# PlumbingVoid and Mudskipper

Presentation of Two Plumbing Isolation Systems Foundation Performance Association June 14, 2023



# Agenda

- General Code Requirements
- Design Comparison General
- Design and Execution Details PlumbingVoid
- Design and Execution Details Mudskipper
- Questions



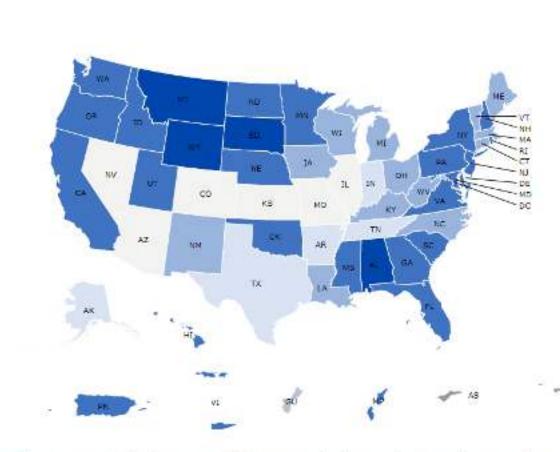
For I-Codes adoption, click an I-Code abbreviation to see where each code has been adopted.

<	IBC	IRC	IEBC	IPMC	ICCPC	IFC	IMC	IFGC	IECC	IPC	IPSDC	>	
---	-----	-----	------	------	-------	-----	-----	------	------	-----	-------	---	--

#### INTERNATIONAL BUILDING CODE® (IBC®)

ADOPTION MAP

This map depicts the adopted revisions of the IBC by state. Note many are years behind current Code. Industry leaders are advocating for compliance with the IPC 2024 changes regardless of adoption status.





Adoption information is provided for states where the IBC is adopted statewide, adopted statewide for certain categories of buildings, or adopted by a state body to guide local code adoption.

Adoption information across this display is maintained by the international Code Council (ICC). ICC makes every effort to provide current, accurate code adoption information. To obtain more detailed information on amendments and changes to adopt codes, please contact the jurisdiction. To submit adoption information, please visit our <u>Code Adoptions</u> <u>Resources</u> page.

## Codes

### • Comparison of Different Revisions

- IPC 2012, 2015, 2018, 2021
  - 305.2 Stress and strain. Piping in a plumbing system shall be installed so as to prevent strains and stresses that exceed the structural strength of the pipe. Where necessary, provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement.
- IPC 2024 (See next slides)
- UPC 2021
  - Code does not address expansive soils and plumbing damage. The UPC 2024 change committee did agree something needs to be added but rejected the change proposal submitted which was similar to the IPC 2024 provided here.
- IRC 2021
  - Code does not address expansive soils and plumbing damage.



The following is the approved IPC 2024 Code change to go in effect.

305.8 Expansive Soil. <u>Where expansive soil is identified under buildings</u> in accordance with Section 1803.5.3 of the International Building Code, <u>but not removed</u> in accordance with Section 1808.6.3 of the International Building Code, <u>plumbing</u> <u>shall be protected</u> in accordance with Section 305.8.1 or 305.8.2.

305.8.1 <u>Non-Isolated Foundations</u>. Under foundations with slabs that are structurally supported by a subgrade, it shall be permitted for plumbing to be buried.

305.8.2 **Isolated Foundations**. Under foundations with a slab or framing that structurally spans over an under-floor space which **isolates the slab or framing from the effects of expansive soil swelling and shrinking** in accordance with Section 1808.6.1 of the International Building Code, the plumbing shall be suspended so that plumbing, hangers and supports are isolated, by a void space, **from the effects** of expansive soil swelling and shrinking.



Exception: It shall be permitted for plumbing to be buried if the plumbing provides drainage of an under-floor space.

To protect the voidspace, **soil shall be sloped, benched or retained** in accordance with an approved design methodology.

It shall not be permitted for the plumbing, hangers and supports below the slab or below the framing to be in contact with soil or any assemblage of materials that is in contact <u>with soil</u> <u>within the active zone</u>. It shall <u>not be permitted for a slab and plumbing to be lifted as</u> <u>an assembly</u> to create the void space <u>unless</u> the under-floor space is a crawlspace with access to allow inspection of plumbing after lifting.

Exception: It shall be permitted for the piping, fittings, hangers, and supports below the slab or below the framing to be in contact with structural elements of the foundation that are designed to resist the effects of expansive soil swelling and shrinking in accordance with Section 1808.6.1 of the International Building Code.



Organic materials subject to decay shall not be used for hangers, supports and soil retention systems. Materials subject to corrosion shall not be used for hangers, supports and soil retention systems unless protected in an approved manner.

Where plumbing transitions to a buried condition <u>beyond the perimeter of the</u> <u>foundation</u>, an adequately <u>flexible expansion joint shall be provided</u> in the plumbing system to accommodate the effects of expansive soil swelling and shrinking.



## 2 Main Principles

1. Isolate plumbing under slab-on-void foundations from expansive soil movement where the plumbing is installed before the slab is poured

and,

2. <u>Protect transitions</u> at isolated flexible expansion joints between isolated and non-isolated plumbing (e.g. exterior soilsupported conditions)



# **General Design Comparison of Systems**

- PlumbingVoid
  - Adapts to the released MEP plumbing drawing and specification
  - Isolates by retention of soil
- Mudskipper
  - Ideally works with the design group during the design phase using the project model
  - Encourages shallow piping with multiple exits from under foundation
  - Involves multiple disciplines throughout the design and implementation process
  - Isolates by benching the trench where piping is installed
  - Trench filled with carton forms to SlabVoid level
  - Introduction of perimeter vaults for transitions with flex-joints

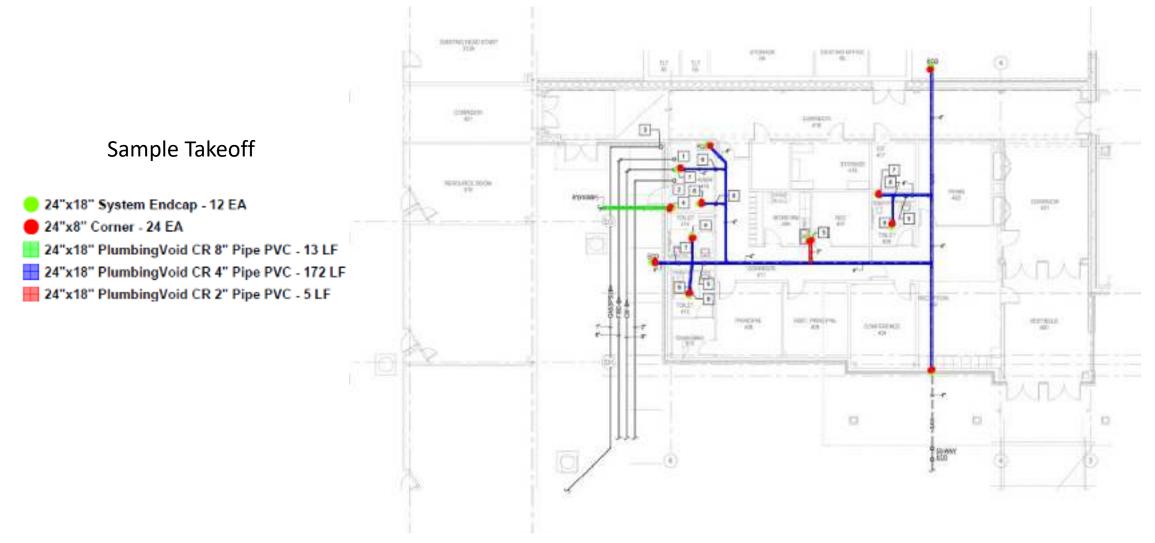


# PlumbingVoid

# Design and Execution Details PlumbingVoid

- Construction Phase Impact
- Single-Discipline
  - MEP
- Procurement
  - Most supplies purchased by plumber
- Coordination Between Trades







# Common PlumbingVoid Design Issues

- Plumbing Drawings are often schematic in nature
- Plumbing Drawings missing invert heights
- Details too generic
- Details include information that is obsolete
- Standard clearance below pipe varies; Void Space vs. PVR
- Trap clearances
- Transition to soil supported pipe



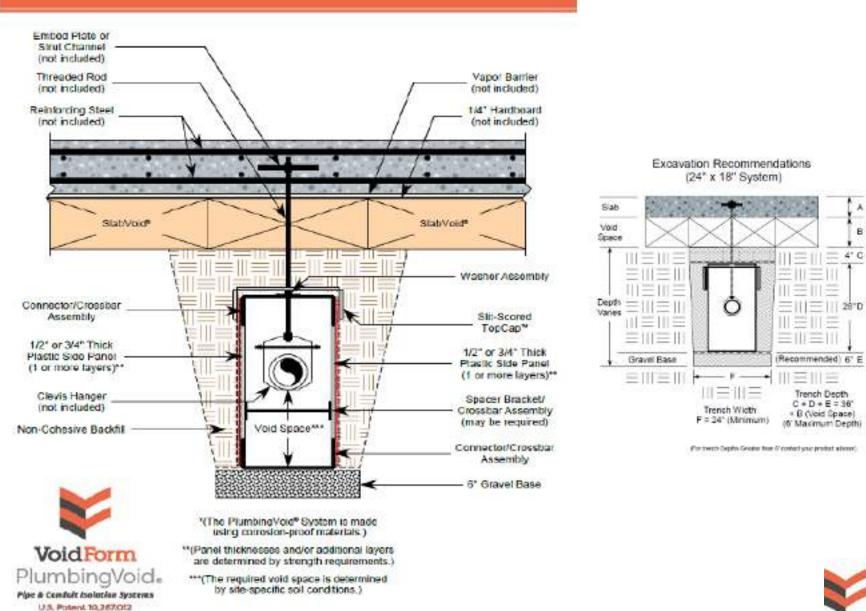
# PlumbingVoid

Assembly and Installation



### PlumbingVoid® System

(Corrosion-Proof Components)\*





### Trench Install



### Ready for Backfill



# **Special Considerations**

- 1. Pipe Installed too high
- 2. Multiple Pipes in one conveyance
- 3. Trap installation
- 4. Pipe diameters > 12"
- 5. Congested areas

- 6. Backfill and compaction
- 7. Insufficient spacers
- 8. Trapeze Hangers
- 9. Seal Top Cap penetrations
- 10. Fasten to or pass through grade beam



# Mudskipper

# **Design and Execution Details Mudskipper**

- Design Phase Impact
- Multi-Discipline
  - MEP-Piping
  - Structural-Vaults
  - Civil-Inverts and multiple tie-in
- MRO vs Shop Drawing w/open issues
- Procurement
  - Most supplies purchased by Concrete Contractor
- Coordination Between Trades



## Drawing Sections

- Important Notes Regarding Sequencing and Responsibilities
- Important Notes to Purchaser
- Notes Regarding the Use of These Drawings
- Note Regarding Vehicle/Equipment Loads
- Plumbing Sub-Contractor
- Minimum Required Order (MRO)
- Important Note
- Various Local Notes

#### INFORTANT NOTES (REGARDING REGIRINGING AND RESPONSIBLE TES).

- 1. THE SEDIENCE CAN BE PORTORING TO METALLAU, MUSICIPPER WALLS ON THE PROJECT AT THE BARE THE, BEFORE NETALING ANY PERS OR GRADESEARS, OR THE SOCIENCE CAN BE PERFORMED AND A TANKA, BATALLING BLOOKIPPER WALLS BEFORE FIRST OF DADOBELASS ALLONG RACAVETOR OF BADARDERS AND AND HALLS AND HALLS AND HALLS BEFORE FIRST OF DECLAR INTRONY MAYING TO MANELVER AROUND FOUNDATION ELEMENTS.
- 3. CONCRETE RUNCONTRACTOR PROPORES CUT AND FAL OPERATIONS TO CREATE A LIVE. SUBGRADE FOR THE UNIT LIVE OF YOUR STREAM SERVICE IN THE ALL PROVIDER THE ALL PROVIDER THE STREAM SERVICE IN THE ALL PROVIDER TH LOCATIONS OF FLUMMING SEVEND THE MUDBRIPHER MALLS VET.
- A PLUMBER REVIEWS AND APPROVED OF THE DEFINE OF THE PROVIDED AUDIOCHMEN MALLS, COORDINATING INT THE CARDON RACTOR TO BHET THE PLAN LOCATIONS OF THE DEDUCTION O NAVIER, ANY INCOMENDATION OF PLUMINGS OF ALL MUDIPLEYER WALLS. 5. CONCRETE SUBCONTRACTOR EXCANATES TRENCHES FOR ALL MUDIPLEYER WALLS.
- A CONCRETE REACCOMPACTOR PLANDED FOR MILE AND ADDRESS THE RECORD THE RECORD THE READER THE TRANSMICHTE AT FOLING AND HUMBER ADDRESS THEY ARE DETENDED FOR MILE AND ADDRESS AND AND ADDRESS THEY ARE DETENDED FOR MILE ADDRESS AND ADDRESS THEY ARE DETENDED FOR MILE ADDRESS AND ADDRESS A REMOVE PLYNODG FORMAIG REFORE BACKPELING
- A DETAIL FRIE AND GRADERIANS, WHIN CONCRETE SUBCONTRACTOR MELEVES THE WALLS AND SUFFERENTLY CURED INVESTIGATED BE FOR BLAMMAR, ATTEN CHLV + CR 2 SAYS FOREBLY, MER DECLER CAN DEDU COME THE UNDERSPECT MALLS IF THERE IS \$75,1 SOL BETWEEN THE MUSICIPARY WALLS.
- A PLUMBER MARKS PLAN LOCATIONS OF PLIMBRIG LINES OUTSIDE OF MUDSHIPPER WALLS. 18, CONCRETE BURCHMATTCH BUCHMATTCH BUCHMATTCH THERCHES FIR MUCHAPPER FLAR, BUCHAPPER BUCHMATTCH BUCHMATTCH
- MALL & 11. PLANER PATALLA ALGORPTER STAKES, WUOSIPPER ROOK, SUDBIPPER PRANSO, NANGERS, CLEVIS HANGERS AND PLANESS
- PLUMBER HAS PLUMBED BESPOOTED.
- I. PLANET VIE \$5 THAT CONCEPTS BARCOSTRACTOR THAT DISTRICTOR REPORTS BUTTONS BUTTONS BUTTONS AND ADDRESS AND ADDRESS
- A. PLIMBET INSTALLS THE WAY TO SECURE WUSSIFPER FRAMEIG TO PERPENDICULAR UPACE REWEDICES BARS.
- IS, FLAMBER REMOVES NUCLEARING AND TESPORARY SUPPORT MITS, LARGES SUBSEQUES STATES IN THE RECORD, IS, FLAMBER VERTES THAT THE FLAW LINES AND AT THE ODMENT ELEVATIONS AND ENVIRONMENTATIONS RECALLED. ADJUST OF HE ADJUST SUPPORT THE FLAW LINES AND AT THE ODMENT ELEVATIONS AND ENVIRONMENTATIONS READING. ADJUST ADJUST OF HE REPORT OF NUT ADJUST INADJUST IF MECHINARY, TO VERIFY PLUMING EVACUATES WATER, FLUMING ADDS WATER TO THE LINE AND FLUMING LINES A CARENA TO VERIFY THERE ARE NO DPA IN THE FLUMING.
- 17, PLUMER HAS FILMEDES IMPECTED AT OWNERS INDEREDORT COMPLEXING ASSAT, FIREARDS, 16. CONCRETE SUBCONTRACTOR POURS CONCRETE, GURING CONCRETE FOUR, PLUMERUS PRESENT TO MATCH PLUMENS AND PLUMENS SUPPORTS.
- INCREMENT OR RES FLUENCES RUPPORTS ARE DEVELOPING TO DATALLES ON FLUENCES D'AMAGES DURING & CONCRETE POIN, F THE ANOTARY REVERIDES NOT PROPERTY EVALUATE INSTEM A THE VERSION AND A DESCRIPTION OF THE ADDRESS OF THE DESCRIPTION OF THE DESCRIPTION OF THE ADDRESS OF THE ADDRESS OF THE DESCRIPTION OF THE ADDRESS OF THE ADDRE

#### INFORTANT NOTES TO FURCHAREN

#### MOTES REGARDING THE USE OF THERE DRAMINGS

The sole purpose of this set of drawings is for VoldForm, LLG (VoldForm/) to develop the Miximum Required Order, and use of these drawings for any other purpose shall be at. Proclamme and dis. Native Valid Form not MCARLIN CONSTRUCTION SERVICES LLC MOSt make any parameters or provide any warranty as to the assuming of the information shows on these strategies, including but not instant to location of old this, depths of markets or gradient, quantifies of markets required, event according to the information shows for the strategies, including but not instant to location of old this, depths of markets or gradient, quantifies of markets required, even places with used findients, etc., For example, Processor what is required in the strategies of the product dependence in the bit of markets or even and or the strategies of markets or product. The "Minimum Required Grader" is the retemport of the trial form requires the original, it is not excessing the relations of the interval or complete the project. The actual quartities revolut its complete the project will depend on numerous factors beyond VoldForm's control, including but not indiced to, waste by intervent, damage during installation, and faid modifications to the behall byond is the automation of the standard of the Ridmann Regard Order, Punthamer road automatics for VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics to VoldForm for the guardness of the Ridmann Regard Order, Punthamer road automatics of the Ridmann Regard Order, Punthamer road automatics of the Ridmann Regard Order, Punthamer Re Form any dealed changes on these develops before requesting shop drawings. Open receipt of add shop drawings, Parchaser shall have the shop drawings reviewed by the Concrets Statearministic. Planning Subcontracture, Concrets Statearministic, Planning reviewed at comments from these series to Voldform have requesting provided at comments. Architect, Menterland Engineer, Structured Engineer and Chill Engineer and and provide at comments from these series to Voldform have requesting provided intermentations of the State and related and register concerning (Interlated and register the State and State

 The Specifications require owns is products to purchased by Valiform, if the Materiapper System will be used, The only party (knowed to and) Materiapper products as this project as noted in the Mill of Materials in VoldForm, provides no warranty or guaranty of its respect to the Materialization of its installation; 2. The Specifications require cathled training of installers. VoldForm will request that a representative from NGS or Materialization; LLC meet online with the installer to review (note) before proceedures and will document each a meeting request by an energi upon request, However, none of VoldForm, NCE, nor Mutabipper, LLC will unritly that installers are qualified to properly install the products because none of VoldForm, NCE, nor Mutabipper, LLC are responsible for the installation of any products. It is the responsible by of Purchaser to organize such required certified training of installers.

3. The Specifications reader: "Inspecified by the Present Mendatories, Veld Form wEreased that a representative from MCS or Madelpays, LLC make observations at the Uniting of the "Inspecifient" models the Specifications, Research and Section 2010 (LLC in the Section 2010) (L Product Menufactures, 8 to the respond billy of Parchaese to argentee such regulated impaction by the Product Manufactures.

#### MOTE REGARD NO VEHICLE/EQUIPMENT LOADS

CONTRACTOR SHALL NOT REMOVE SOR, BETWEEN NUDSKIPPER WALLS OR BEGIN EXCAVATION FOR ANY OF THE PLUMBING TRENCHES UNTIL USE OF ANY VEHICLES/EQUIPMENT IN THE VICINITY IS COMPLETED, VEHICLE/EQUIPMENT LOADS ARE PROVIDED OVER THE PLUVISING TRENCHES, OVER THE BUDGK/PPER WALLS, AND DVER A HOREDWITH, DISTANCE BEYOND THE EDGES OF PLUMING TRENCHES AND MUDIK PTCH WALLS EQUAL TO THE CHANGE IN ELEVATED OF THE SUBGRADE FROM THE MEMORY ELEVATION AT THE SEES OF THE EXTIRE PLUMBING TRENCH TO THE BOTTOM OF THE PLUMBING TRENCH AT EACH LOCATION ALONG THE LENGTH OF ALL PLUMBING. TRENCHES.

		WAYMUM REDURID CROCK - BASCOD	I	
TEM NO.	in the second	DECORPTION	-	
TEM MOL	-	DEVAPTOR DEVLOSE MUDICIPALISTANE, NO ENVIRE	-	
2		ANDER MEDICATION AND AND AND AND AND AND AND AND AND AN	+	
- 1			-	
		AR' MUDSKIPPER NOD ASSIMBLE, EACH IN CLUDING	-	
-		3.1 CHE 3.4" DIANETER X 41" 10Y6 THEADED RUDHDG INTH CHE MANUF ACTURED PAIL	-	
		3.5 OKE 2H, SWINCTER SOFFORT NUT HOG (HET THREADED CELLERGIN THREADED CELLERGING THREADED CARD		
		W/ WUDBHPRRIND XISSNED, SICH INCLUDING	-	
		IF ORE SIA, INVALUES A MUTCH PREPARATION FOR HIGH ORE MERINACUTIED DATE	-	
	-	A 2-ORE 294, BARRELER FROMME KIT ADD THE VERY D. D., LED R. LED R. HARVERELINED CARD		
2		SH, FOMO 15 GR MARQUILLESONDE F 2/4, C 7/1, SKI 24MIN CHUNNET		
6	1.14	DUP LONG D SK UNKTING FOODD D STASS SUP INS UTILIT CHANNEL (TO BE HELD OUT READING READING TO		
1	340	S/P DAMATES STRAT CIANNEL AMERICE HDG	-	
		STA SHORTER BUT HOR FOR MODIFICITIES ADD TOUTSUTS TWO HER BUTS	-	
	- 1	LONGE VERY EPPERTURE XING ME WHEN ANY LONGE BUILD. THEY AND ME SOUTH WHEL, NOT DETENDED AND LONGE AND		
		WITH SPAN DRICHON SPINIP FRINTED ON 2561 YAGE OF BEITESS CUT BY CONCRETE SUBCOVERACES AS		
	1-14	authority		
10	200	SOUME THAT LODGE BURNOW SP HIGHS IF WOLFS FOR LODG CARTON YOU FORM FUR WOOSD FEER TROUCHUS		
11	208	SOMALE FEET INSESSABLYCHESP HAGH K KOT WIDE X INT USING CARTON YOR FORM FOR MUSICHPRETTEN CHES	-	
- 10		UNITED AND INCOMENDATION OF WEREAST CONTRACTORS AND ANY CONTRACTORS AND ANY CONTRACTORS IN A REPORT		
		WITH SHAR SHEETING SHEETING IN THE ON THE FACE (TO BE FIELD OF THE CONDERSE EXECUTION AS		
		NESHER)	-	
11	1	A WE OR ANY A CHARACTERISTIC CONTRACT OF A C		
	-	TO IL THE SPEER HELF OF A 4" MADICIPARIE AMP, STREETS STREET.	-	
		ES.2: ONE (CANTER AND OF A 4" INVIDENTIFIC OWNER, TRAINEDS STOTS	1	
		DUE THEO STRATEMED CLAMP INT, TH. WITH WASHING AND AND AND COMPLETURING AND COMPLETING MALERY OF A		
		MICHIPER CLAPP		
		(approximation)	-	
		the total and the second s	-	
		THE LOOK TALL OR WELLER IN, CONTINUES FOR LARGE LOOK ACTIVITY AND ADDRESS TO BE ACTIVITY OF ALL CONTINUES.	-	
_		13.5: TOUR L/T: DWWETCH STA/NUESS STEEL WASHER	-	
		15.6 YOUR 1/2" DWWETCH STANK ESS STIEL NUTS	-	
		PROVIDE HIR HIR ATH ST MISSION TO BURSTALLED BURST	-	
- 25		2/Y THRA PLACTIC SCH. BETMARK FINNEL: HE VORTICAL 3:32" HONEON FAC, WITH 32" LONG FLUTES IN THE	1	
		REPORT AND AND TAKEN WITH A 12' DWART IN THE CUT HOLE IN THE CONTON OF THE PANEL (TO BE MID ANLIED BE		
		PLUMER, J PANED SOR ERDAM/DORDFER DAL		
- 28	- 1	INVOLUTIONS THE FORMING ATS TO BEFELIED WITH CONCRETE ON SITE IF FLOWING LACK INCLUDING:		
		TRIT 4. DAMAGEN X 24, COR HAVEN HAG		
		as a interaction carry concretely or idealogicate rack (weares teach allowed) advects mitty		
		IN 2 12" DAMATER & 62" LONG PVE SCHEDULE 46 OVTSE/VIK		
		16-A TEMPORARY RECED SHERINGS HARRY PLANESER TO DRIENT FURSI VEHICLALLY ON SITE AND STABILIZE THE TOP		
		INFORE POLICING CONCRETE IN INFORMATION FOR FORMAND SITE:		
10	14	STILLE BAG OF SCREWM BENTONTE	-	
		MUTED GOM THES OF RELATED PRODUCTS THAT AND NOT IN THE MIRRING A RELETED CHORE AND NOT INVOLUD.	WVORDER AND	1982
CENTROL		DECORTON	PURCHASER	INSTALLO
1	100 C	CLERC XARDS OF LOW STRENGTH FLOWING CONCRETS FLL FOR INLINE PRER WALLS, INCLUDING:	CONDICTS SUP	CONCRETE SU
		SV" DAMETER WASHER, IF DESIRED AN RUMARE HOREACH SUPPORT NUT AT MUSICIPARE ACES	PLINNEN	PLIO7525
- 1		ANY GAMETER INJUGIO IN CONTRACTORY, IN COMPLETE YOR INVITE HERE AND AND UND AND IN CONTRACTORY		Contractor.
		REQUER ENVIRATION RETWEEN STRUGUES (FEE) AND GALVANIED STRUCKERE	PLANTY	PLLMARK
-		HAVO IN KITCH HAMER FOOTDER LET, CIEVE, AND ACCHISCHES	Distance in the second	2110/925
		STREETING YARE ROLL SOFT LENG ROLL, INSTITUTED AT SACR HERE FOD HERETRICTION IN VARIA BARRIER	CONCRETE SLIB.	CONCRETE SL
5	1			CONCIDENT INT
5	1	WARDS SARROSS REPAIR FARE (RETAULS) OVER HOLD IN WARDS SARROSS AFTER RECEIPTING VALUES OVER TO A SARROSSA AFTER RECEIPTING VALUES AFTER RECEIPTING VALUES OVER TO A SARROSSA AFTER RECEIPTING VALUES A	CONTRICT NR.	and the second second second second
	1	NAMES BARRED AND TAKE (INSTALLED OVER TAKES HE VAREN BARRED AFTER MEDISIPHER TOD STORE VAL CLEAR OF CONCASTS FOR A DESCRIPTES SALIS/TO BE FOUND IN MEDISIPHER TAKE FOR AND ATTES ON MEDI	insublem.	0.19666
5	1	NARCE BARREN HAR FARE (RETAILED OVER HEALE) HE VAREN BARREN AFTER MUDIUM HER FOR TWO VAL CUBIC TARE OF CONCRETE FOR MUDIUM HER SALENTE EN CONED IN MUDIUM HER TWO FORMED HTS ON MED. P. OT HUT HE AN BEOFRET OF RESIDENCE MUDIUM RECEIVER CLASSES	PLUMBER DI UMBER	01.00900 01.00900
	1	NAMES BARRED AND TAKE (INSTALLED OVER TAKES HE VAREN BARRED AFTER MEDISIPHER TOD STORE VAL CLEAR OF CONCASTS FOR A DESCRIPTES SALIS/TO BE FOUND IN MEDISIPHER TAKE FOR AND ATTES ON MEDI	insublem.	0.19666
	1	NARCE BARREN HAR FARE (RETAILED OVER HEALE) HE VAREN BARREN AFTER MUDIUM HER FOR TWO VAL CUBIC TARE OF CONCRETE FOR MUDIUM HER SALENTE EN CONED IN MUDIUM HER TWO FORMED HTS ON MED. P. OT HUT HE AN BEOFRET OF RESIDENCE MUDIUM RECEIVER CLASSES	esulation tripatete Plotation	01.009970 01.009970
0.00 10 10 10 10	1	NARON BARRINGTHAN FARE (INITIALIZE OVER NOUTE IN VARON BARRINARTIN MURDINGEND FOR THOUSAN) CANE CANNED CONCERNE TOR MURDINGEN ALL TO BE POWER WINDOW FOR DEPENDENT FOR A POWER INTO THE WEI CANE CANNED AND ADDRESS OF RECENT OF A DRESS OF RECENTION BRILL & DEMANTER KONDO ALEXTERIO FUNCTION DEPOSITION OF M	esulation tripatete Plotation	01.009970 01.009970
0.00	1	VARIES BARE DEVICE THAN FARE (INSTALLED OVER HOLES IN VARIES ARE DEVELOPED AND DEVICE TOD STOLDARD, CARE OF CONTRACT TO A MEMORY STALLED OVER HOLES OF COMEN WEILD DEVELOPMENTAL FORMATION OF SHARE (CONTRACT HIS AN INSTALLED OVER HOLES (INFORMATION COMEN) BOD CONTAINER WAR NO COMER ANTI-SEED STAIN LESS STEEL CONTAINER DANS (IN DIAME) TO DE ARRUED ON NUMBER ON	PLUMBER PLUMBER	RUMPER RUMPER

THAT WILL BE NEEDED FOR THE ENTRIE PROJECT, PLACEARD SHALL BE REPORTED FOR VERITING THE SUMPTIME ABOVE BEFORE ANY USE. THE ABOVE UNT AND ESTIMATED QUARTERS ARE RECORDED SOLD FOR ADJUST DEDDONATION WITH DIVERTIGATION, FUNCTIONAL ADJUST AD THAT ANY DE THE QUANTITIES FOR ITTME ON THE OUT ANY INCOMED IN CALLSE THAT MOTIVATE VOIDE DEPENDENCE RELATIONS OF THE RECEIPTER MAILOHANGE THE SCOPE AND QUAVITITIES IN THE MINIMUM REQUIRED DRIVER.



IT IS OUR ASSUMPTION THAT THE TOP OF ALL LINES CAN START AT A FINISHED FLOW LINE ELEVATION OF 98-5" BASED ON A FF-150-0", PLUMBING SUBCONTRACTOR TO VERIFY

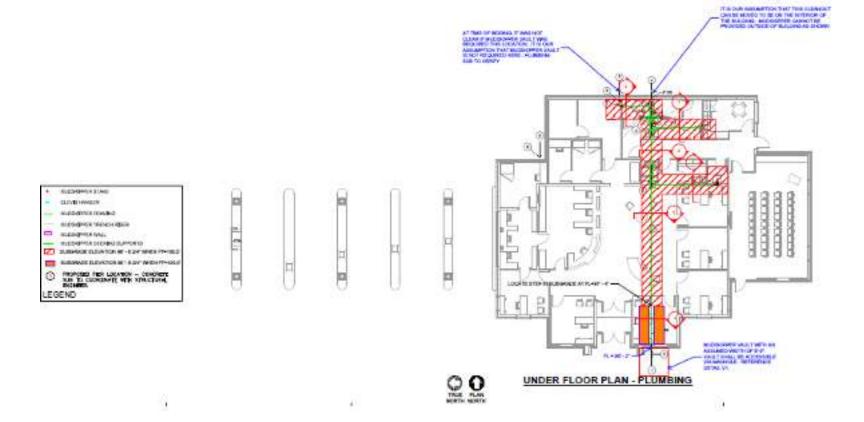
#### AT TIME OF THIS WRO SET, MUDSKIPPER DESIGN DETAILS WERE UNAVAILABLE FROM THE DESIGN TEAM. ALL DETAILS AND ASSUMPTIONS WADE HERE ARE WHAT WOFARLIN CONSTRUCTION SERVICES CONSIDERS STANDARD CONDITIONS, ANY DEVIATIONS REQUIRED TO SECTIONS AND ELEVATIONS SHOWN SHALL BE COORDINATED BY PLUMEING SUBCONTRACTOR.

#### PER CONVERSATIONS WITH STRUCTURAL ENGINEER, IT IS OUR ASSUMPTION THAT A DESIGN PVM OF 71 IS ADDEPTABLE

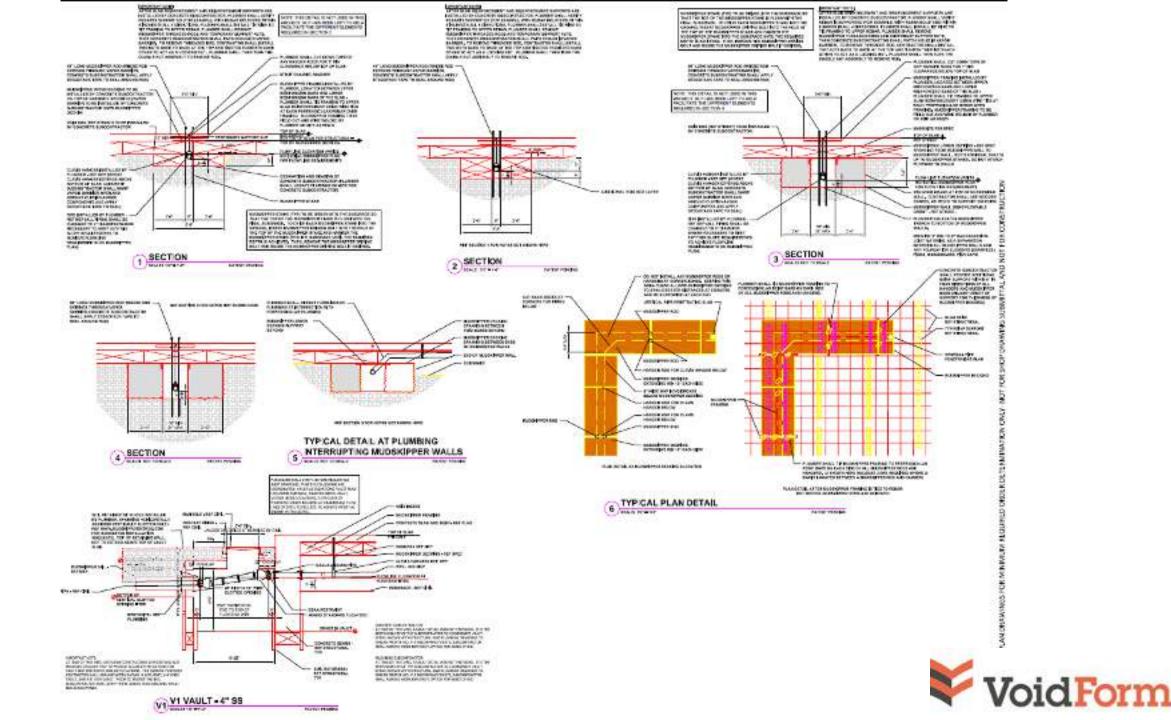
AT LOCATIONS WHERE PLUMBING INTERCECTS WITH STRUCTURAL GRADE BEAMS. IT IS OUR ASSUMPTION THAT CONCRETE SUBCONTRACTOR CAN DEEPEN GRADE BEAMS TO ALLOW PLUMBING PENETRATION. CONCRETE SUB TO COORDINATE WITH STRUCTURAL ENGINEER

#### PLUMEING SUBCONTRACTOR:

IT IS OUR ASSUMPTION THAT AT ALL LOCATIONS WHERE THERE IS AN INTERFERENCE BETWEEN PLUMBING AND FOUNDATION PLEMENTS, THAT IT WILL BE POSSIBLE TO RELOCATE UNE TO AVOID CONFLICTS. IT IS THE RESPONSIBILITY OF THE SUBCONTRACTOR TO DETERMINE WHETHER OR NOT ADDITIONAL SUPPLIES WILL BE REQUIRED IN ORDER TO REPOUTE LINES







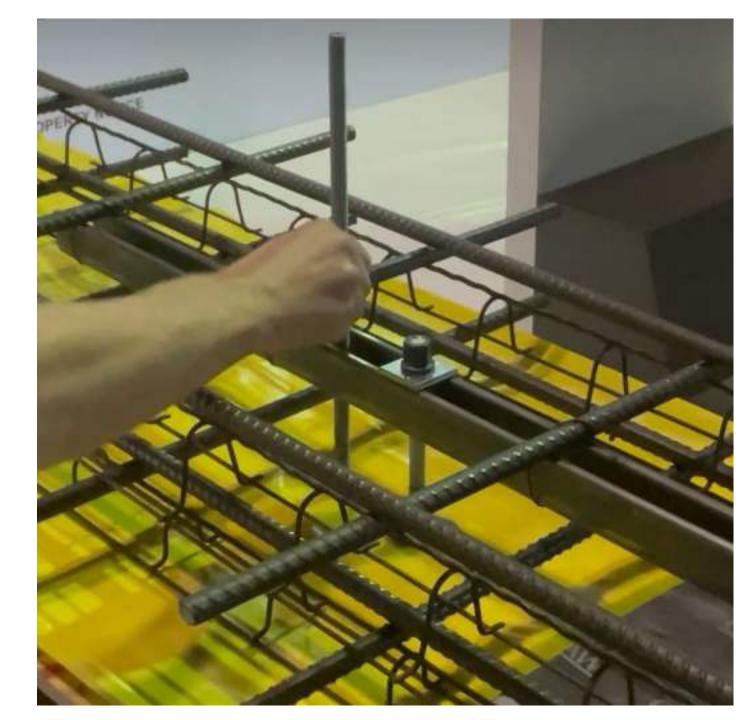
### Mudskipper Framework



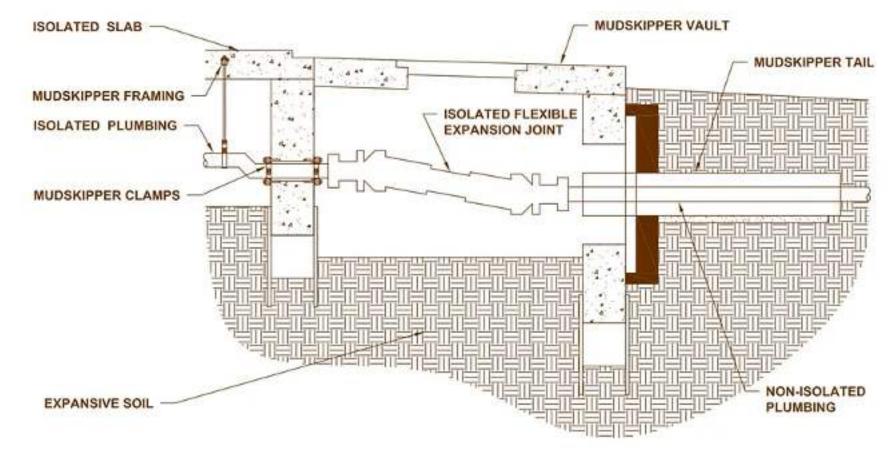
### Framing ready for steel



### Pulling the Threaded Rods







## Common Mudskipper Design Issues

Project not coordinated with all disciplines at the design phase. Invert heights not specified.

Plumbing design has one gut line out rather than multiple shallow.

Structural drawing either missing vault details or differ in count from plumbing.

Mudskipper submittal documents contain unanswered questions.

Trap Clearances.

Limited Experience.

# New Product – Composite Hangers

# VoidForm Products, LLC will soon have fiberglass rods, nuts and PVC and fiberglass hangers available.



**Super Hanger™** PVC pipe hanger is comprised of all nonmetallic, corrosion resistant materials and maintenance free properties. Sizes available for 1" to 10" pipe size.

Use the **Super Rod** Fiberglass Threaded Hanger Rod and **Super Nut** Hex Flange Nut for a complete pipe hanger system. Sizes available from 3/8" to 1" in diameter and 96" in length.

The **Super Loop Hanger** is great for industrial applications or commercial drainage pipes, where pipes sizes are considerably larger. The biggest advantage of using the Super Loop Hanger is that in any environment the Super Loop performs better than metallic counterparts, because of its rust-free properties.



# Questions?



## Thank You!

If you have any additional questions or would like more information:

John Snyder, Vice President of Engineering (817) 975-0326

john.s@voidform.com

Greg Thomas, Application Engineer (817) 823-1990

greg.t@voidform.com

Todd Diehl, Chief Product Officer (CPO) (817) 209-4216 <u>todd.d@voidform.com</u>

> Website Information: www.voidform.com

