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**NOTE: Below is example specification language for the Structural Engineer to issue on a project with cast iron plumbing under a slab-on-voidwork foundation. There is an accompanying example specification for the Mechanical Engineer to issue. Both sections and typical details are suggested for each project on a case-by-case basis at no cost to the Design Professionals by VoidForm’s Detailer: McFarlin Construction Services (Phone 915-276-5416 and jacktylermcfarlin@gmail.com)**

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**SECTION 03 11 14**

**CONCRETE SUBCONTRACTOR SCOPE FOR PROTECTION OF UNDER-SLAB PLUMBING**

**PART 1 – GENERAL**

* 1. DESCRIPTION OF WORK
1. In general, the Concrete Subcontractor’s work to be included in this section is as follows:
2. After the Plumber marks the plan locations of plumbing on the site, the Concrete Subcontractor shall excavate the subgrade and install retaining structures, decking that spans over retaining structures, and voidforms to isolate all new under-slab plumbing, hangers and supports from the subgrade under new slab-on-voidform areas.
3. Construction by the Concrete Subcontractor of an accessible concrete vault outside of the building footprint that contains flexible expansion joints in all new under-slab plumbing where the plumbing transitions between isolated conditions under new slab-on-voidform areas to soil-supported conditions at the perimeter of slab-on-voidform areas.
4. This section shall apply to all sanitary sewer plumbing under slab-on-voidform areas. This section does not apply to plumbing under crawlspace areas which will be accessible by occupants after completion of the construction, where the Owner can access the crawlspace and perform maintenance as needed if plumbing is damaged by expansive soil movement.
5. If there is a conflict between other specification sections and this section, or between any construction drawings and this section, this section shall govern with regard to the protection of under-slab plumbing.
6. The Contractor shall be permitted to, at the Contractor’s option, either install the plumbing before the slab is poured by using the PATENT-PENDING MudskipperTM System or install the plumbing after the slab is poured by accessing the under-slab space, removing all voidforms and excavating as required so as to epoxy anchor threaded hanger rods to the under-side of the slab and create the voidspace required. The Basis of Design is the MudskipperTM System. PlumbingVoid as manufactured by VoidForm shall not be permitted. PipeVoid or Utility Protection System as manufactured by SuperVoid shall not be permitted.
	1. QUALITY ASSURANCE
7. Refer to Section 22 0531.
	1. SUBMITTALS
8. Refer to Section 22 0531.
	1. RELATED SECTIONS
9. Refer to Section 22 0531.

**PART 2 – PRODUCTS**

2.01 Related PATENT-PENDING MudskipperTM System products to be purchased, fabricated and/or installed by the Concrete Subcontractor, not the Plumber. If the Contractor chooses to install MudskipperTM System products, the Concrete Subcontractor shall install the following items:

1. MudskipperTM Walls: Earth-formed, gravity retaining walls to retain soil for plumbing trenches to be installed on-site by Concrete Subcontractor with unreinforced, flowable concrete fill; 1:1 horizontal to vertical aspect ratio except where interrupted by foundation elements (piers and gradebeams; bottom of MudskipperTM Walls to be at the same elevation as the bottom of the excavated plumbing trench; maximum depth of 34 inches unless otherwise approved; flowable concrete fill with fine aggregate but no coarse aggregate; minimum 110 pcf unit weight; minimum specified compressive strength of 1,200 psi at 28 days; material to be purchased from a concrete supplier.
2. Degradable MudskipperTM Decking: American Plywood Association (APA) Rated Sheathing; 19/32” thickness; Performance Category Span Rating: 40/20; Exposure 1 Bond Classification (not permitted to be “C-C” Bond Classification or “Exterior” rated sheathing); as manufactured/distributed by:
3. VoidForm® Products, Inc.; [www.voidform.com](http://www.voidform.com); phone: 888-704-8643
4. Other manufacturers are permitted only if licensed by Mudskipper, LLC; [www.mudskippersystem.com](http://www.mudskippersystem.com); email: info@mudskippersystem.com
5. Substitutions that the Contractor believes to be equal or better must be submitted and approved before proposals are submitted. However, substitutions which would constitute infringement on the intellectual property rights of the inventor of the MudskipperTM System will not be permitted.
6. MudskipperTM Decking Supports: 12 gage 1.625” x 1.625” strut channels with slotted holes in the webs; to bear on MudskipperTM Walls (in a seat that is created by the Concrete Subontractor with a grinder) so as to provide support for MudskipperTM Decking where plumbing lines interrupt MudskipperTM Walls; oriented with the open side at the bottom; it shall not be permitted to attach decking to walls; it shall be permitted to attach MudskipperTM Decking material to decking supports; finishes permitted: ungalvanized and unpainted steel, galvanized steel, or painted steel; as distributed by:
7. VoidForm® Products, Inc.; [www.voidform.com](http://www.voidform.com); phone: 888-704-8643
8. Other manufacturers are permitted only if licensed by Mudskipper, LLC; [www.mudskippersystem.com](http://www.mudskippersystem.com); email: info@mudskippersystem.com
9. Substitutions that the Contractor believes to be equal or better must be submitted and approved before proposals are submitted. However, substitutions which would constitute infringement on the intellectual property rights of the inventor of the MudskipperTM System will not be permitted.
10. MudskipperTM Vaults: Refer to the Structural Drawings for concrete cast-in-place vaults outside of the building footprint that provide a space for a flexible expansion joint transition with a vertically-slotted opening for MudskipperTM Tails.

2.02 PATENT-PENDING MudskipperTM System products to be installed by the Plumber. If the Contractor chooses to install MudskipperTM System products, the Concrete Subcontractor shall purchase the following with voidforms and include the cost of this purchase in the Concrete Subcontractor’s Bid (not to be included in the Plumbing Subcontractor’s Bid) but, during construction, the Concrete Subcontractor shall provide these to the Plumber on-site and the Plumber shall install them:

1. MudskipperTM Stakes to Remain in the Subgrade Permanently: Refer to Section 22 0531.
2. Re-Usable MudskipperTM Rods and Rod Accessories: Refer to Section 22 0531.
3. MudskipperTM Framing to be Field-Cut and Wire Welded Together by Plumber On-Site and Cast Permanently into the Concrete Slab, and Framing Accessories: Refer to Section 22 0531.
4. MudskipperTM Clamps: Refer to Section 22 0531.
5. MudskipperTM Tails: Refer to Section 22 0531.
6. MudskipperTM Retainer Boards: Refer to Section 22 0531.
7. MudskipperTM Plug Material: Refer to Section 22 0531.

2.03 Vapor Barrier Material at Threaded Rod Hanger Penetrations: Flexible and moldable blend of synthetic rubber and resins to be verified as compatible with the specified vapor barrier system before purchasing materials; as manufactured/distributed by:

1. StegoTack® Tape by Stego Industries; [www.stegoindustries.com](http://www.stegoindustries.com); phone: 877-464-7834
2. Other manufacturers are permitted only if licensed by Mudskipper, LLC; [www.mudskippersystem.com](http://www.mudskippersystem.com); email: info@mudskippersystem.com
3. Substitutions that the Contractor believes to be equal or better must be submitted and approved before proposals are submitted.

**PART 3 – EXECUTION**

3.01 Installation of MudskipperTM Walls: After general cut and fill operations have been performed to create a level pad under the building areas, but before installation of piers and gradebeams, Concrete Subcontractor shall install earth-formed MudskipperTM Walls. It shall be permitted to phase this construction where walls are installed before piers in areas determined by the Contractor. Refer to the construction documents for locations and details of MudskipperTM Walls.

A. When the Concrete Subcontractor requests, the Plumber shall mark the plan locations on-site of plumbing lines that will be installed between Mudskipper Walls and intersecting plumbing lines that will interrupt Mudskipper Walls, and mark the locations where flow lines occur that will require transition in Mudskipper Wall depths to provide the required voidspace underneath utilities.

B. Concrete Subcontractor shall install the walls based on the locations marked by the Plumber.

C. Concrete Subcontractor shall not excavate soil between Mudskipper Walls until it is no longer necessary for equipment to drive over or within 3 feet of Mudskipper Walls, which will generally be after piers and gradebeams have been installed in an area.

D. No curing compound or other curing methods are required for the Mudskipper Walls, which are utility walls that will be under the slab in unaccessible areas.

3.02 Installation of Piers, Pier Caps and Gradebeams: After installation of Mudskipper Walls, piers and gradebeams shall be installed, driving equipment over the Mudskipper Walls shall not be permitted until at least 2 days after the Mudskipper Walls have been poured.

3.03 Excavation for Plumbing Trenches: When the Concrete Subcontractor requests, the Plumber shall mark the plan locations on-site of plumbing lines that will be installed without Mudskipper Walls flanking the plumbing. Concrete Subcontractor shall then excavate as required by Section 22 0531 (according to the Initial Mudskipper Plan Submittal).

3.04 Installation by Plumber of Temporary Plumbing Supports and Plumbing: After excavation by the Concrete Subcontractor, the Plumber shall install Mudskipper Stakes and Rods and Framing, and install pipe hanges, clevis hanges and plumbing, and the plumbing shall be inspected and approved by the Authority Having Jurisdiction (AHJ).

3.05 Installation of Voidform Formwork:

A. Grading Verification: Concrete Subcontractor shall verify that grades under main slab-on-void areas will allow top of Mudskipper Decking immediately under the slab to be at the specified elevation of the bottom of the slab. This will require approximately 1/2" more concrete under the slab where Mudskipper Decking is not installed immediately under the slab and the Concrete Subcontrator shall account for this extra concrete in their bid.

B. Installation of Mudskipper Decking over Mudskipper Walls: After approval by the AHJ, the Concrete Subcontractor shall install Mudskipper Decking to span in the strong direction (parallel to the originally long dimension of an 8’ x 4’ sheet of plywood) over Mudskipper Walls so as to provide means of support for carton voidboxes. Ends of Mudskipper walls shall be formed with plywood, wood or steel where the ends are near foundation elements and where the ends create a gap for intersecting plumbing that interrupts the Mudskipper Walls. It shall be permitted for Mudskipper Decking to be installed and receive rain during construction before carton voidboxes are installed. It shall not be permitted to attach Mudskipper Decking to Mudskipper Walls. Install Mudskipper Decking Supports between Mudskipper Walls where pluming interrupts Mudskipper Walls. Provide 1” expansion joint material as a separation between Mudskipper walls and any adjacent foundation elements (e.g. piers and/or gradebeams).

C. Installation of Carton Void Boxes: Carton Void Boxes shall be installed as specified. At drop panels in the slab, install 8” voidforms in lieu of 12” voidforms.

D. Installation of Masonite over Carton Void Boxes: Install 1/4” Masonite over carton voidboxes as specified.

E. Installation of Mudskipper Decking over Masonite: After Masonite is installed, Concrete Subcontractor shall install Mudskipper Decking over gaps in the void formwork created by the plumbing.

3.06 Installation of Slab Components before pouring concrete:

A. Initial Installation of Vapor Barrier and Accessories: Concrete Subcontractor shall install vapor barrier as specified, installing StegoTack Tape or equal around each hanger rod penetration. The Concrete Subcontractor shall not be required to install StegoTack Tape around the temporary Mudskipper Rods. Where clevis hangers extend up into the bottom of the slab at unique plan locations, Concrete Subcontractor shall warp vapor barrier up and over Clevis hangers.

B. Installation of Reinforcing Bars and Accessories: Concrete Subcontractor shall install reinforcement as specified by the Structural Engineer. Bars shall be supported over vapor barrier over decking with supports that are shorter, to accommodate for the difference in height. Top bars shall be supported within 6 inches in all 4 directions of any pipe hanger and any Mudskipper Rod. These bar supports will be in addition to typical bar supports and the Concrete Subcontractor shall include these additional supports in their bid.

C. Tying of Mudskipper Framing to Reinforcing Bars: The Plumber shall verify that sufficnet bar supports have been installed by the Concrete Subcontractor and then the Plumber shall tie Mudskipper Framing to perpendicular bars to stabilize the Mudskipper Framing and then the Plumber shall remove the Mudskipper Rods and Temporary Support Nut.

D. Repair of Vapor Barrier: After the Plumber removes the Mudskipper Rods, the Concrete Subcontractor shall repair the hole in the vapor barrier in accordance with specifications.

E. Quality Control by the Plumber: Before concrete is poured, the Concrete Subcontractor shall verify that the Plumber has provided the Contractor with a video recording of camera evidence that the Plumber has verified the flow lines of the plumbing are acceptable, as specified in Section 22 0531.

3.06 Pouring the concrete slab: Only after the Concrete Subcontractor has provided the Contractor with a video recording of camera evidence that the Plumber has verified the flow lines of the plumbing are acceptable, the Concrete Subcontractor shall pour the concrete for the slab.

3.07 Post-slab quality control: At least 3 days after the concrete slab has been poured, the Concrete Subcontractor shall verify that the Plumber has provided the Contractor with video evidence that the flow lines of the plumbing are acceptable.