of pipe with material specified in referenced ASTM standard.
   h. Minimum cover over top of pipe not under building slab:
      1) 36 inches 900 mm before wheel loading.
      2) 48 inches 1200 mm before compaction.

D. Install piping so cleanouts may be installed as follows:
1. Where shown on Drawings and near bottom of each stack and riser.
2. At every 135 degrees of accumulative change in direction for horizontal lines.
3. Every 100 feet 30 meters of horizontal run.
4. Extend piping to accessible surface. Do not install piping so cleanouts must be installed in carpeted floors. In such locations, configure piping so wall type cleanouts may be used.

E. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system so gasses pass freely to atmosphere with no pressure or syphon condition on water seal.

F. Vent entire waste system to atmosphere. Join lines together in fewest practicable number before projecting above roof. Set back vent lines so they will not pierce roof near edge or valley. Vent line terminations shall be:
1. 6 inches 150 mm minimum above roof and 12 inches 300 mm minimum from any vertical surface.
2. Same size as vent pipe.
3. In areas where minimum design temperature is below 0 deg F minus 18 deg C or where frost or snow closure may be possible:
   a. Vent line terminations shall be same size as vent pipe, except no smaller than 2 inches 50 mm in diameter.
   b. Vents shall terminate 10 inches 250 mm minimum above roof or higher if required by local codes.

G. Furnish and install firestopping at penetrations of fire-rated structures as required under Sections 07 8400 and 22 0501.

3.2 FIELD QUALITY CONTROL

A. Site Tests:
1. Conduct tests for leaks and defective work. Notify Architect before testing.
2. Metal Pipe System: After backfilling and compacting of trenches is complete but before placing floor slab, fill waste and vent system to roof level with water, 10 feet 3 meters minimum, and show no leaks for two hours. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.

3. Thermoplastic Pipe System:
   a. Before backfilling and compacting of trenches, cap all open ends and pressure test to 20 psi for 4 hours with no leaks. Correct leaks and defective work.
   b. After backfilling and compacting of trenches is complete but before placing floor slab, re-test as specified above. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.