UNIVERSITY OF KENTUCKY
Purchasing Division

INVITATION FOR BIDS

CCK-2729-24
UKHC Parking Structure #8 Expansion BP#01
Project# 2565.0
ADDENDUM #3
06/23/2023

IMPORTANT: BID AND ADDENDUM MUST BE RECEIVED BY: 07/20/2023 @ 3:00 P.M. LEXINGTON, KY TIME

Bidder must acknowledge receipt of this and any addendum as stated in the Invitation for Bids.

ITEM #1: BIDDER NOTICES

- The Pre-Bid meeting minutes and sign-in sheet are attached.

ITEM #2: CLARIFICATIONS AND MODIFICATIONS TO THE ADVERTISEMENT

- The following Specifications were inadvertently omitted with the initial bid posting and are attached:

00 31 13	Preliminary Schedules + Schedules
00 31 32	Geotech Report
00 31 43	Permit Application
00 61 13b	Bid Bond
01 21 00	Allowances
01 22 00	Unit Price - Walker
01 23 00	Alternates - Walker
01 42 00	References - Walker
01 42 10	Ref Stand - Walker
01 45 16	Ground Penetration Requirements
01 60 00	Prod Req – Walker
01 60 10	Prod Sub – Walker
01 73 00	Execution – Walker
01 78 23	O&M Data – Walker
01 78 39	Proj Rec Doc – Walker
01 79 00	Demo & Training – Walker
01 79 00	UK Info

- Special Conditions – Article 30 Owner Provided Materials: Updated list attached.

University of Kentucky
Purchasing Division
322 Peterson Service Building
Lexington, KY 40506-0005

OFFICIAL APPROVAL
UNIVERSITY OF KENTUCKY

Ken Scott 06/23/2023

Ken Scott / (859) 257-9102

SIGNATURE

_____

_____

Typed or Printed Name

University of Kentucky
Purchasing Division
322 Peterson Service Building
Lexington, KY 40506-0005

Messer Construction Co.'s
Quality Leadership System

UK Parking Structure 8 Expansion: Pre-Bid Meeting Minutes

Date: 06.22.2023
Time: 10:00 AM
Location: UK – HKRB Room # 245

Attendees: Scotty Bowles, UK CPMD; **Ken Scott**, UK Purchasing; **Tim Aldridge**, Walker Consulting; **Bill Wilson**, KFI; **Shelby Fryman**, Messer Construction. See attached sign in sheet for complete list.

Overview: The purpose of the pre-bid review meeting is to establish clear alignment on bid and project requirements.

I. PROJECT INFORMATION

Project Name: University of Kentucky PS-8 Expansion,
UK Project #2565.0 / CCK – 2729-24

Description: Project comprises of an expansion to the existing Parking Structure 8 Facility that will net approximately 730 additional spaces for University of Kentucky Healthcare located at 110 Transcript Ave, Lexington KY, 40508. An adjacent office building to the west may be included if bid alternate is accepted. Garage work consists of 6 supported tiers and slab-on-grade. Office consists of 3 supported levels (including roof) and slab-on-grade. Neither facility is designed for future expansion.

Project Bid Schedule:

- Question Due: 06.29.2023
- Final Addendum Out: 07.13.2023
- Bid Opening: 07.20.2023 @ 3PM
  - Peterson service Building, Room #322

Owner: University of Kentucky CPMD

Designers: **Walker Consultants**, Tim Aldridge; **JRA Architects**, Matt DeLuca; **Ratio**; **KFI Engineers**, Bill Wilson; **Element Design,** Ramona Fry

Project Contact: Messer Construction Company, Shelby Fryman, sfryman@messer.com, 859-621-5181

II. BID INFORMATION

Messer
WeAreBuilding.

Bid Package: This is bid package 1, contains all elements needed for construction of PS Expansion & Office (Alternate 1). BP 2 will consist of final directional signage & Parking Equipment. There are two Alternates – 1. Office Construction, 2. Lighting Replacement in the existing PS8 (Electrical TC Only)

Description: There are 22 bid packages – plan holders can be seen on Lynn Imaging's web site, no partial bids will be accepted.

1. Project will need to rearrange the traffic from PS8 out the south side of the building.
2. Sanitary Rerouting around the site, followed by a new storm detention structure will need to be in place prior to grading the site.
3. Drilled Piers will start in the middle of October on the Office Portion with foundations and vertical concrete following.
4. Office will precede the garage vertically if the alternate is accepted.
5. Tower Crane, provided by TC01, will be installed and operational by the end of November for a period of one year.

Project Schedule: Project will begin immediately following bid period in early August – The overall project Schedule will be 18 months without the Alternate & 22 months if it is selected.

Bid Categories: 22 Bid Categories are available for review, note there are some services that are pre-purchased with the project that the successful bidder will take responsibility for these items including:

1. Electrical – Generator, ATS & Fire Alarm Service including wiring.
2. Parking Control Relocation Equipment & temp signage for the existing Garage
3. Earthwork – Sanitary piping for main 12" & 18" ductile & corresponding manholes.
4. Earthwork – Storm Detention System.

Bid Due: Bid's are due on July 20 at 3PM – bid forms (first 6 pages of bid form and 5% bid bond is to be included in submission). Remaining documents will be required by noon the next day with the lowest complete bidder for each Trade Category.

Bid Location: Peterson Service Building Room 322.

Bid Documents: Are available on Lynn Imaging and Messer Plan Room. Monday we will have an organized PDF on Messer Plan Room to assist bidders in navigating the PDF Document.

Addenda: Two addendum to date (correcting this meetings location & SOW). Final addendum will be issued one week prior to the bid date.

Questions: All questions shall be submitted in writing to UK Purchasing (cckbidquestions@uky.edu) PLEASE IDENTIFY THE PROJECT NAME IN TITLE.

III. SAFETY REQUIREMENTS

A. Messer Zero Injury Culture
B. Safety4Site
C. CCIP Requirements

D. Platform Ladders
E. High Visibility Clothing
F. Safety Glasses
G. 100% Gloves
H. 5S Program
I. Preconstruction Safety Meeting
J. Daily JSA

IV. PROJECT REQUIREMENTS

A. Supplier Diversity – 12% Goal
B. Other Project Specific Requirements
   a. Autodesk Build will be software utilized by CM & subcontractors
   b. BIM requirements listed for Alternate 1 – CM Leading
C. Project is taxable
D. No Prevailing Wages
E. Insurance this is a CCIP, and should NOT be included in bid amount.
F. Bonds is an SDI, Payment & Performance bond should NOT be included in bid amount.
G. Prequalification via Messer Business Portal (MBP) is highly recommended prior to bidding
H. Form of Agreement – standard Messer subcontract

Messer
WeAreBuildingHealthCare.

University of Kentucky - Parking Structure 8 Expansion

Pre-Bid Sign-In Sheet

Date: 06-22-2023

Name (Print)	Company	Phone Number	Email Address
Anthony Lewis	Berkel and Company Contracting	606-273-9841	tlewis@berkelandcompany.com
JEFF DRAPER	BESCO	606-510-7530	jdraper@BESCO
[illegible]	TJ Dyer	513-478-3666	[illegible]
Kelly Goble	Goble Signs INC	859-608-5522	kelly@goblesigns.com
Jim Mitchell	Ranger Steel	606-584-0484	jim@[illegible].com
HUNTER JEFFRIES	Todd Johnson Contracting, Inc	859-238-9489	hunter@toddjohnsoncontracting.com
SHERI BOMKAMP	RIW ORNAMENTAL METAL, INC	859-466-0370	SBomkamp@[illegible]
CODEY LESLIE	UK	859-323-5405	CCK810[illegible]
Barry Swanson	UK Procurement	859-257-9101	barry.s[illegible]
Cole Sparker	Cleveland Construction	440-752-6007	csparker@cleveland[illegible]truction.com

Messer
WeAreBuildingHealthCare.

University of Kentucky - Parking Structure 8 Expansion

Date: 06-22-2023

Pre-Bid Sign-In Sheet

Name (Print)	Company	Phone Number	Email Address
Scott Hollmann	O'Rourke Engineering	513 871-1400	SHollmann@ORourkeEngineering.com
Thomas Bryant	Omni	859-539-9207	TBryant@omnicommercial...
Andy Gehelt	Dugan & Meyers	513 891-4300	agehelt@dugan-Meyers.com
Craig Myers	Hayes Drilling, Inc	859.699.4093	cmyers@hayesdrilling...
Ken Scott	UK	859.257.9102	Kenneth.Scott@uky.edu
Scotty Bowles	UK CPMD	859-563-8220	Scotty.Bowles@uky.edu
Sam Wilzenbusch	Cleveland Construction	513-441-9190	swilzenbusch@ClevelandConstruction.com
Emily Edgington	Messer Construction	859-621-2988	eedgington@messer.com
Bill Faris	Gray Hawk	859-618-9842	bfaris@grayhawkky.com
Jack Brown	Sunesis Construction	513 326 6000	jbrown@sunesisec.com
Jason Zeuch	Sunesis Environmental	513-823-5737	jzeuch@sunesisenv.com
Derek Motsch	Element Design	859-389-6533	derek@element-site.com
Dalton Estes	Elliot Electrical	859-779-3174	DEstes@DHEC.com
Aaron Rogers	Project GPR	502-314-5817	arogers@projectgpr.com

Messer

University of Kentucky - Parking Structure 8 Expansion

Pre-Bid Sign-In Sheet

Date: 06-22-2023

Name (Print)	Company	Phone Number	Email Address
Shelby Fryman	Messer Const	859.624.5181	sfryman@messer.com
ANDY MAYS	Whittenberg Construction	502-361-8891	andy@wccbuild.com
DAVID STRANGE	WOODFORD EXCAVATION	859-285-9113	drstrangewet@aol.com
Dan Zorres	Glenwood Elec	859-393-3263	DWZ@Glenwoodelectric.com
Bill Wilson	KFI	859-208-0654	wpwilson@kfi-eng.com
Matt Gurley	KFI	859-271-3246	mgurley@kfi-eng.com
Marilyn Clark	UK		Marilyn.clark@UK.Edu
Nate Doty	D+P	859-221-7906	ndoty@devisendplain.com
Matthew DeLuca	JRA Architects		mdeluca@jrarchitects.com
John Howard	UK OFPD	859 433 5155	john.howard@uky.edu
Sarah Fryman	CinFAB	513-667-8464	sfryman@cinfab.com

SECTION 00 31 13 - PRELIMINARY SCHEDULES

1.1 PROJECT SCHEDULE

A. The Milestone Schedule prepared by the Contractor defines major areas of work, phasing requirements and establishes milestone dates for the entire project.

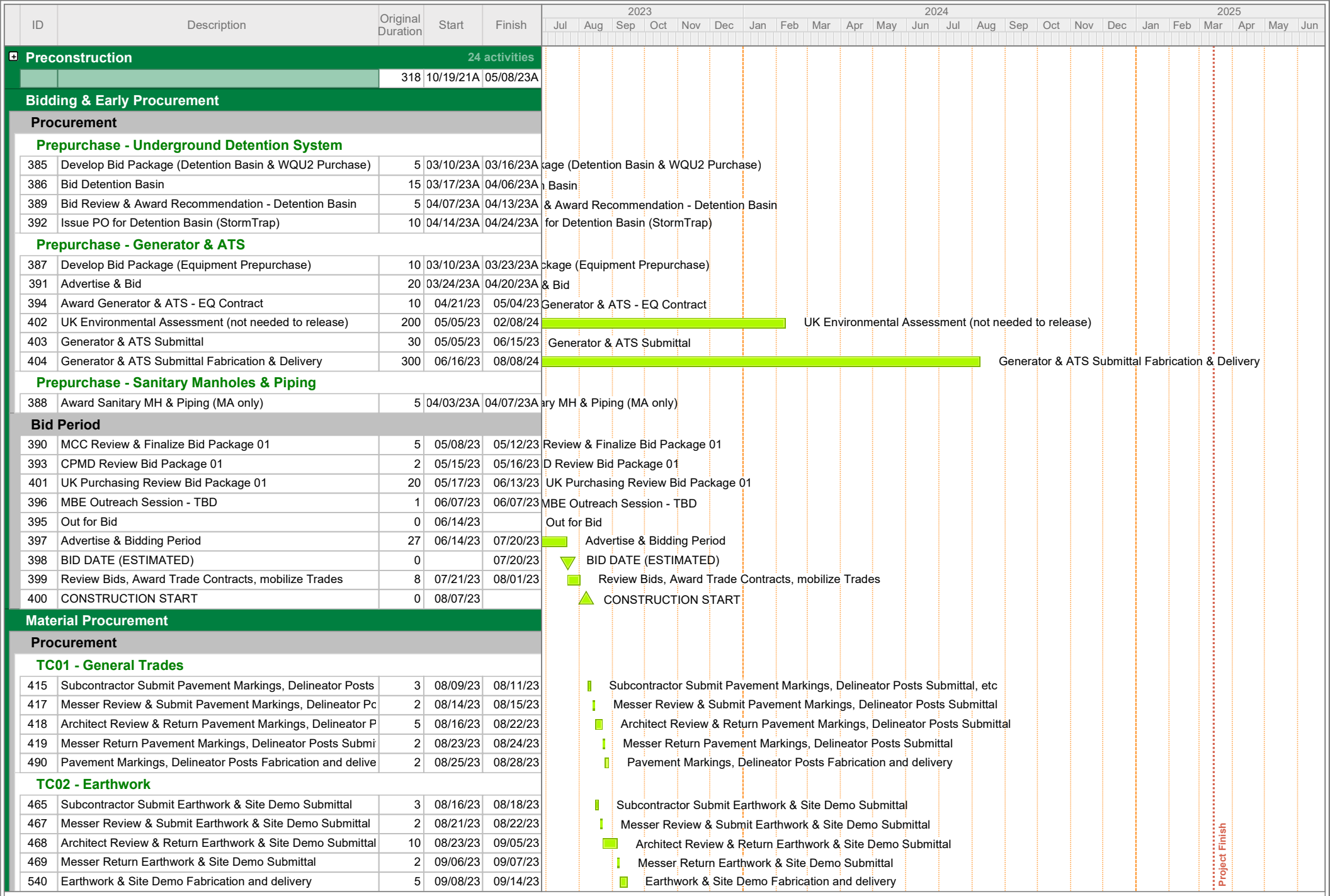
B. The Milestone Schedule for bidding is included in this Project Manual.

C. Each Subcontractor, by submitting a bid, acknowledges that they have reviewed this schedule and have included the means to meet this schedule in their bid.

D. It is the responsibility of all Subcontractors to complete their portions of the Project within established milestone dates in order to ensure completion of all work of the project by the final completion date. Subcontractors shall include costs required for overtime work, increased work force or other means to achieve the project schedule without change in the Contract Sum or Contract Time.

E. The Milestone Schedule shall be expanded into a Construction Schedule during the course of the project and will be reviewed at the weekly construction progress meetings and updated monthly and or at other intervals as needed for proper execution of the work. The Subcontractor shall notify the Contractor prior to bidding if a schedule update adversely affects its scope of work. See Section 01 32 16 for more information on Construction Progress Scheduling.

END OF SECTION 00 31 13

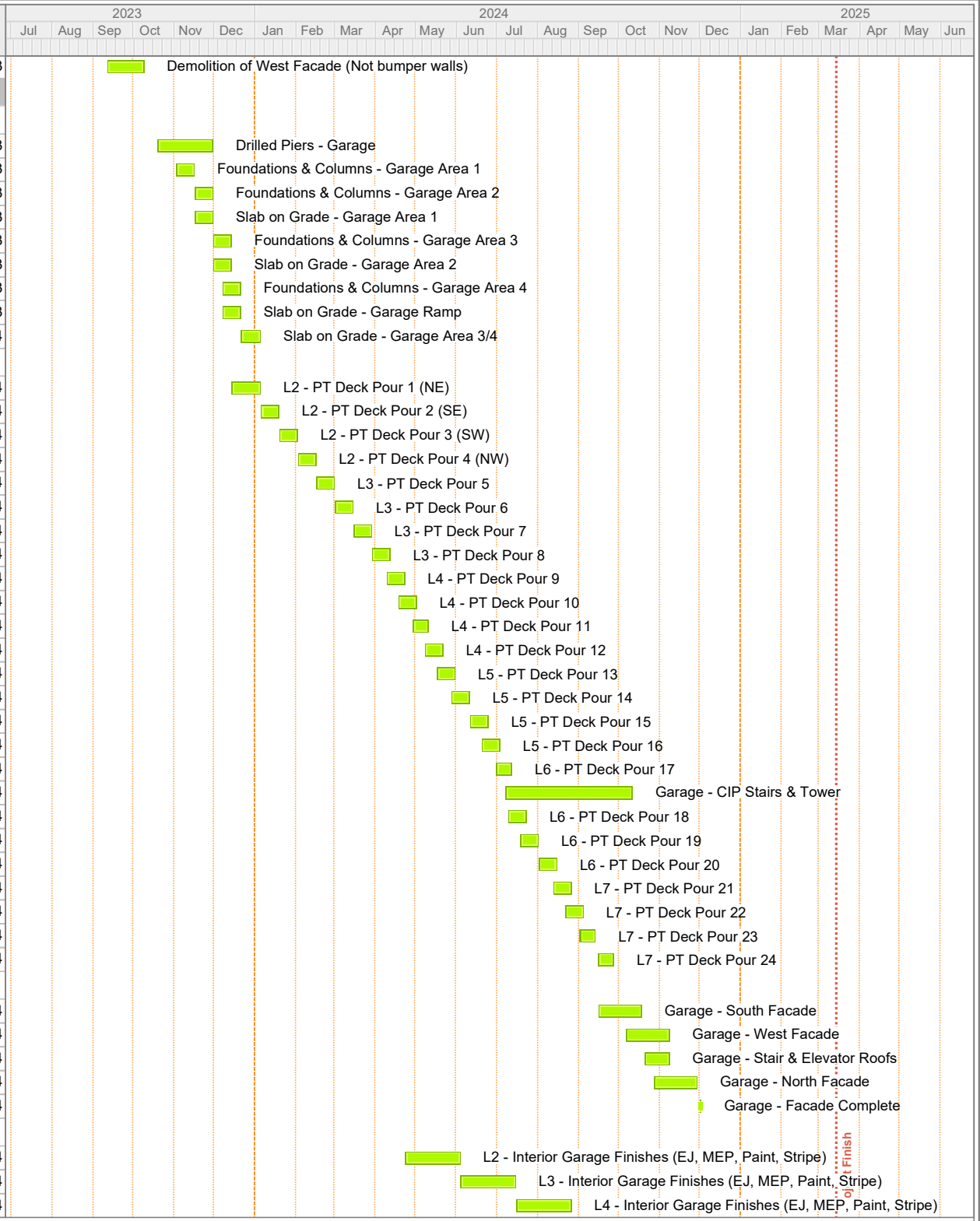


ID	Description	Original Duration	Start	Finish
Preconstruction		24 activities		
		318	10/19/21A	05/08/23A
Bidding & Early Procurement				
Procurement				
Prepurchase - Underground Detention System				
385	Develop Bid Package (Detention Basin & WQU2 Purchase)	5	03/10/23A	03/16/23A
386	Bid Detention Basin	15	03/17/23A	04/06/23A
389	Bid Review & Award Recommendation - Detention Basin	5	04/07/23A	04/13/23A
392	Issue PO for Detention Basin (StormTrap)	10	04/14/23A	04/24/23A
Prepurchase - Generator & ATS				
387	Develop Bid Package (Equipment Prepurchase)	10	03/10/23A	03/23/23A
391	Advertise & Bid	20	03/24/23A	04/20/23A
394	Award Generator & ATS - EQ Contract	10	04/21/23	05/04/23
402	UK Environmental Assessment (not needed to release)	200	05/05/23	02/08/24
403	Generator & ATS Submittal	30	05/05/23	06/15/23
404	Generator & ATS Submittal Fabrication & Delivery	300	06/16/23	08/08/24
Prepurchase - Sanitary Manholes & Piping				
388	Award Sanitary MH & Piping (MA only)	5	04/03/23A	04/07/23A
Bid Period				
390	MCC Review & Finalize Bid Package 01	5	05/08/23	05/12/23
393	CPMD Review Bid Package 01	2	05/15/23	05/16/23
401	UK Purchasing Review Bid Package 01	20	05/17/23	06/13/23
396	MBE Outreach Session - TBD	1	06/07/23	06/07/23
395	Out for Bid	0	06/14/23	
397	Advertise & Bidding Period	27	06/14/23	07/20/23
398	BID DATE (ESTIMATED)	0		07/20/23
399	Review Bids, Award Trade Contracts, mobilize Trades	8	07/21/23	08/01/23
400	CONSTRUCTION START	0	08/07/23	
Material Procurement				
Procurement				
TC01 - General Trades				
415	Subcontractor Submit Pavement Markings, Delineator Posts	3	08/09/23	08/11/23
417	Messer Review & Submit Pavement Markings, Delineator Pc	2	08/14/23	08/15/23
418	Architect Review & Return Pavement Markings, Delineator P	5	08/16/23	08/22/23
419	Messer Return Pavement Markings, Delineator Posts Submi	2	08/23/23	08/24/23
490	Pavement Markings, Delineator Posts Fabrication and delive	2	08/25/23	08/28/23
TC02 - Earthwork				
465	Subcontractor Submit Earthwork & Site Demo Submittal	3	08/16/23	08/18/23
467	Messer Review & Submit Earthwork & Site Demo Submittal	2	08/21/23	08/22/23
468	Architect Review & Return Earthwork & Site Demo Submittal	10	08/23/23	09/05/23
469	Messer Return Earthwork & Site Demo Submittal	2	09/06/23	09/07/23
540	Earthwork & Site Demo Fabrication and delivery	5	09/08/23	09/14/23

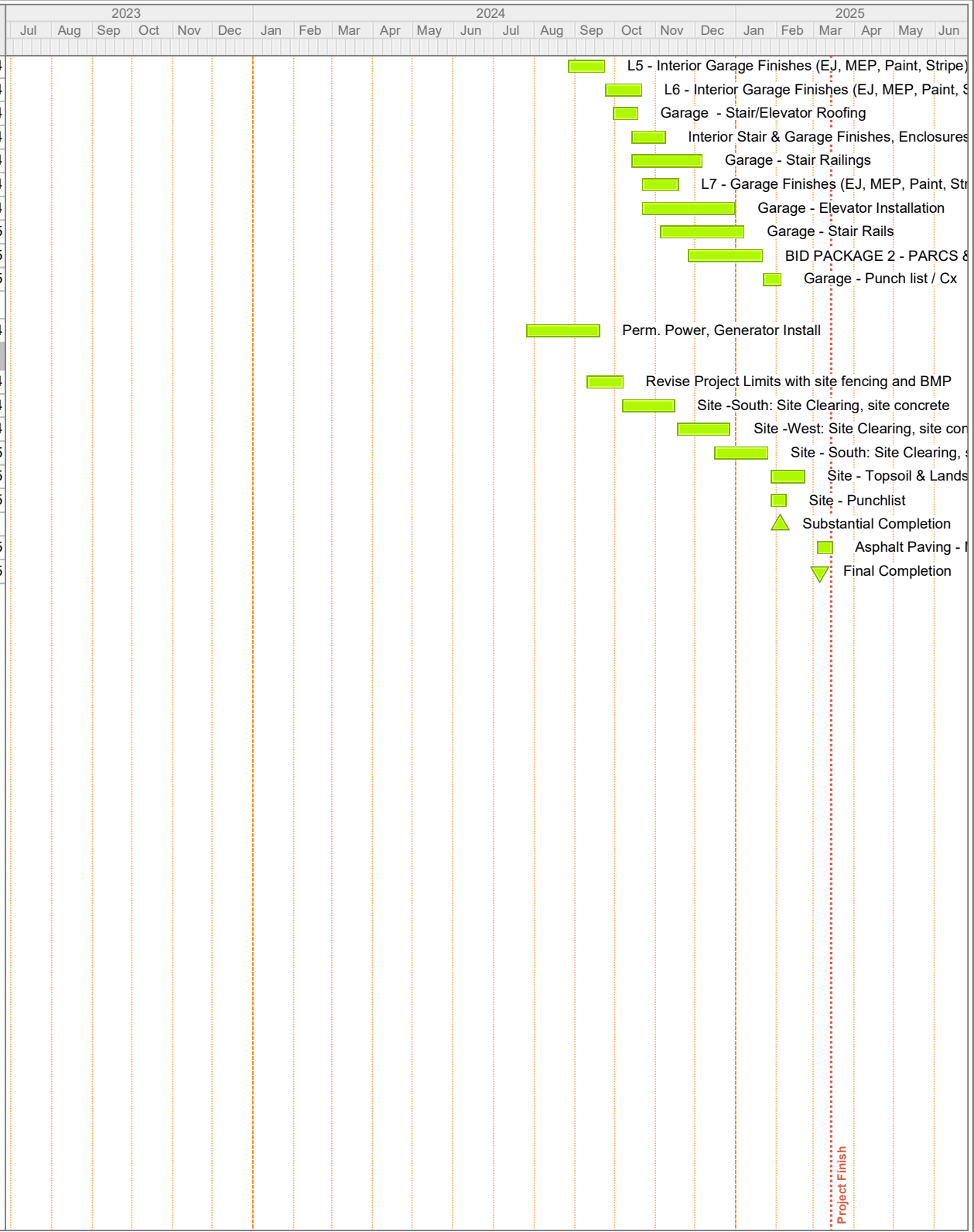
ID	Description	Original Duration	Start	Finish
TC03 - Demolition				
375	Subcontractor Submit Selective Demo Submittal / Permit	10	08/02/23	08/15/23
377	Messer Review & Submit Selective Demo Submittal	2	08/16/23	08/17/23
378	Architect Review & Return Selective Demo Submittal	5	08/18/23	08/24/23
379	Messer Return Selective Demo Submittal	1	08/25/23	08/25/23
382	Pre-Demo Conference	1	08/28/23	08/28/23
TC04 - Drilled Piers				
475	Subcontractor Submit Drilled Pier Submittals	15	08/02/23	08/22/23
477	Messer Review & Submit Drilled Pier Submittals	2	08/23/23	08/24/23
478	Architect Review & Return Drilled Pier Submittals	10	08/25/23	09/07/23
479	Messer Return Drilled Pier Submittals	2	09/08/23	09/11/23
550	Drilled Pier Fabrication and delivery	25	09/12/23	10/16/23
TC05 - Concrete				
405	Submit Concrete, Reinforcing Submittal (phased)	10	08/02/23	08/15/23
407	Messer Review & Submit Concrete, Reinforcing & Accessori	2	08/16/23	08/17/23
408	Architect Review & Return Concrete, Reinforcing & Accesso	10	08/18/23	08/31/23
409	Messer Return Concrete, Reinforcing & Accessories Submitt	2	09/01/23	09/04/23
420	Concrete, Reinforcing & Acc Fabrication and delivery	40	09/05/23	10/30/23
TC07 - Structural, Misc Steel & Rail				
425	Submit Railing Submittals	35	08/09/23	09/26/23
428	Messer Review & Submit Rail Submittal	5	09/27/23	10/03/23
429	Architect Review & Return Rail Submittal	10	10/04/23	10/17/23
455	Messer Return Rail Submittal	2	10/18/23	10/19/23
458	Rail Fabrication & Delivery	80	10/20/23	02/08/24
TC12 - Glass & Glazing				
427	Submit Curtain Wall & SF Submittals	35	08/09/23	09/26/23
457	Messer Review & Submit Curtain Wall & SF Submittals	5	09/27/23	10/03/23
459	Architect Review & Return Curtain Wall & SF Submittals	10	10/04/23	10/17/23
485	Messer Return Curtain Wall & SF Submittals	2	10/18/23	10/19/23
489	Curtain Wall & Storefront Fabrication & Delivery	80	10/20/23	02/08/24
TC13 - Drywall, EFIS, Exterior Panels				
487	Subcontractor Submit Exterior Wall Panels	35	08/02/23	09/19/23
488	Messer Review & Submit Exterior Wall Panel Submittal	5	09/20/23	09/26/23
500	Architect Review & Return Exterior Wall Panel Submittal	20	09/27/23	10/24/23
523	Messer Return Exterior Wall Panel Submittal	2	10/25/23	10/26/23
524	Exterior Wall Panel Fabrication & Delivery	60	10/27/23	01/18/24
TC18 - Elevator				
526	Submit Elevator Submittals	30	08/02/23	09/12/23
532	Messer Review & Submit Elevator Submittal	5	09/13/23	09/19/23
533	Architect Review & Submit Elevator Submittal	10	09/20/23	10/03/23
534	Messer Return Elevator Submittal	2	10/04/23	10/05/23
553	Elevator Fabrication & Delivery	120	10/06/23	03/21/24
TC19 - Fire Protection				
435	Subcontractor Submit Fire Suppression Material Submittal	30	08/02/23	09/12/23
437	Messer Review & Submit Fire Suppression Material Submitta	2	09/13/23	09/14/23
438	Architect Review & Return Fire Suppression Material Submit	10	09/15/23	09/28/23
439	Messer Return Fire Suppression Material Submittal	2	09/29/23	10/02/23
510	Fire Suppression Material Fabrication and delivery	30	10/03/23	11/13/23

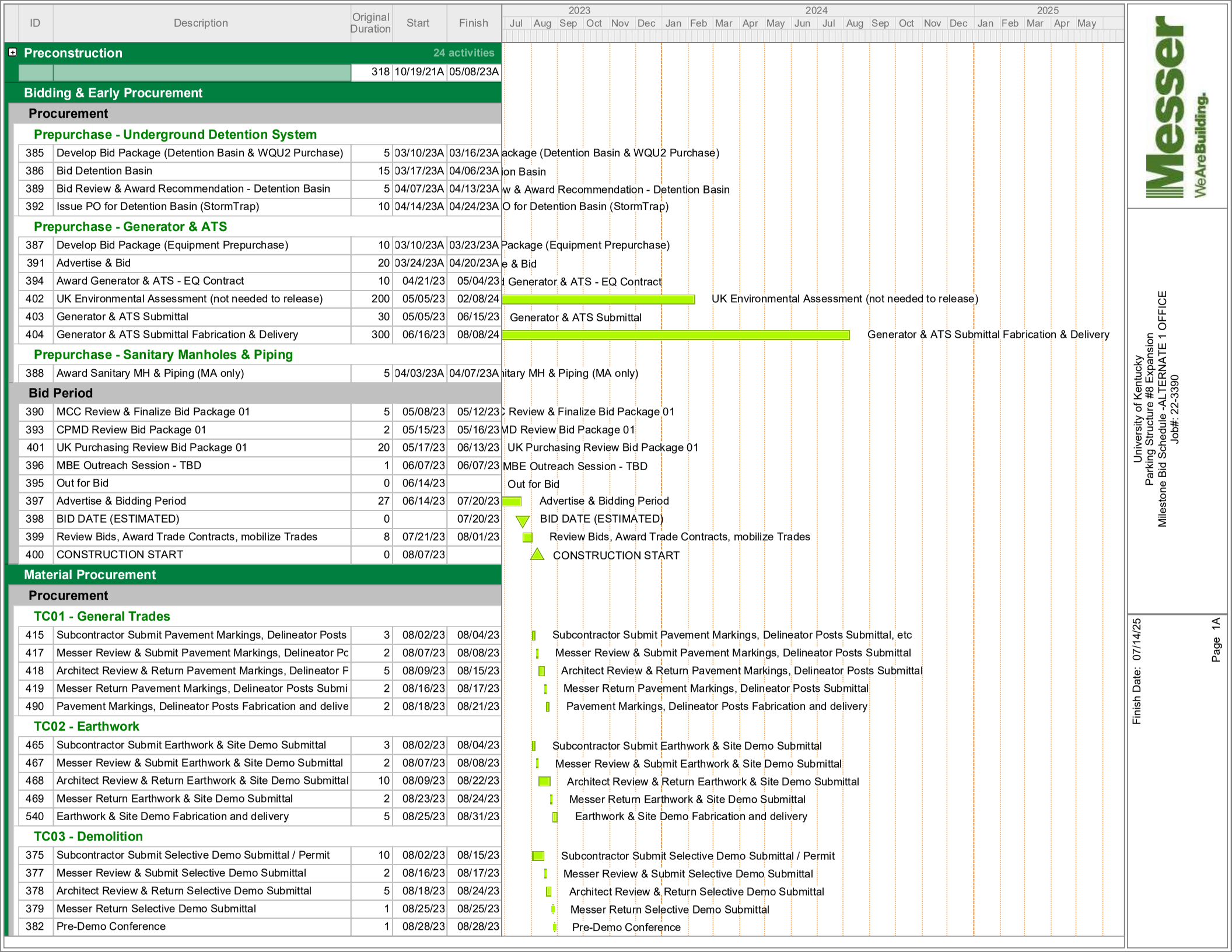
ID	Description	Original Duration	Start	Finish
	TC20 - Plumbing & HVAC			
445	Subcontractor Submit AHU & Chiller Submittal	10	08/02/23	08/15/23
447	Messer Review & Submit AHU & Chiller Submittal	5	08/16/23	08/22/23
448	Architect Review & Return AHU & Chiller Submittal	10	08/23/23	09/05/23
449	Messer Return AHU & Chiller Submittal	5	09/06/23	09/12/23
520	AHU & Chiller Fabrication and delivery	200	09/13/23	06/18/24
	Early Purchased Sanitary Pipe & Manholes			
495	MCC Submit Sanitary Pipe&MH (partial) Submittals	10	04/10/23A	04/21/23A
497	Messer Review & Submit Sanitary (partial) Submittals	2	04/24/23A	04/25/23A
498	Architect Review & Return Sanitary (partial) Items Submittal	5	04/26/23A	05/02/23A
499	Messer Return Sanitary Submittal	2	05/03/23A	05/04/23A
600	Sanitary Fabrication and delivery	10	05/05/23A	05/18/23
610	Sanitary (partial) Fabrication and delivery	40	05/05/23	06/29/23
	Underground Detention System Procurement			
505	Submit Storm Detention Submittals (StormTrap)	5	04/28/23A	05/04/23A
507	Messer Review Direct Procured Storm Detention Submittals	2	05/04/23A	05/04/23A
508	Architect Review & Return Direct Procured Storm Detention	10	05/04/23A	05/17/23
509	Messer Return Direct Procured Storm Detention Submittals	1	05/18/23	05/18/23
570	Direct Procured Storm Detention System Fabrication & Deliv	60	05/19/23	08/10/23
	Schedule Meetings			
580	RPS 1 - Existing Garage Work, Site Utilities, Grading Bldg P	1	07/31/23	07/31/23
590	RPS 2 - Drilled Piers - Completion of Concrete Frame	1	08/14/23	08/14/23
595	RPS 3 - Exterior Framing, Steel, CMU & Facade	1	08/28/23	08/28/23
597	RPS 4 - MEP & Interior Finishes	1	09/11/23	09/11/23
598	RPS 5 - Site Work & Utilities	1	09/25/23	09/25/23
	Construction			
	Site Utilities / Civil			
	General			
410	Sidewalk Closures & Project Fencing	30	08/07/23	09/15/23
412	BMP / Silt Protection Measures	30	08/07/23	09/15/23
421	Site Utility relocations for new construction, Demo Safe	20	09/12/23	10/09/23
	Utilities			
414	Install & Test New Site Sanitary Line	25	08/14/23	09/15/23
413	Install Underground Detention System	25	09/11/23	10/13/23
416	Demo Existing Sanitary	10	09/11/23	09/22/23
424	Relocate, test, clean new domestic water to PS8	10	09/18/23	09/29/23
433	Relocate FDC & install Fire Hydrants (relocate existing)	10	09/18/23	09/29/23
441	Relocate, test Existing Generator to PS8	10	09/18/23	09/29/23
422	Connections & Testing for the Underground Detention Syste	10	10/09/23	10/20/23
	Earthwork			
423	Site Clearing, grading & gravel to subgrade	20	09/28/23	10/25/23
	Existing Garage			
	Demolition & Existing Garage Work			
432	Existing Garage Work for new Traffic Pattern	25	08/07/23	09/08/23
440	Install / Relocate PARCS	10	08/28/23	09/08/23
470	Install Separation Wall in Existing Garage	25	08/29/23	10/02/23
411	Reroute Traffic to utilize new (WEEKEND WORK)	4	09/06/23	09/11/23

ID	Description	Original Duration	Start	Finish
431	Demolition of West Facade (Not bumper walls)	20	09/12/23	10/09/23
Garage Construction				
Foundations				
446	Drilled Piers - Garage	30	10/20/23	11/30/23
452	Foundations & Columns - Garage Area 1	10	11/03/23	11/16/23
453	Foundations & Columns - Garage Area 2	10	11/17/23	11/30/23
462	Slab on Grade - Garage Area 1	10	11/17/23	11/30/23
454	Foundations & Columns - Garage Area 3	10	12/01/23	12/14/23
463	Slab on Grade - Garage Area 2	10	12/01/23	12/14/23
456	Foundations & Columns - Garage Area 4	10	12/08/23	12/21/23
464	Slab on Grade - Garage Ramp	10	12/08/23	12/21/23
466	Slab on Grade - Garage Area 3/4	10	12/22/23	01/04/24
Structure				
472	L2 - PT Deck Pour 1 (NE)	15	12/15/23	01/04/24
474	L2 - PT Deck Pour 2 (SE)	10	01/05/24	01/18/24
476	L2 - PT Deck Pour 3 (SW)	10	01/19/24	02/01/24
482	L2 - PT Deck Pour 4 (NW)	10	02/02/24	02/15/24
483	L3 - PT Deck Pour 5	10	02/16/24	02/29/24
484	L3 - PT Deck Pour 6	10	03/01/24	03/14/24
486	L3 - PT Deck Pour 7	10	03/15/24	03/28/24
492	L3 - PT Deck Pour 8	10	03/29/24	04/11/24
493	L4 - PT Deck Pour 9	10	04/09/24	04/22/24
494	L4 - PT Deck Pour 10	10	04/18/24	05/01/24
496	L4 - PT Deck Pour 11	10	04/29/24	05/10/24
502	L4 - PT Deck Pour 12	10	05/08/24	05/21/24
503	L5 - PT Deck Pour 13	10	05/17/24	05/30/24
504	L5 - PT Deck Pour 14	10	05/28/24	06/10/24
506	L5 - PT Deck Pour 15	10	06/11/24	06/24/24
515	L5 - PT Deck Pour 16	10	06/20/24	07/03/24
517	L6 - PT Deck Pour 17	10	07/01/24	07/12/24
536	Garage - CIP Stairs & Tower	70	07/08/24	10/11/24
518	L6 - PT Deck Pour 18	10	07/10/24	07/23/24
519	L6 - PT Deck Pour 19	10	07/19/24	08/01/24
525	L6 - PT Deck Pour 20	10	08/02/24	08/15/24
527	L7 - PT Deck Pour 21	10	08/13/24	08/26/24
528	L7 - PT Deck Pour 22	10	08/22/24	09/04/24
529	L7 - PT Deck Pour 23	10	09/02/24	09/13/24
535	L7 - PT Deck Pour 24	10	09/16/24	09/27/24
Facade				
545	Garage - South Facade	25	09/16/24	10/18/24
547	Garage - West Facade	25	10/07/24	11/08/24
543	Garage - Stair & Elevator Roofs	15	10/21/24	11/08/24
548	Garage - North Facade	25	10/28/24	11/29/24
552	Garage - Facade Complete	1	12/02/24	12/02/24
Finishes				
501	L2 - Interior Garage Finishes (EJ, MEP, Paint, Stripe)	30	04/23/24	06/03/24
512	L3 - Interior Garage Finishes (EJ, MEP, Paint, Stripe)	30	06/04/24	07/15/24
513	L4 - Interior Garage Finishes (EJ, MEP, Paint, Stripe)	30	07/16/24	08/26/24



ID	Description	Original Duration	Start	Finish
514	L5 - Interior Garage Finishes (EJ, MEP, Paint, Stripe)	20	08/27/24	09/23/24
516	L6 - Interior Garage Finishes (EJ, MEP, Paint, Stripe)	20	09/24/24	10/21/24
537	Garage - Stair/Elevator Roofing	15	09/30/24	10/18/24
544	Interior Stair & Garage Finishes, Enclosures	20	10/14/24	11/08/24
551	Garage - Stair Railings	40	10/14/24	12/06/24
522	L7 - Garage Finishes (EJ, MEP, Paint, Stripe)	20	10/22/24	11/18/24
538	Garage - Elevator Installation	50	10/22/24	12/30/24
539	Garage - Stair Rails	45	11/05/24	01/06/25
554	BID PACKAGE 2 - PARCS & SIGNAGE	40	11/26/24	01/20/25
542	Garage - Punch list / Cx	10	01/21/25	02/03/25
	MEP			
541	Perm. Power, Generator Install	40	07/26/24	09/19/24
	Site Work (Phase 2 Limits)			
549	Revise Project Limits with site fencing and BMP	20	09/10/24	10/07/24
546	Site -South: Site Clearing, site concrete	30	10/07/24	11/15/24
555	Site -West: Site Clearing, site concrete	30	11/18/24	12/27/24
556	Site - South: Site Clearing, site Concrete	30	12/16/24	01/24/25
557	Site - Topsoil & Landscaping (weather dependent)	20	01/27/25	02/21/25
559	Site - Punchlist	10	01/27/25	02/07/25
565	Substantial Completion	0	02/03/25	
558	Asphalt Paving - Mill / Overlay (when plants open)	10	03/03/25	03/14/25
567	Final Completion	0		03/04/24

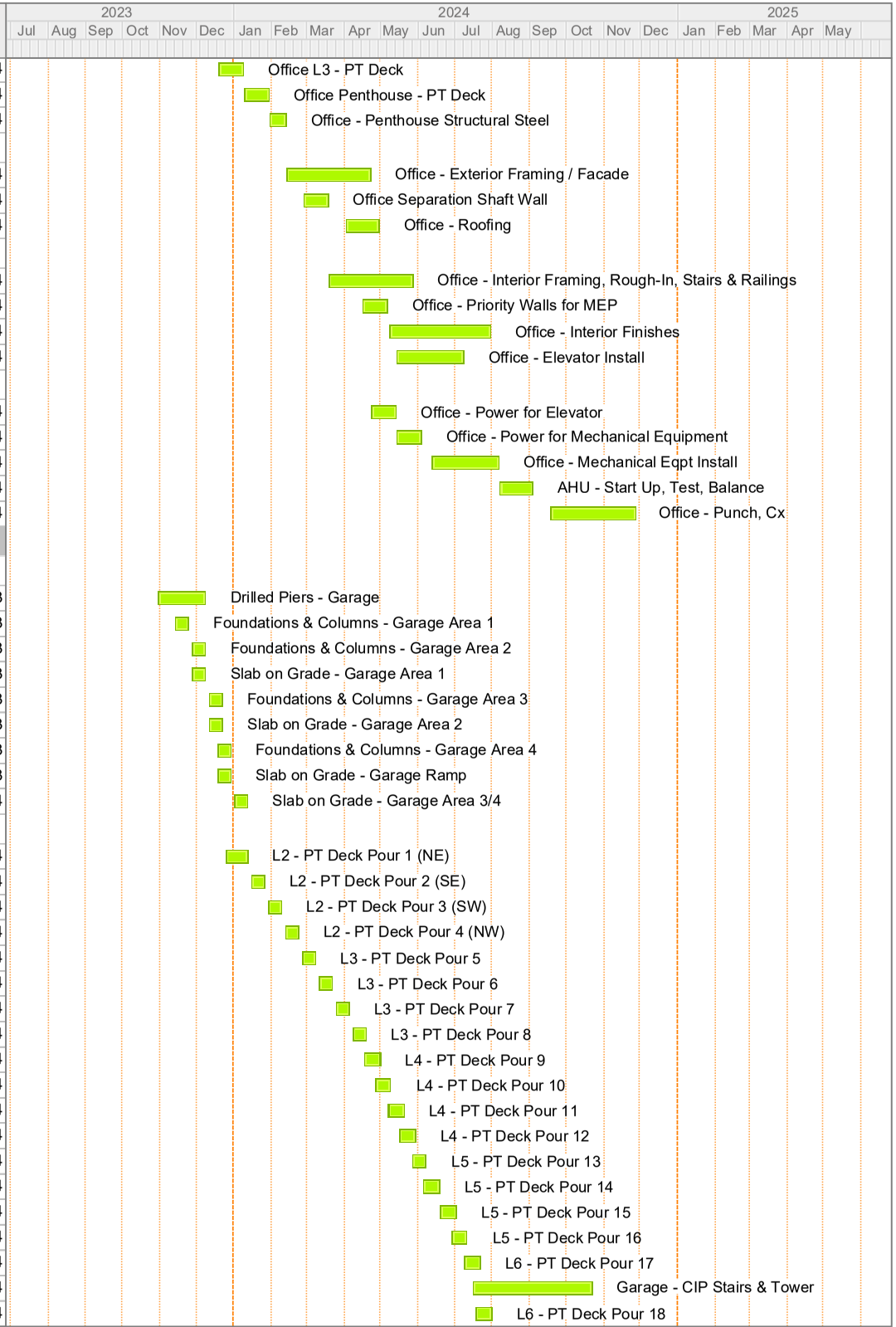



ID
Description
Original Duration
Start
Finish
2023
2024
2025
Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May
Preconstruction 24 activities
318 10/19/21A 05/08/23A
Bidding & Early Procurement
Procurement
Prepurchase - Underground Detention System
385 Develop Bid Package (Detention Basin & WQU2 Purchase) 5 03/10/23A 03/16/23A
386 Bid Detention Basin 15 03/17/23A 04/06/23A
389 Bid Review & Award Recommendation - Detention Basin 5 04/07/23A 04/13/23A
392 Issue PO for Detention Basin (StormTrap) 10 04/14/23A 04/24/23A
Prepurchase - Generator & ATS
387 Develop Bid Package (Equipment Prepurchase) 10 03/10/23A 03/23/23A
391 Advertise & Bid 20 03/24/23A 04/20/23A
394 Award Generator & ATS - EQ Contract 10 04/21/23 05/04/23
402 UK Environmental Assessment (not needed to release) 200 05/05/23 02/08/24
403 Generator & ATS Submittal 30 05/05/23 06/15/23
404 Generator & ATS Submittal Fabrication & Delivery 300 06/16/23 08/08/24
Prepurchase - Sanitary Manholes & Piping
388 Award Sanitary MH & Piping (MA only) 5 04/03/23A 04/07/23A
Bid Period
390 MCC Review & Finalize Bid Package 01 5 05/08/23 05/12/23
393 CPMD Review Bid Package 01 2 05/15/23 05/16/23
401 UK Purchasing Review Bid Package 01 20 05/17/23 06/13/23
396 MBE Outreach Session - TBD 1 06/07/23 06/07/23
395 Out for Bid 0 06/14/23
397 Advertise & Bidding Period 27 06/14/23 07/20/23
398 BID DATE (ESTIMATED) 0 07/20/23
399 Review Bids, Award Trade Contracts, mobilize Trades 8 07/21/23 08/01/23
400 CONSTRUCTION START 0 08/07/23
Material Procurement
Procurement
TC01 - General Trades
415 Subcontractor Submit Pavement Markings, Delineator Posts 3 08/02/23 08/04/23
417 Messer Review & Submit Pavement Markings, Delineator Pc 2 08/07/23 08/08/23
418 Architect Review & Return Pavement Markings, Delineator P 5 08/09/23 08/15/23
419 Messer Return Pavement Markings, Delineator Posts Submi 2 08/16/23 08/17/23
490 Pavement Markings, Delineator Posts Fabrication and delive 2 08/18/23 08/21/23
TC02 - Earthwork
465 Subcontractor Submit Earthwork & Site Demo Submittal 3 08/02/23 08/04/23
467 Messer Review & Submit Earthwork & Site Demo Submittal 2 08/07/23 08/08/23
468 Architect Review & Return Earthwork & Site Demo Submittal 10 08/09/23 08/22/23
469 Messer Return Earthwork & Site Demo Submittal 2 08/23/23 08/24/23
540 Earthwork & Site Demo Fabrication and delivery 5 08/25/23 08/31/23
TC03 - Demolition
375 Subcontractor Submit Selective Demo Submittal / Permit 10 08/02/23 08/15/23
377 Messer Review & Submit Selective Demo Submittal 2 08/16/23 08/17/23
378 Architect Review & Return Selective Demo Submittal 5 08/18/23 08/24/23
379 Messer Return Selective Demo Submittal 1 08/25/23 08/25/23
382 Pre-Demo Conference 1 08/28/23 08/28/23
ackage (Detention Basin & WQU2 Purchase)
on Basin
w & Award Recommendation - Detention Basin
O for Detention Basin (StormTrap)
Package (Equipment Prepurchase)
e & Bid
l Generator & ATS - EQ Contract
UK Environmental Assessment (not needed to release)
Generator & ATS Submittal
Generator & ATS Submittal Fabrication & Delivery
itary MH & Piping (MA only)
C Review & Finalize Bid Package 01
MD Review Bid Package 01
UK Purchasing Review Bid Package 01
MBE Outreach Session - TBD
Out for Bid
Advertise & Bidding Period
BID DATE (ESTIMATED)
Review Bids, Award Trade Contracts, mobilize Trades
CONSTRUCTION START
Subcontractor Submit Pavement Markings, Delineator Posts Submittal, etc
Messer Review & Submit Pavement Markings, Delineator Posts Submittal
Architect Review & Return Pavement Markings, Delineator Posts Submittal
Messer Return Pavement Markings, Delineator Posts Submittal
Pavement Markings, Delineator Posts Fabrication and delivery
Subcontractor Submit Earthwork & Site Demo Submittal
Messer Review & Submit Earthwork & Site Demo Submittal
Architect Review & Return Earthwork & Site Demo Submittal
Messer Return Earthwork & Site Demo Submittal
Earthwork & Site Demo Fabrication and delivery
Subcontractor Submit Selective Demo Submittal / Permit
Messer Review & Submit Selective Demo Submittal
Architect Review & Return Selective Demo Submittal
Messer Return Selective Demo Submittal
Pre-Demo Conference
Messer
WeAreBuilding.
University of Kentucky
Parking Structure #8 Expansion
Milestone Bid Schedule -ALTERNATE 1 OFFICE
Job#: 22-3390
Finish Date: 07/14/25
Page 1A

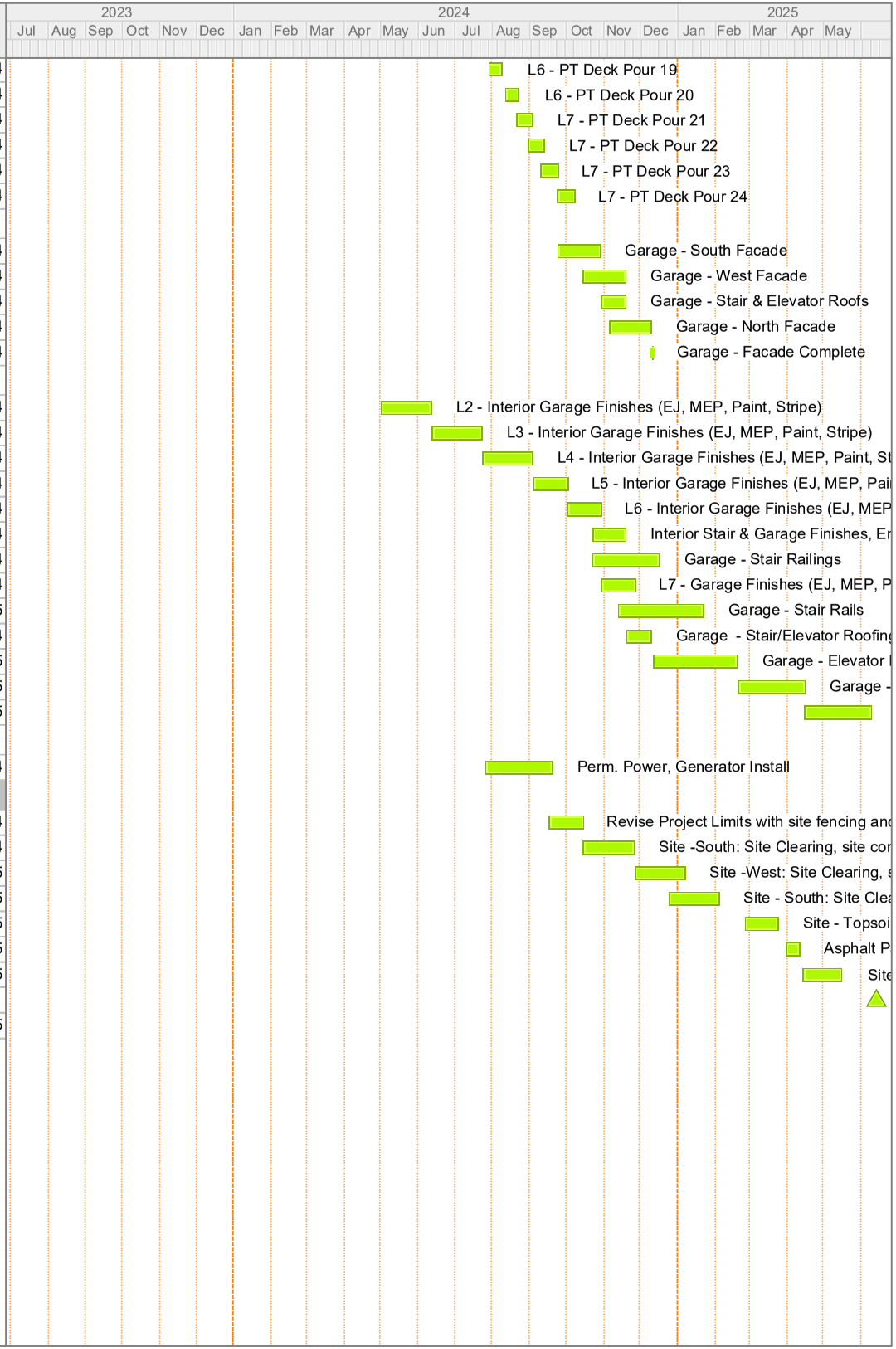
ID	Description	Original Duration	Start	Finish
TC04 - Drilled Piers				
475	Subcontractor Submit Drilled Pier Submittals	15	08/02/23	08/22/23
477	Messer Review & Submit Drilled Pier Submittals	2	08/23/23	08/24/23
478	Architect Review & Return Drilled Pier Submittals	10	08/25/23	09/07/23
479	Messer Return Drilled Pier Submittals	2	09/08/23	09/11/23
550	Drilled Pier Fabrication and delivery	25	09/12/23	10/16/23
TC05 - Concrete				
405	Submit Concrete, Reinforcing Submittal (phased)	10	08/02/23	08/15/23
407	Messer Review & Submit Concrete, Reinforcing & Accessori	2	08/16/23	08/17/23
408	Architect Review & Return Concrete, Reinforcing & Accesso	10	08/18/23	08/31/23
409	Messer Return Concrete, Reinforcing & Accessories Submitt	2	09/01/23	09/04/23
420	Concrete, Reinforcing & Acc Fabrication and delivery	40	09/05/23	10/30/23
TC07 - Structural, Misc Steel & Rail				
425	Submit Railing Submittals	35	08/09/23	09/26/23
428	Messer Review & Submit Rail Submittal	5	09/27/23	10/03/23
429	Architect Review & Return Rail Submittal	10	10/04/23	10/17/23
455	Messer Return Rail Submittal	2	10/18/23	10/19/23
458	Rail Fabrication & Delivery	80	10/20/23	02/08/24
TC12 - Glass & Glazing				
427	Submit Curtain Wall & SF Submittals	35	08/09/23	09/26/23
457	Messer Review & Submit Curtain Wall & SF Submittals	5	09/27/23	10/03/23
459	Architect Review & Return Curtain Wall & SF Submittals	10	10/04/23	10/17/23
485	Messer Return Curtain Wall & SF Submittals	2	10/18/23	10/19/23
489	Curtain Wall & Storefront Fabrication & Delivery	80	10/20/23	02/08/24
TC13 - Drywall, EFIS, Exterior Panels				
487	Subcontractor Submit Exterior Wall Panels	35	08/02/23	09/19/23
488	Messer Review & Submit Exterior Wall Panel Submittal	5	09/20/23	09/26/23
500	Architect Review & Return Exterior Wall Panel Submittal	20	09/27/23	10/24/23
523	Messer Return Exterior Wall Panel Submittal	2	10/25/23	10/26/23
524	Exterior Wall Panel Fabrication & Delivery	60	10/27/23	01/18/24
TC18 - Elevator				
526	Submit Elevator Submittals	30	08/02/23	09/12/23
532	Messer Review & Submit Elevator Submittal	5	09/13/23	09/19/23
533	Architect Review & Submit Elevator Submittal	10	09/20/23	10/03/23
534	Messer Return Elevator Submittal	2	10/04/23	10/05/23
553	Elevator Fabrication & Delivery	120	10/06/23	03/21/24
TC19 - Fire Protection				
435	Subcontractor Submit Fire Suppression Material Submittal	30	08/02/23	09/12/23
437	Messer Review & Submit Fire Suppression Material Submitta	2	09/13/23	09/14/23
438	Architect Review & Return Fire Suppression Material Submit	10	09/15/23	09/28/23
439	Messer Return Fire Suppression Material Submittal	2	09/29/23	10/02/23
510	Fire Suppression Material Fabrication and delivery	30	10/03/23	11/13/23
TC20 - Plumbing & HVAC				
445	Subcontractor Submit AHU & Chiller Submittal	10	08/02/23	08/15/23
447	Messer Review & Submit AHU & Chiller Submittal	5	08/16/23	08/22/23
448	Architect Review & Return AHU & Chiller Submittal	10	08/23/23	09/05/23
449	Messer Return AHU & Chiller Submittal	5	09/06/23	09/12/23
520	AHU & Chiller Fabrication and delivery	200	09/13/23	06/18/24

ID	Description	Original Duration	Start	Finish
	Early Purchased Sanitary Pipe & Manholes			
495	MCC Submit Sanitary Pipe&MH (partial) Submittals	10	04/10/23A	04/21/23A
497	Messer Review & Submit Sanitary (partial) Submittals	2	04/24/23A	04/25/23A
498	Architect Review & Return Sanitary (partial) Items Submittal	5	04/26/23A	05/02/23A
499	Messer Return Sanitary Submittal	2	05/03/23A	05/04/23A
600	Sanitary Fabrication and delivery	10	05/05/23A	05/18/23
610	Sanitary (partial) Fabrication and delivery	40	05/05/23	06/29/23
	Underground Detention System Procurement			
505	Submit Storm Detention Submittals (StormTrap)	5	04/28/23A	05/04/23A
507	Messer Review Direct Procured Storm Detention Submittals	2	05/04/23A	05/04/23A
508	Architect Review & Return Direct Procured Storm Detention	10	05/04/23A	05/17/23
509	Messer Return Direct Procured Storm Detention Submittals	1	05/18/23	05/18/23
570	Direct Procured Storm Detention System Fabrication & Deliv	60	05/19/23	08/10/23
	Schedule Meetings			
580	RPS 1 - Existing Garage Work, Site Utilities, Grading Bldg P	1	07/31/23	07/31/23
590	RPS 2 - Drilled Piers - Completion of Concrete Frame	1	08/14/23	08/14/23
595	RPS 3 - Exterior Framing, Steel, CMU & Facade	1	08/28/23	08/28/23
597	RPS 4 - MEP & Interior Finishes	1	09/11/23	09/11/23
598	RPS 5 - Site Work & Utilities	1	09/25/23	09/25/23
	Construction			
	Site Utilities / Civil			
	General			
410	Sidewalk Closures & Project Fencing	30	08/07/23	09/15/23
412	BMP / Silt Protection Measures	30	08/07/23	09/15/23
421	Site Utility relocations for new construction, Demo Safe	20	09/12/23	10/09/23
	Utilities			
414	Install & Test New Site Sanitary Line	25	08/14/23	09/15/23
413	Install Underground Detention System	25	09/11/23	10/13/23
416	Demo Existing Sanitary	10	09/11/23	09/22/23
424	Relocate, test, clean new domestic water to PS8	10	09/18/23	09/29/23
433	Relocate FDC & install Fire Hydrants (relocate existing)	10	09/18/23	09/29/23
441	Relocate, test Existing Generator to PS8	10	09/18/23	09/29/23
422	Connections & Testing for the Underground Detention Syste	10	10/09/23	10/20/23
	Earthwork			
423	Site Clearing, grading & gravel to subgrade	20	09/28/23	10/25/23
	Existing Garage			
	Demolition & Existing Garage Work			
432	Existing Garage Work for new Traffic Pattern	25	08/07/23	09/08/23
440	Install / Relocate PARCS	10	08/28/23	09/08/23
470	Install Separation Wall in Existing Garage	25	08/29/23	10/02/23
411	Reroute Traffic to utilize new (WEEKEND WORK)	4	09/06/23	09/11/23
431	Demolition of West Facade (Not bumper walls)	20	09/12/23	10/09/23
	Office Const ALT 1			
	Foundations			
426	Drilled Piers - Office	15	10/16/23	11/03/23
430	Foundations & Columns - Office	15	11/07/23	11/27/23
	Structure			
434	Office L2 - PT Deck (mud mats)	15	11/28/23	12/18/23

ID	Description	Original Duration	Start	Finish
436	Office L3 - PT Deck	15	12/19/23	01/08/24
442	Office Penthouse - PT Deck	15	01/09/24	01/29/24
443	Office - Penthouse Structural Steel	10	01/30/24	02/12/24
Facade				
444	Office - Exterior Framing / Facade	50	02/13/24	04/22/24
460	Office Separation Shaft Wall	15	02/27/24	03/18/24
450	Office - Roofing	20	04/02/24	04/29/24
Finishes				
451	Office - Interior Framing, Rough-In, Stairs & Railings	50	03/19/24	05/27/24
473	Office - Priority Walls for MEP	15	04/16/24	05/06/24
461	Office - Interior Finishes	60	05/08/24	07/30/24
471	Office - Elevator Install	40	05/14/24	07/08/24
MEP				
480	Office - Power for Elevator	15	04/23/24	05/13/24
481	Office - Power for Mechanical Equipment	15	05/14/24	06/03/24
491	Office - Mechanical Eqpt Install	40	06/12/24	08/06/24
511	AHU - Start Up, Test, Balance	20	08/07/24	09/03/24
521	Office - Punch, Cx	50	09/18/24	11/26/24
Garage Construction				
Foundations				
446	Drilled Piers - Garage	30	10/30/23	12/08/23
452	Foundations & Columns - Garage Area 1	10	11/13/23	11/24/23
453	Foundations & Columns - Garage Area 2	10	11/27/23	12/08/23
462	Slab on Grade - Garage Area 1	10	11/27/23	12/08/23
454	Foundations & Columns - Garage Area 3	10	12/11/23	12/22/23
463	Slab on Grade - Garage Area 2	10	12/11/23	12/22/23
456	Foundations & Columns - Garage Area 4	10	12/18/23	12/29/23
464	Slab on Grade - Garage Ramp	10	12/18/23	12/29/23
466	Slab on Grade - Garage Area 3/4	10	01/01/24	01/12/24
Structure				
472	L2 - PT Deck Pour 1 (NE)	15	12/25/23	01/12/24
474	L2 - PT Deck Pour 2 (SE)	10	01/15/24	01/26/24
476	L2 - PT Deck Pour 3 (SW)	10	01/29/24	02/09/24
482	L2 - PT Deck Pour 4 (NW)	10	02/12/24	02/23/24
483	L3 - PT Deck Pour 5	10	02/26/24	03/08/24
484	L3 - PT Deck Pour 6	10	03/11/24	03/22/24
486	L3 - PT Deck Pour 7	10	03/25/24	04/05/24
492	L3 - PT Deck Pour 8	10	04/08/24	04/19/24
493	L4 - PT Deck Pour 9	10	04/17/24	04/30/24
494	L4 - PT Deck Pour 10	10	04/26/24	05/09/24
496	L4 - PT Deck Pour 11	10	05/07/24	05/20/24
502	L4 - PT Deck Pour 12	10	05/16/24	05/29/24
503	L5 - PT Deck Pour 13	10	05/27/24	06/07/24
504	L5 - PT Deck Pour 14	10	06/05/24	06/18/24
506	L5 - PT Deck Pour 15	10	06/19/24	07/02/24
515	L5 - PT Deck Pour 16	10	06/28/24	07/11/24
517	L6 - PT Deck Pour 17	10	07/09/24	07/22/24
536	Garage - CIP Stairs & Tower	70	07/16/24	10/21/24
518	L6 - PT Deck Pour 18	10	07/18/24	07/31/24



ID	Description	Original Duration	Start	Finish
519	L6 - PT Deck Pour 19	10	07/29/24	08/09/24
525	L6 - PT Deck Pour 20	10	08/12/24	08/23/24
527	L7 - PT Deck Pour 21	10	08/21/24	09/03/24
528	L7 - PT Deck Pour 22	10	08/30/24	09/12/24
529	L7 - PT Deck Pour 23	10	09/10/24	09/23/24
535	L7 - PT Deck Pour 24	10	09/24/24	10/07/24
Facade				
545	Garage - South Facade	25	09/24/24	10/28/24
547	Garage - West Facade	25	10/15/24	11/18/24
543	Garage - Stair & Elevator Roofs	15	10/29/24	11/18/24
548	Garage - North Facade	25	11/05/24	12/09/24
552	Garage - Facade Complete	1	12/10/24	12/10/24
Finishes				
501	L2 - Interior Garage Finishes (EJ, MEP, Paint, Stripe)	30	05/01/24	06/11/24
512	L3 - Interior Garage Finishes (EJ, MEP, Paint, Stripe)	30	06/12/24	07/23/24
513	L4 - Interior Garage Finishes (EJ, MEP, Paint, Stripe)	30	07/24/24	09/03/24
514	L5 - Interior Garage Finishes (EJ, MEP, Paint, Stripe)	20	09/04/24	10/01/24
516	L6 - Interior Garage Finishes (EJ, MEP, Paint, Stripe)	20	10/02/24	10/29/24
544	Interior Stair & Garage Finishes, Enclosures	20	10/22/24	11/18/24
551	Garage - Stair Railings	40	10/22/24	12/16/24
522	L7 - Garage Finishes (EJ, MEP, Paint, Stripe)	20	10/30/24	11/26/24
539	Garage - Stair Rails	50	11/13/24	01/21/25
537	Garage - Stair/Elevator Roofing	15	11/19/24	12/09/24
538	Garage - Elevator Installation	50	12/11/24	02/18/25
542	Garage - Punch list / Cx	40	02/19/25	04/15/25
554	BID PACKAGE 2 - PARCS & SIGNAGE	40	04/15/25	06/09/25
MEP				
541	Perm. Power, Generator Install	40	07/26/24	09/19/24
Site Work (Phase 2 Limits)				
549	Revise Project Limits with site fencing and BMP	20	09/17/24	10/14/24
546	Site -South: Site Clearing, site concrete	30	10/15/24	11/25/24
555	Site -West: Site Clearing, site concrete	30	11/26/24	01/06/25
556	Site - South: Site Clearing, site Concrete	30	12/24/24	02/03/25
557	Site - Topsoil & Landscaping	20	02/25/25	03/24/25
558	Asphalt Paving - Mill / Overlay (when plants open)	10	03/31/25	04/11/25
559	Site - Punchlist	25	04/14/25	05/16/25
565	Substantial Completion	0	06/13/25	
567	Final Completion	0		07/14/25



SOLID GROUND
CONSULTING ENGINEERS, PLLC
Engineering Innovation; Providing Solutions to Your Challenges.

REVISED REPORT OF GEOTECHNICAL EXPLORATION

University of Kentucky

Parking Structure #8 Addition

Lexington, Fayette County, Kentucky

Prepared for: Mr. Scott Bowles

University of Kentucky

Lexington, Kentucky

April 25, 2023

TABLE OF CONTENTS

APPENDICES

SOLID GROUND
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Engineering Innovation; Providing Solutions to Your Challenges.

April 25, 2023

Mr. Scott Bowles
Project Manager
University of Kentucky
Capital Project Management Division
222 Frank D. Peterson Service Building
Lexington, Kentucky 40506-0005

Subject: **Report of Geotechnical Exploration**
University of Kentucky Parking Structure #8 Addition
Lexington, Kentucky
Solid Ground Project No: 21-426R2

Mr. Bowles,

Solid Ground Consulting Engineers, PLLC (Solid Ground) is pleased to present our Report of Geotechnical Exploration. This report is for the proposed addition to the University of Kentucky's Parking Structure #8 in Lexington, Kentucky. The geotechnical exploration was conducted in general accordance with the scope of work outlined in Solid Ground proposal 21-275 dated November 8, 2021.

This report contains our findings and recommendations for the referenced project detailed above. Once completed, it is recommended that Solid Ground have the opportunity to review plans and specifications. In addition, it is recommended that Solid Ground be retained to perform observations and special inspections during construction. Solid Ground will not be held responsible for interpretations and field observations made by others.

We appreciate the opportunity to provide our consulting services to you. We look forward to working with you on this and future projects.

Sincerely,
SOLID GROUND CONSULTING ENGINEERS, PLLC

STATE OF KENTUCKY
MICHAEL BECK SMITH
37415
LICENSED PROFESSIONAL ENGINEER

Beck Smith, PE
Senior Engineer
Kentucky License Number 37415

Caitlin Noel
Project Geologist

1.0 Executive Summary

Solid Ground Consulting Engineers performed a geotechnical exploration in support of the University of Kentucky's Parking Structure #8 addition located on South Limestone, Lexington, Fayette County, Kentucky. The approximate coordinates of the site are 38.031694°N, -84.511683°W.

1.1 Summary of Findings

Solid Ground conducted a total of nine (9) soil test borings at the site, located at various points of interest within the limits of the proposed new addition. The borings were drilled along the existing grade.

Soil overburden generally consisted of a layer of topsoil underlain by either fill material or natural soils generally described as lean clay to refusal depths. The borings encountered auger refusal at depths ranging from 5.6 to 10.5 feet.

All nine (9) of the borings had rock coring performed at auger refusal elevation encountering slightly to moderately weathered limestone interbedded with shale.

2.0 Project Information

2.1 Purpose and Scope of Services

The purpose of this subsurface exploration was to prepare recommendations for design and construction of foundations and concrete slabs for the proposed parking garage. Our scope of work included the following:

- Conducted a desktop review of the site's conditions and historical use.
- Completed field reconnaissance and laid out the site for drilling and coring operations.
- Drilled soil and cored rock in nine (9) soil test borings.
- Completed laboratory analysis of soil and rock core samples.
- Written a geotechnical report discussing the following topics:
    a. A discussion of site surface conditions.

b. A discussion of subsurface conditions encountered as well as a discussion of the published geologic conditions at the site.

c. A summary of field and laboratory testing results including a brief review our test procedures.

d. Boring logs and laboratory tests will be summarized in the report and included in the appendices.

e. A discussion of specific geotechnical conditions and concerns which may affect the design or construction of the project.

f. Recommendations for site preparation and construction of compacted fills.

g. Recommended general design and construction criteria for the project foundations.

h. Recommendations for design and construction of below grade walls and/or retaining walls.

i. A recommendation for seismic site class according to International Building Code which was adopted by the 2018 Kentucky Building Code (KBC).

2.2 Project Description

Project information was provided by Walker Consultants through a Request for Proposal (RFP) dated October 25, 2021, and by email correspondence since. We understand that the proposed structure is to be a seven-story concrete and structural steel parking garage and office expansion. Currently the Finished Floor Elevation is unknown. We further understand that the structural design portion of the project is ongoing and awaiting final geotechnical parameters to complete the rock bearing foundation design. Anticipated maximum column service loads range from 700 to 2,600 kips.

The approximate addition area is depicted below in Figure 1.

Figure 1: Approximate Site Location

2.3 Site Conditions

Solid Ground personnel visited the site throughout the geotechnical investigation to observe existing conditions, to help interpret the subsurface data, and to detect conditions which could affect recommendations.

The site is located just west of South Limestone, Lexington, Fayette County, Kentucky. The property is currently occupied and serves as an open green space. There is currently a rainwater runoff trench running from the southeast corner of the property to the central western portion of the property. There also is currently an access road providing entry and exit to the adjacent existing parking garage.

2.4 Site Grading and Topography

The finished floor elevation (FFE) is not currently known. However, we assume the addition will match the FFE of the existing parking structure to the east. The existing green space has approximately 10 feet in elevation difference across the site, running from the outer perimeter towards the center. We understand that the site is currently at a grade that collects surrounding surface runoff.

3.0 Subsurface Findings and Encountered Conditions

3.1 Review of Previous Site Development and Historical Information

Based on review of topographic maps provided by the United States Geological Survey (USGS) and historical imagery provided by Google Earth, it appears that the site has undergone typical urbanization changes in recent years. The site was residential until the construction of the existing parking garage around 2006, at which time the area where the addition will be located has been left as a green space. Figure 2 shows the site topographical area. Figures 3-5 show select historical views.

Figure 2: 2019 USGS Topographic Map of Lexington West Quadrangle

Figure 3: 1993 Google Earth Imagery

Figure 4: 2006 Google Earth Imagery

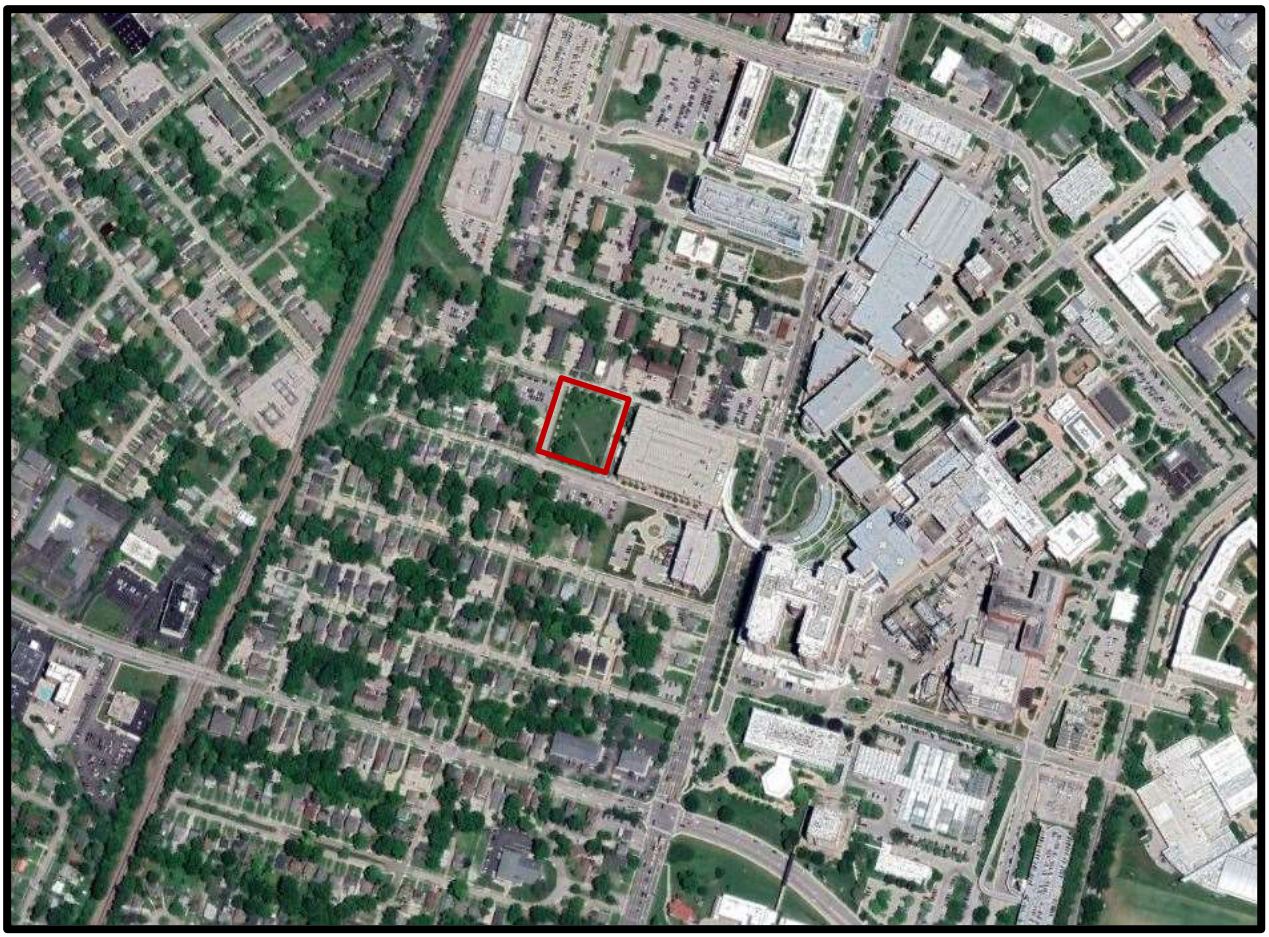
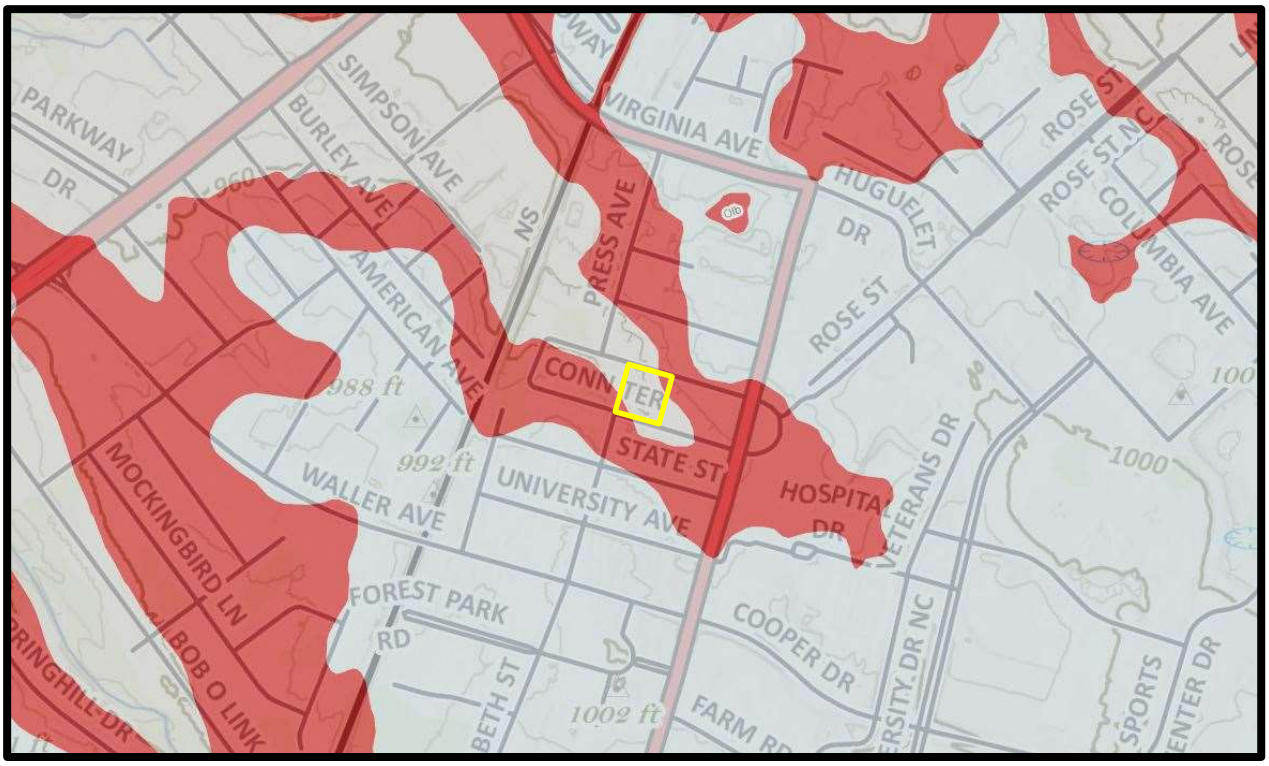


Figure 5: 2021 Google Earth Imagery

3.2 Published Geologic Information

Geologic information was referenced from the Kentucky Geological Survey (KGS), geologic maps of the Lexington West Quadrangle, Fayette County, Kentucky. At the site there is a meeting of bedrock units underlying the site mapped as the Brannon Member and Lower part of Lexington Limestone. Locally, the limestone is described as microgranular and argillaceous, sometimes containing chert nodules interbedded with shale, Lower to Middle Ordovician in age. Figure 6 shows the geological map of the site along with details of the map legend.



Ollr

Lower part of Lexington Limestone
This geologic unit is a part of:
Informal Part of Lexington Limestone
(Lower Ordovician - Middle Ordovician)

USGS Unit Info: *GEOLEX (id: Lexington 2452)*

Mapped or described as these unit(s) on the original GQ:

CANE RUN BED
USGS Unit Info: not available
Primary Lithology: Limestone
Description: Limestone, light-gray to light-brownish-gray, microgranular, argillaceous; in part silty; dense limestone nodules and boulders in convolute beds, locally. Chert as nodules and thin beds in upper few feet diagnostic lithologic feature. Top of unit is chert marker bed. Unit interfingers with and grades into lower part of Tanglewood Limestone Member.

Olb

Brannon Member
This geologic unit is a part of:
Member of Upper part of Lexington Limestone
Informal Part of Lexington Limestone
(Lower Ordovician - Middle Ordovician)

USGS Unit Info: *GEOLEX (id: Brannon 605)*

Mapped or described as these unit(s) on the original GQ:

BRANNON MEMBER
USGS Unit Info: *GEOLEX (id: Brannon 605)*
Primary Lithology: Limestone and shale
Description: Limestone and shale: Limestone, light-gray to light-brownish-gray, microgranular, argillaceous; in part silty with thin beds of medium-dark-gray shale; interbeds of clastic limestone locally present; convolute bedding and flow rolls are common in thicker beds, as along New Circle Road at Frankfort Pike, and along railroad cut beneath Virginia Street overpass; chert occurs as thin beds and as nodules; thin beds of swelling bentonite locally occur near base; springs occur at top, but are more common near contact with underlying bioclastic and granular phosphatic limestones. Weathers to a yellowish clayey soil containing abundant porcelaneous chert and siltstone fragments. Unit thins and pinches out northeastward.

Figure 6: KGS Geologic Mapping

The KGS maps for karst potential and for closed depressions were reviewed. The KGS mapping indicates that the underlying rock units are of intense karst potential with mapped sinkholes near the project vicinity (Figure 7). If karst features are encountered during earthwork operations, Solid Ground should be contacted to provide recommendations for the repair.

Figure 7: KGS Karst Potential Mapping

3.3 Subsurface Exploration Program

Solid Ground conducted a total of nine (9) soil test borings at the site, located at various points of interest around the property. The borings had rock coring performed at auger refusal into bedrock. Borings were located as close to the proposed development as site topography and underground utility conditions allowed.

Boring surface elevations were measured in the field by Solid Ground using Carlson GPS Equipment. Therefore, the boring locations and surface elevations should be considered approximate. It should be noted that the subsurface conditions will vary between borings and the representative profile is based upon the number of borings drilled during the field operations. Boring locations are shown in Figure below.

Figure 8: Approximate Boring Locations

3.4 Subsurface Conditions

The soil samples were visually classified by Solid Ground personnel according to the Unified Soil Classification System (USCS, ASTM D2487). A description of each soil layer as follows.

Surficial Materials – The borings encountered a surficial layer of topsoil (3 to 7 inches). It should be noted that thicknesses of these materials may vary across the site. The thicknesses presented in this report should be considered approximate.

Fill Material - The borings, with exception of Boring B-1, generally encountered a layer of undocumented fill material underlying the surficial materials described as Lean Clay sometimes containing rock and coal fragments, and organic material. The Standard

Penetration Test (SPT) N-values ranged from 4 to 36 blows per foot before encountering natural soils. An Expansion Index was performed on a soil sample and the results were of "Very Low" potential for expansion.

Natural Soils – The borings encountered natural soils either from below the surficial layer or below the undocumented fill material to auger refusal depths. The natural soils are described as Lean Clay. The Standard Penetration Test (SPT) N-values ranged from 3 to 50 blows per foot before encountering refusal with consistencies of soft to hard. An Expansion Index was performed on a soil sample and the results were of "Very Low" potential for expansion.

Auger Refusal – The borings encountered auger refusal at depths ranging from 5.6 to 10.5 feet. Auger refusal is defined as rock-like refusal to auger advancement. Coring was performed once auger refusal was encountered.

Bedrock – All of the borings had rock coring performed at auger refusal. Slightly to moderately weathered limestone, sometimes interbedded with shale seams were encountered. The bedrock samples had recoveries of 83% to 100% and rock quality designations of 5% to 87%, indicating very poor to good rock quality.

Detailed descriptions and strength characteristics are included on the rock core logs in Appendix A.

Groundwater – Groundwater (potentially active groundwater, surface water, or a combination thereof) was encountered within the borings at depths ranging between 1.5 and 8.0 feet. Free groundwater levels fluctuate with seasonal weather conditions and may vary. Therefore, the borings may not be representative of the actual free water levels, especially in view of the area's current use as a detention area. To achieve an accurate measurement of free groundwater levels, water wells or piezometers should be installed.

Solid Ground should be contacted if groundwater is encountered during construction. Please note, the groundwater table can fluctuate significantly which could have an impact on the subsurface soils. The following table summarizes our findings.

Table 1 – Summary of Borings

Boring Number	Approximate Surface Elevation (ft)*	Auger Refusal Depth (ft) *	Auger Refusal Elevation (ft) *	Total Coring Length (ft)	Depth to Groundwater (ft)
B-1	967.9	5.6	962.3	25.0	6.9
B-2	960.8	10.5	950.3	35.5	7.0
B-3	957.6	9.1	948.5	26.5	5.0
B-4	962.0	10.4	951.6	25.5	7.0
B-5	957.5	8.2	949.3	28.5	3.5
B-6	959.9	10.5	949.4	25.5	1.5
B-7	958.9	8.6	950.3	23.5	8.0
B-8	962.0	7.5	954.5	24.5	3.5
B-9	963.4	8.3	955.1	23.5	5.0

**Estimated Surface Elevations and Approximate Refusal Depths*

4.0 Geotechnical Concerns and Construction Considerations

Based on the results of the subsurface exploration and past experience with similar projects, we believe the project site is generally suitable for the proposed development. However, some concerns exist with the subsurface conditions as discussed below.

4.1 Topsoil

Based on the information gathered from the soil borings, the site has a surficial layer of topsoil. These thicknesses varied and are representative of conditions encountered at the boring locations only, thickness and aerial extent of the strata may vary across the site. Construction plans should adequately address stripping and the disposal of these materials prior to earthwork operations.

4.2 Construction in Cut/Fill Areas

Cut areas have the potential to be overcut, disturbing the in-situ soils to depths below proposed finished grade. Areas to receive fill are stripped of topsoil and are also sometimes disturbed to depths deeper than intended. Both cut and fill areas shall be proof rolled prior to construction taking place. Soft, loose, or wet areas shall be identified and remediated in

accordance with the recommendations provided in the "5.1 Earthwork" section of this report.

4.3 Underground Utilities

The location of all underground utilities within the proposed development area is unknown. Construction plans should include provisions for complete removal of utility lines encountered during the site grading.

4.4 Construction During Wet Conditions

Based on our conversations it is understood that potential development could occur during wet conditions. Based on experience with construction projects during wet conditions, subgrade remediation is often required. In addition, delays of earthwork/foundation operations should be anticipated. This is due to the groundwater encountered and the poor condition of the upper bedrock stratum.

As this project is anticipated to be of fast pace, with construction potentially occurring during wet conditions, we anticipate remediation may be required. We recommend contracting Solid Ground to observe construction special inspections.

4.5 Site and Foundation Drainage

Surface and ground water should be controlled during and after construction operations. In addition, it is recommended that foundation concrete, or a concrete bearing medium, be placed the same day that foundation excavation is performed.

The final grade should be sloped away from the structure and pavements a minimum of two percent to promote positive drainage. Roof drains and foundation drains should be installed and should discharge surface runoff away from the structure to provide positive site drainage. It should be noted that drainage should be designed and constructed without impacting neighboring properties. Drainage design is beyond our scope of work.

It is imperative that dewatering be maintained during construction and after development. If positive dewatering methods are not continually applied and maintained, there is potential of decreasing the service life of the structure.

We understand that there is possibility to utilize underground detention storage underneath the parking garage. The design and implementation of this underground detention should

refer to sections 4.8 and especially 4.9 of this report. Any seepage of the underground detention through the soils could cause potential sinkhole development and other negative impacts associated with Karst. Design of slabs and structural elements over the underground detention should be conducted with care to the reduced structural bearing over the underground detention. Design of underground detention is not included in this report; however, Solid Ground should review all plans and specifications regarding underground detention for conformance with geotechnical recommendations.

4.6 Soil Compaction Equipment

The soil compaction equipment should be selected by the type of fill anticipated for the site. We anticipate utilizing a sheepsfoot roller at this site.

4.7 Lean Clay Material

As previously mentioned, the site soils are lean clay. Past experience has shown that lean clay soils are prone to degradation during wet periods of the year and/or under heavy traffic. Surface and ground water should be controlled while the subgrade soils are exposed and use only enough compactive effort to achieve stability and job site requirements for compaction.

4.8 Shallow Rock Excavation

We do anticipate rock excavation to occur within the foundation, slab on grade, underground utilities depending upon the FFE. Construction plans should address the method of rock removal and the amount (if any) of rock to be hauled off the site or utilized as fill. In addition, construction plans should adequately address underground utilities as recommended in this report. We do anticipate a much slower process of pneumatic hammer in this geology that should be accounted for by the contractor.

4.9 Development within a Karst Region

Solution activity in areas underlain by limestone generally results from a slow process of dissolving the underlying rock units by surface runoff or rainwater. Sinkholes at the ground surface are caused from either a general raveling failure within the soil unit or by rock collapse. Either phenomenon typically result in depressions at the ground surface, which, if large enough, can be identified on topographic maps. In addition to the natural causes of sinkhole development previously discussed, sinkholes may form as a result from water

leaking from subsurface piping and drainage systems such as buried water and sewer pipes, septic lateral fields, and roof drains beneath the building and floor slabs.

As previously stated, the Kentucky Geological Survey rates the site with an intense potential for karst development. It is not possible to remove all of the risk associated with construction over known sinkholes or in sinkhole-prone, karst areas. Our experience indicates that the limestone formations mapped underlying the site pose a high risk for solution activity and sinkhole formation. The natural rising and lowering of the ground water table and surface water migration downward through the subsurface soils can create the risk of continued soil migration into solution voids in the underlying limestone.

There is potential for sinkholes to be encountered during construction, especially in the drilled shafts and cut areas. Solid Ground should be contacted if a solution feature or other karst features are encountered during construction. Repair methods of sinkholes and other karst features exist. When sinkholes are encountered, the common practice is to excavate the soil from within the solution feature down to hard bedrock. The two most common methods of remediation are a concrete plug or an inverted filter.

We believe the risk with this development is no greater than for similar developments in the area. To further reduce the risk of unidentified sinkholes at the site would require the implementation of more sophisticated and expensive geotechnical exploration methods including test pits on a tightly spaced grid or geophysical methods.

4.10 Vibration of Construction Equipment

It is recommended that the vibration impact from the construction be considered and addressed. It is highly recommended to contract a third party to perform pre and post construction observations and monitoring of nearby and adjacent structures. Solid Ground can perform this service.

4.11 Stable Excavation Bottoms and Drainage

Dewatering will be required during mass excavation and throughout the construction process. Please refer to Section 5.6 for additional dewatering discussion. It is recommended that the excavation bottoms consist of competent limestone bedrock. If clay seams greater in thickness and at depths different than those encountered during our exploration are encountered during mass excavation, we should be contacted. Drainage design is beyond our scope of work.

4.12 Temporary Shoring of Excavation

Due to the existing roadway infrastructure located on all sides of the site and the anticipated bottom deck FFE, temporary shoring may be required. Construction plans should adequately address this potential. It is strongly recommended that the structural engineer and specialty structural engineer of record or contractor take into consideration and provide a design that accommodates this concern.

The earthwork contractors should be cautioned that vertical and near vertical cuts in granular materials and limestone with shale and clay seams, may be prone to raveling and potentially more significant caving failure. The contractor should take appropriate precautions to shore the proposed mass excavation.

Shoring and bracing should be provided in accordance with all applicable local, state, and federal safety regulations, including the current OSHA excavation and trench safety standards. The design and construction of any temporary or permanent shoring or dewatering is the responsibility of the contractor and is beyond the scope of this exploration. Due to the severely weathered bedrock, it may be recommended to design the permanent shoring as soil located behind the walls with potential of active groundwater. Please refer to Section 5.6 for additional dewatering discussion. The constructions plans should address the potential of undermining of the existing roadways and hardscapes.

4.13 Design Progress and Discussion

It is recommended to contract Solid Ground as the Geotechnical Engineer of Record to continue to provide services during the design phase and construction phase. We do anticipate anomalies, such as Karst, groundwater and clay seams, to be encountered during construction. In addition, there is a possibility that dewatering methods will prove to be difficult. Please refer to Section 5.6 for additional dewatering discussion.

4.14 Clay Seams for Bedrock Bearing Drilled Shafts

Thick clay seams were observed in the cores in the upper 15 feet of bedrock. The bedrock is considered severely weathered in the upper 15 feet. It is recommended to perform air test holes or coring at the bottom of each drilled shaft as per the recommendations set in this report. Solid Ground should observe each test hole location. This will allow us to better determine shaft termination depths and potentially reduce shaft length. It should be noted that if clay seams are encountered with larger magnitudes of composite thickness or closer

to the bearing elevation, the foundation excavation may have to be over-excavated to penetrate that material. This may require temporary shoring or casing.

4.15 Mass Rock Excavation

Excavation of the limestone bedrock in confined areas will require ripping tools and pneumatic hammers. The speed and ease of excavation will depend on the type of equipment, the skill of the equipment operators and the geologic structure of the material itself, such as the direction of bedding, planes of weakness, and spacing between discontinuities. We do anticipate a much slower process of pneumatic hammer in this geology that should be accounted for by the contractor.

4.16 Corrosion

Based on past experience corrosion is a concern for parking structures due to chemicals used during roadway treatments during winter. Corrosion should be taken into consideration during design.

4.17 Groundwater

Groundwater levels of 1.5 feet to 8.0 feet below existing grade are considered to be potentially an active groundwater table and surface runoff water from the sites current use as a detention area. Please refer to Section 5.6 of this report for further details, recommendations and methods for dewatering.

Please note, a detailed groundwater study and analysis is beyond the scope of our work. If an underground detention system is planned it should account for the existing groundwater and the future stormwater due to the increased impervious surface.

4.18 Undocumented Fill

The borings generally encountered undocumented fill to depths of approximately 1.5 to 6.5 feet. Undocumented fill is frequently heterogeneous in composition and consistency and can contain pockets of soft, loose, organic or otherwise deleterious materials. Structures sited on such materials are at risk of damages due to differential settlement under typical loading conditions. It should be noted that the encountered fill could extend to greater depths than encountered in our limited geotechnical study.

If the structure is founded on footings bearing within the uncontrolled fill material, there is a risk that foundation and/or slab settlement may occur. This could potentially cause differential settlement of the footings or cracking in the floor slab of the building.

5.0 Recommendations

The following recommendations are based on the information gathered and subsurface conditions encountered during this exploration. Based on our understanding of the project we do not anticipate fill operations. However, we are providing these recommendations if fill is required.

It is recommended to retain Solid Ground to perform construction materials testing and special inspections for the duration of construction to both maintain speed of construction and overall project costs.

5.1 Earthwork

5.1.1 Site Preparation

- Topsoil materials should be stripped to prepare the site for construction.
  - The stripping should extend a minimum of five feet outside of the pavement and building areas.
- After stripping and cutting operations, **the subgrade should be evaluated by Solid Ground by proof rolling methods with a fully loaded dump truck.**
  - *Possible remediation methods may be required if the subgrade and site soils are exposed to wet weather conditions.*

5.1.2 Structural Fill Placement

Backfill materials for structural fill placement may consist of soil or durable crushed stone. The following steps are recommended for fill placement within the building pad. **The onsite soils are expected to meet the requirements for structural fill.**

Structural fill material, if required, is defined as the following:

- Inorganic natural soil with maximum particle sizes of 3 inches.
- Plasticity Index of no greater than 35 percent.

- Solid Ground should observe to ensure the soils meet applicable standards for structural fill.
- Other sources of structural fill should be verified by Solid Ground.
    - If other sources of structural fill are anticipating, Solid Ground should collect a bulk sample for Standard Proctor testing.

The following are recommendations for placement of soil structural fill:

- Structural fill should be placed in no greater than 8-inch-thick layers.
- Structural fill should be compacted to at least 98 percent of the soil's maximum dry density as determined by the Standard Proctor Compaction test (ASTM D698).
- The moisture content of the fill material should be maintained within 2 percent (above or below) of its Standard Proctor optimum moisture content depending on the results of the Proctor tests.
- In-place density testing should be performed as a check that the previously recommended compaction criteria have been achieved.
- Fill placement should be monitored on a full-time basis by Solid Ground during site grading.
- Fill placement should extend to a minimum of 5 feet beyond the building footprint on a 1:1 (H:V) slope.
- Trench or confined backfill should be placed in no greater than 6-inch-thick layers due to smaller compaction equipment.

Solid Ground should be contacted if any unexpected subsurface conditions are encountered during earthwork construction. It is important that Solid Ground observe earthwork construction.

5.2 Foundations

5.2.1 Foundation Recommendations – Drilled Shafts

Due to the heavy anticipated loads (1,000 kips or greater) and the severely to slightly weathered bedrock, we recommend utilizing a deep foundation system for the parking structure, such as drilled shafts (caissons), to bear upon competent bedrock. The deep foundation system can be designed for the anticipated heavier loads, seismic lateral loads and utilize friction and end bearing on bedrock material. Conventional shallow foundations and/or shallower drilled shafts bearing on severely weathered bedrock may be considered

for areas that aren't as heavily loaded. It should be noted that we recommend neglecting the soil overburden above bedrock from frictional capacity.

Our foundation bearing and friction recommendation is based on the following:

- The compressive strength of the bedrock at selected samples and depths
  - Compressive Strength Results ranged from 6,151 psi to 13,071 psi with the majority over 10,000 psi.
- Rock Mass Rating System
  - Quantified as Fair and Poor-Quality Rock Mass
  - "M" Constant of 0.128 and 0.029
  - "S" Constant of 0.00009 and 0.000003
- Geological Strength Index (GSI) System
  - Quantified as Fair and Poor Surface Conditions and Blocky/Disturbed/Seamy Structure
  - GSI numbers ranging from 27.5 to 55
- FHWA friction capacities
- Subsurface conditions encountered consisting of severely to slightly weathered limestone bedrock with some clay seams and interbedded shale
- Anticipated loading information
- Information gathered during this exploration and the proposed development

Competent Bedrock Bearing Recommendations (All loads consisting of 1,000 kips or greater should utilize this recommendation)

We recommend the use of a maximum net allowable **competent bedrock** bearing pressure of 85,000 PSF (pounds per square foot) for foundations utilizing drilled shafts. Competent bedrock for end bearing, for the provided net allowable bearing capacity, is located approximately 25 feet below the current surface elevation (See Solid Ground Report #22-434, dated 12-30-22 for shaft specific bearing depths). We highly recommend that each drilled shaft have specific air test holes or coring performed to better determine bedrock capacity elevations for each shaft. It should be noted that each drilled shaft should have a minimum rock socket depth of 1D (D being the Diameter of the Drilled Shaft). For the heavier loaded shafts, the minimum rock socket depth is easily achieved if each shaft is drilled 15 feet through highly weathered bedrock. We recommend that a 10 feet test hole or rock core be observed at each shaft once bottom of shaft elevation is achieved.

This allowable bearing pressure is based on the assumption that the bearing material for each drilled shaft will be observed and approved by the geotechnical engineer of record. A net allowable skin friction of 2,000 PSF is available for rock socket capacity considerations. **However, the end-bearing should be at least 65 percent of the total design capacity.** Total and differential settlements of foundations bearing on continuous limestone, using the recommended bearing pressure, should be about 1 inch or less. Once the design is finalized, we recommend allowing us the opportunity to review the plans and specifications.

Table 2 – Generalized Design Parameters for Competent Bedrock

Top of Competent Bedrock, Approximate Elevation	Bedrock Description	Net Allowable Skin Friction, PSF	Net Allowable Bearing Capacity, PSF	Lateral Bearing Capacity, PSF/ft
Approximately 25 feet below current surface elevation	Gray Limestone with Shale partings	2,000	85,000	400

Severely Weathered Bedrock Bearing Recommendations

We recommend the use of a maximum net allowable bearing pressure of 25,000 PSF (pounds per square foot) for foundations utilizing drilled shafts or conventional shallow continuous or spread footings bearing on **severely weathered bedrock.** This allowable bearing pressure is based on the assumption that the bearing material for each drilled shaft and/or conventional shallow spread or continuous footings will be observed and approved by the geotechnical engineer of record. A net allowable skin friction of 1,500 PSF is available for rock socket capacity considerations within the weathered bedrock strata. The upper 2 feet of weathered bedrock should be ignored for skin friction. T**he end-bearing should be at least 65 percent of the total design capacity.** Due to the voids and clay seams encountered at potential bearing depth, we recommend a minimum rock socket for all drilled shafts or conventional shallow continuous footings utilizing bearing within the upper severely weathered bedrock to be a minimum of 1 feet. We recommend that a 5 feet test hole or rock core be utilized at each shaft and a 5 feet test hole at every 30 feet on center for continuous footings. Total and differential settlements of foundations bearing on continuous limestone,

using the recommended bearing pressure, should be about 1 inch or less. Once the design is finalized, we recommend allowing us the opportunity to review the plans and specifications.

Table 3 – Generalized Design Parameters for Severely Weathered Bedrock

Top of Severely Weathered Bedrock, Approximate Elevation	Bedrock Description	Net Allowable Skin Friction, PSF	Net Allowable Bearing Capacity, PSF	Lateral Bearing Capacity, PSF/ft	Recommended Minimum Bedrock Socket (ft)
Approximately 10 feet below current surface elevation	Severely Weathered Gray Limestone with Shale partings	1,500	25,000	300	1

General Construction Considerations for Heavy and Lightly Loaded Areas

As the drilled shafts are anticipated to bear upon limestone bedrock, the drilled shafts should be placed the same day that they are open or no later than 12 hours after opening. Shafts remaining open longer than 12 hours may be required to be over-excavated 1 additional vertical foot deeper into the bedrock due to the severely weathered limestone with clay seams encountered. It should be noted that if the rock socket of the shafts appears to be degraded prior to the 12 hours after opening, an additional 1 vertical feet of over-excavation will be required. It should be noted that it is imperative to place concrete the same day as of the excavation to ensure the bearing is protected from wet weather that could potentially cause degradation of the limestone.

Construction Considerations (Dry Method)

- Clean the foundation bearing area so it is nearly level or suitably benched and is free of ponded water or loose material.
- Provide a minimum drilled shaft diameter of 36 inches to reasonably enter the drilled shaft excavation for cleaning, bottom preparation and inspection. If the drilled shaft is less than 36 inches an air test hole can be performed either with

an air track rig or by coring to observe the end bearing conditions at each drilled shaft.

- Make provisions for ground water removal from the drilled shaft excavation. Ground water conditions at this site will require the use of special procedures to achieve a satisfactory foundation installation.
    - If water is flowing into the drilled shaft at less than 20 gallons per minute, pumps may be used to maintain less than 2 inches of water in the drilled shaft during cleaning and inspection. After approval of the bearing surface, the pumps should be pulled and concreting commenced immediately.
    - If more than 20 gallons per minute are flowing into the drilled hole, the water level should be allowed to stabilize before attempting to place the concrete. For this condition, concrete placement should be accomplished using a tremie pipe or concrete pumping equipment.
    - Please refer to Section 5.6 for additional dewatering discussion.
- Specify concrete slumps ranging from 4 to 7 inches for the drilled shaft construction.
- Retain the Solid Ground to observe foundation excavations after the bottom of the hole is leveled, cleaned of any mud, and dewatered.
- Install a temporary protective steel casing to prevent side wall collapse, prevent excessive mud and water intrusion, and to allow workers to safely enter, clean and inspect the drilled shaft.
- Clean the socket "face" prior to concrete placements. Cleaning will require hand cleaning or washing if a mud smear forms on the face of the rock. Solid Ground should approve the rock socket surface prior to concrete placement.
- The protective steel casing may be extracted as the concrete is placed provided a sufficient head of concrete is maintained inside the steel casing to prevent soil or water intrusion into the newly placed concrete.
- Direct the concrete placement into the drilled hole through a centering chute to reduce side flow or segregation.
- Solid Ground recommends a 30 percent concrete overage allowance for seams and cracks in surrounding bedrock.

Construction Considerations (Slurry Method)

- Provide a temporary steel casing to prevent side wall collapse, above the ground water level.
- Prior to drilling, install the temporary steel casing to a minimum depth of 10 feet below the expected ground water level using driving techniques.
- Use a bentonite slurry suspension to support the uncased portion of the drilled shaft.
- Circulate or agitate the bentonite slurry to prevent silt- and sand-sized particles from settling of the suspension prior to concreting.
- Pump or tremie the concrete to the bottom of the driller shaft. If a tremie is used, place a plug in the tremie pipe to reduce exposure of the concrete to water.
- Use a concrete mix with a design slump of 5 to 7 inches for drilled shaft concrete.
- Extract the temporary steel casing as the concrete is placed. Maintain a positive head of concrete above the casing bottom as the casing is extracted.
- The protective steel casing may be extracted as the concrete is placed provided a sufficient head of concrete is maintained inside the steel casing to prevent soil or water intrusion into the newly placed concrete.
- Overfill the drilled shaft with concrete to aide in wasting drilled shaft concrete contaminated by exposure to the slurry solution and suspended sediment. We recommend that project planning include a minimum of 25 percent concrete waste. The actual quantity of contaminated concrete removed from the drilled shaft should be governed by site observations of the geotechnical engineer monitoring the drilled shaft installation.
- Solid Ground recommends a 30 percent concrete overage allowance for seams and cracks in surrounding bedrock.

Rock Excavation

Our borings encountered varying depth to refusal and weathered rock conditions. Our experience with the underlying bedrock formation indicates the rock will be severely weathered. Typically, an average depth of rock removal of ½ to 2 shaft diameters should be

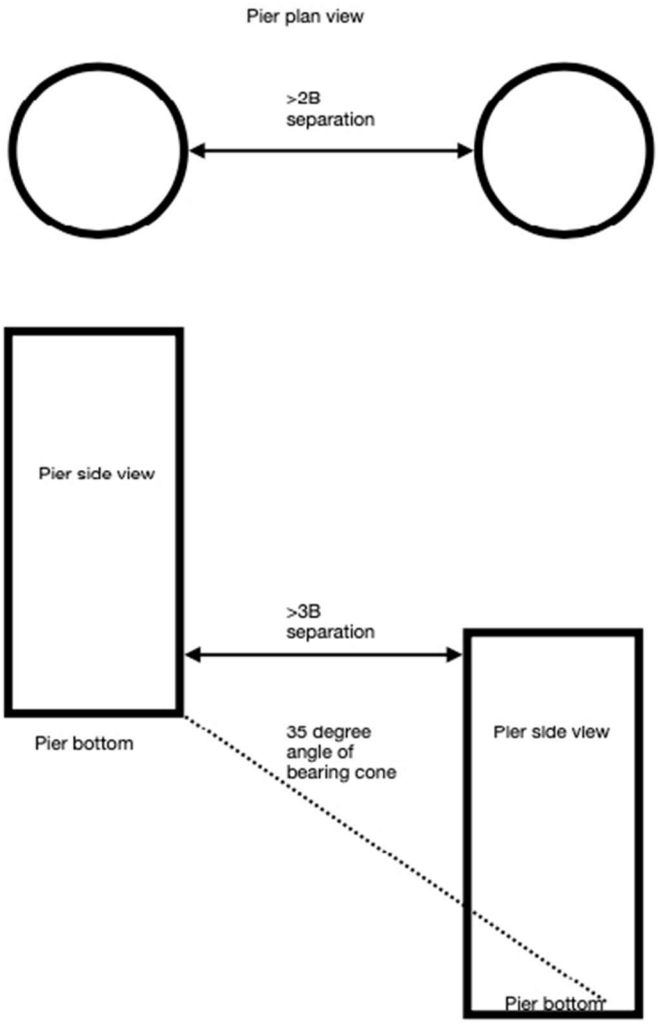
anticipated to provide a level bottom and rock suitable to achieve the allowable bearing pressure provided our elevations for end bearing are met.

Our experience indicates general drilled shaft construction and delineation of "rock" in the excavation is greatly facilitated if suitable drilling equipment is used. We recommend the use of a drill capable of producing at least 500,000 inch·pounds of torque and 35,000 pounds of downward force. Additionally, we recommend that rock be defined as material which cannot be penetrated by a heavy-duty earth auger with hardened teeth at a rate in excess of 3 inches per minute. For mass rock removal, the cores encountered shale seams and clay seams. **We anticipate dampen hoe-ramming efforts and slow down hoe-ramming production. This should be accounted for by the contractor during rock removal.**

Spacing Requirements

Due to the Karst geological setting and fractured bedrock encountered, we recommend a minimum center-to-center pile spacing of 2D pile diameters. This restriction is necessary to limit surface heave, to enhance the bearing efficiency of the individual piles, and to reduce the possibility of damaging previously installed piles. In addition, we recommend no shaft bottoms can intersect a cone of rupture (35-45 degrees from bottom for fractured limestone such is in the cores) of another shaft bottom within 3B. Please refer to the following Diagram.

Diagram 1



Quality Control Requirements

Each drilled shaft should be excavated to appropriate bearing medium as outlined in this section and be inspected by Solid Ground personnel. We recommend that all drilled shaft locations to be pre-drilled using air test or coring methods to remove the need for costly and time-consuming down hole inspections. Drilled shafts with diameters of 36 inches or greater are large enough to allow a down-hole inspection of the bearing conditions. Solid Ground personnel performing inspections can determine in the field if the shaft is on appropriate bearing material or if the shaft need to be excavated deeper. As stated, for heavier loads (1,000 kips or greater) we recommend either rock coring or a 1½-inch-diameter, 10 feet

long probe holes into the exposed limestone rock at column locations. For lighter loads (less than 1,000 kips) we recommend a 1½-inch-diameter, 5 feet long probe holes into the exposed limestone rock at column locations and at 30 feet on center at continuous footings. These probe holes are usually drilled with a pneumatic percussion drill. The geotechnical engineer will evaluate the condition of the bearing material using a hooked feeler rod.

We recommend that the drilled shaft construction be observed by Solid Ground. The observation should address the following items:

- Correct plan dimensions
- Plumbness within tolerances
- Materials excavated agree with borings
- Statement of bottom cleanliness
- Construction procedure

Discussion with Design Team for Drilled Shafts

Due to the complexity and heavy loads anticipated for this structure we recommend that the structural engineer provide a detailed foundation loading condition per shaft and re-evaluate recommendations per loading per shaft prior to issuing final plans for submittal. There is a possibility that the re-evaluation could have cost savings to the owner.

Drilled Shaft – LPile Analysis

An LPile Analysis was performed on five of the loading conditions, with differing lateral loads, shaft sizes, and embedment depths into limestone bedrock. Lateral deflection, bending moment, and shear force were calculated for the nine shaft sizes requested (30, 36, 42, 48, 54, 60, 66, 72, and 78 inch) on the five column loading conditions. Appendix D has both full reports from our subcontractor with assumptions and charts. If conditions differ from those provided and/or assumed, Solid Ground recommends that additional analysis be performed for additional negotiated compensation.

5.2.2 Foundation Recommendations - Shallow Spread Footings (Lightly Loaded less than 25 kips and isolated from structure)

The in-situ soils are marginal for support of the lightly loaded structure foundations. It should be expected that the foundation bearing elevation may need to be extended to up to 5 feet below finished grade for sufficient bearing strength and to penetrate the fill material and bear upon natural soils.

It is recommended that foundations bear on stiff or better natural soils or engineered fill. **We recommend the use of a maximum net allowable bearing pressure of 1,500 psf (pounds per square foot) for foundations bearing on these materials.**

A detailed settlement analysis was beyond the scope of this report. Based on the assumed structural loads, the available site grading information, the recommended bearing pressure, knowledge of the site's development and empirical correlation for the subsurface conditions encountered beneath the proposed structure, we estimate the total settlements of the foundation to be about one inch or less. Differential settlements are estimated to be about ½ inch or less.

Once the design is finalized, we recommend allowing Solid Ground the opportunity to review the plans and specifications.

Construction Considerations

The following construction considerations are recommended:

- **The foundations utilizing soils as bearing should be isolated from the structure to decrease settlement issues.**
- **All foundations should bear on suitable natural soils or a bearing medium such as lean concrete or graded stone (suitable bearing medium).**
- **We anticipate some cave in during the foundation excavations. Construction plans should adequately plan for the additional haul off, as well as the additional quantity of concrete. It is recommended to place concrete soon after excavations are completed to limit the cave in potential. If cave in does occur, the material should be removed prior to placement of lean concrete. Solid Ground should observe this remediation.**

- Perform Dynamic Cone Penetrometer (DCP) testing within each isolated footing and continuous footing location to confirm recommendations for bearing capacity. It should be anticipated that some of the footing bearing depths may need to be deepened up to 5 feet below finished grade.
- Column footings and strip footings should be at least 24 inches wide and 12 inches thick.

- **All exterior footing bottoms should be at least 24 inches below the lowest adjacent exterior grade** for protection against frost penetration.
- Clean the foundation bearing area so it is nearly level and is free of ponded water and loose material.
- Dewatering methods will be necessary if the foundation excavation takes place during wet weather.
- Solid Ground should be on site while the foundation construction is performed.

5.3 Slab-on-Grade

We assume that the slab-on-grade will be utilized for light loads of 150 pounds per square foot maximum within the office and associated areas. The majority of the ground supported slabs will consist of concrete paving. If this assumption is incorrect, Solid Ground should be contacted to modify recommendations.

- It should be noted that if the site soils are exposed to wet weather conditions or continuous construction traffic, the soils have potential to degrade and will lose their strength. This could require a more robust subgrade improvement design.
- We anticipate that some subgrade remediation will be required due to construction means and methods.
- It is imperative that dewatering be continuous and construction traffic be controlled to limit damage to the subgrade.
- It should be noted that the means and methods of construction that will be performed by others will heavily dictate the suitability and sustainability of the site conditions and building service life during and after construction**.**

The following recommendations should be followed:

- Solid Ground should observe the finished subgrade once grading is completed. If excessive pumping and/or rutting is observed remediation may be required. Typical remediation methods consist of undercutting the unsuitable soil and placing recompacted soil or granular material.
- If construction is to take place during wet periods of the year, there is a potential that remediation methods will be required to stabilize the soil subgrade. Solid Ground should be consulted to assist in selecting the method most appropriate for site conditions. These methods may consist of any or combination of the following:
    - Tensar geogrid reinforcement.
    - "Walking" No. 2 stone into the soft subgrade.

- Application of compacted DGA.

- It is imperative that quality control be performed specifically for the slab-on-grade to ensure that moisture contents, as well as compaction efforts, are within optimum.
- It is recommended that the floor slab be constructed with an open graded stone base of a minimum of **6 inches** in thickness. The floor slab should be constructed with a minimum of **4 inches** of reinforced concrete.
- A subgrade modulus, *k,* of 80 pounds per cubic inch (pci) for design of the floor slab supported by granular material.
- Control joints should be placed per the most recent ACI standards and guidance.
- The floor slab should be fully ground-supported. This will reduce the possibility of cracking and displacement of the floor slab due to differential settlement.

It is recommended to perform proof rolling prior to placing stone to serve as the slab working base, and again immediately prior to constructing the slab.

5.4 Seismic Site Classification

As requested, a shear wave velocity analysis was conducted using Refraction Microtremor (ReMi) that provides a simplified subsurface velocity characterization. Using this method, we performed the following:

- Field data was collected using seismic refraction equipment with geophone arrays. With appropriate spacing, we determined the vertical shear waves velocity layers to approximately 100 feet in depth.
- Soil/rock contacts and contrasts between stronger and weaker geologic material layers were interpreted from the collected data.
- Two (2) survey runs were completed at the site within the planned footprint of the proposed parking garage.
- The below equation was used to calculate the soil/rock shear wave velocity (v_s method) for IBC Site Classification.

$$\overline{v}_s = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} d_i / v_{si}}$$

d_i = The thickness of any layer between 0 and 100 feet
v_{si} = The shear wave velocity in feet per second

Table 4 shows the average shear wave velocity data obtained during the field survey along each run and Table 5 indicates the IBC 2018 basis for classification.

Table 4 – Survey Results

Run	Soil/Rock Shear Wave Velocity, v_s, (ft/s)
1	3016
2	2839
Average	**2928**

Table 5 – Site Classification Definition

Site Classification	Soil/Rock Profile Name	Soil/Rock Shear Wave Velocity, vs, (ft/s)
A	Hard Rock	$v_s > 5{,}000$
B	Rock	$2{,}500 < v_s < 5{,}000$
C	Very Dense Soil and Soft Rock	$1{,}200 < v_s < 2{,}500$
D	Stiff Soil	$600 < v_s < 1{,}200$
E	Soft Soil	$v_s < 600$

The IBC 2018 guidelines allow for the site seismic classifications to be determined through an average of the shear wave velocities for the upper 100 feet of strata. The average shear wave velocity for this site is 2,928 ft/s which qualifies the site for a Seismic Site Classification of "B". The IBC guidelines state that a Seismic Site Classification B can only be used when the soil thickness cannot exceed 10 feet between the rock surface and the bottom of concrete. **With the understanding the foundations will bear into limestone bedrock, we recommend a Seismic Site Classification of "B".**

5.5 Below Grade Walls

Based on our understanding of the project, we are currently unsure of the approximate depth of bedrock and clay seams which will be removed to achieve the finished grade elevation. However, based on our knowledge of the project, below grade walls may be required.

Equivalent Fluid Pressures (EFP)

We do not recommend undrained conditions. If undrained conditions are deemed to be designed, we should be contacted to provide additional recommendation. The following table presents EFP for at-rest, passive and active conditions. For the drainage granular backfill, these values assume that a "full" wedge of the material is present behind the wall. The wedge is defined as 2 feet from the base of the wall to a 1:2 (H:V) slope upward. It should be noted that surcharge loads generated by construction equipment and adjacent structures and infrastructure must also be considered in the design. In addition, a factor of safety should also be included as part of the design. Both the factor of safety and surcharge loads are not accounted for in the scope of this study. A coefficient of friction between limestone bedrock and concrete of 0.45 can be utilized and a coefficient of friction between clay soil and concrete of 0.30 can be utilized.

We are assuming the majority of the retaining walls are heavily loaded (greater than 1,000 kips) and will be supported by the drilled shafts. It is recommended that the below grade wall foundations utilize foundation recommendations as detailed in our report in Section 5.2. However, some of the retaining walls are lightly loaded (less than 5 kips) and will be soil supported. The soil supported retaining walls should bear on stiff or better in-situ clay or engineered fill. **We recommend the use of a maximum net allowable bearing pressure of 1,500 PSF (pounds per square foot) for shallow foundations bearing on stiff or better in-situ clay or engineered fill.**

Table 6 – Equivalent Fluid Pressures

Equivalent Fluid Pressures			
Backfill material	At Rest (PCF)	Active (PCF)	Passive (PCF)
	Drained Condition	Drained Condition	Drained Condition
Anticipated Bedrock w/ Clay Seams sloping towards the wall* (Φ = 28◦)	63	43	331
Anticipated Bedrock w/ Well Graded Gravel sloping towards the wall* (Φ = 38◦)	45	26	460
Anticipated Sand sloping towards the Underground Detention wall* (Φ = 33◦)	53	34	395

Free Drainage Granular Material

A free drainage backfill material should preferably be "GW" as classified by the USCS, so that it will be free draining and exhibit an angle of shear resistance of 38 degrees or more. The material should have less than 3 percent passing the No. 200 sieve and less than 30 percent passing the No. 40 sieve. The No. 40 sieve material should be non-plastic.

Wall drainage systems should consist of a filtered granular backfill (No. 57 size crushed stone) by use of geotextile fabric. The drainage backfill should extend to within 2 feet of the ground surface. Compacted structural fill should be placed over the drainage backfill to prevent direct surface water inflow.

Compaction within five feet of walls should be accomplished by using hand compaction equipment.

Drainage Requirements

In order to achieve the “drained” condition, an outlet drain at the base of the wall in conjunction with a collector pipe that drains the water away from the structure should be constructed. The drains should be filtered and protected against potential erosion. **Please note, we highly recommend drainage behind the wall**. To provide drainage behind the

wall, construct a vertical section of crushed stone or gravel approximately 18 inches wide behind the wall with perforated drainpipe located at the foundation level. The granular wall backfill material should be capped with 12 to 24 inches of low plasticity clay to minimize infiltration of surface water runoff behind below grade walls. As with any drainage system, the built-up water will need to be conveyed from behind the wall through a gravity drain or sump pump system. Please refer to Section 5.6 for additional dewatering discussion.

It should be noted that groundwater dewatering methods will require a more extensive and robust wall to accommodate hydrostatic pressure in conjunction with a permanent drainage system.

If drained conditions cannot be achieved, we should be contacted immediately to provide additional recommendations.

5.6 Groundwater Management

The borings encountered groundwater at varying shallow depths. It appears that the water consists of both surface runoff and potentially an active groundwater table. We recommend that three (3) piezometer wells be installed now to accurately measure the groundwater.

For now, our assumption is that there is an active groundwater table based on the information collected during our site visit. Therefore, dewatering mechanism for both during construction and post construction should be designed and planned for. The extent of the permanent and temporary dewatering methods can be more accurately determined by the information found from the piezometer readings. A hydrologist can be contacted to provide additional expertise so that the civil engineer can design dewatering methods accordingly that provide positive dewatering of the site during and after construction. **If dewatering design, analysis and construction means and methods are not applied, then Solid Ground should be immediately contacted to revise our recommendations.**

5.7 Plan Review

To better assure conformance of the final design documents with the recommendations contained in this report, and to better comply with the building department's requirements, Solid Ground should review the completed project plans prior to construction. The plans should be made available for our review as soon as possible after completion so that we can better assist in keeping your project schedule on track.

We recommend that the following project-specific note be added to the architectural, structural, and civil plans: "The geotechnical aspects of the project, including site grading, utility and foundation excavations, slab on grade construction, placement and compaction of engineered fill, installation of site drainage should be performed in accordance with the recommendations of the *"Revised Geotechnical Report prepared by Solid Ground Consulting Engineers, PLLC, dated April 25, 2023."*

5.8 Construction Monitoring and Observations

Based on past experience, in order to obtain the Certificate of Occupancy for this development, you will be required to directly contract a qualified and certified inspection firm to provide special inspection items consisting of observing the following:

- Foundation Construction
- Concrete Placement
- Reinforcement Placement
- Masonry Construction
- Steel Construction

It is advantageous to the owner to contract with Solid Ground to provide construction monitoring and observations for this project. Some of those benefits are as follows:

- As the Geotechnical Engineer of Record (GEoR) for this project, we will provide confirmation that subsurface conditions exposed during construction are substantially the same as those interpolated from our limited subsurface exploration, on which the analysis and design were based.
- The recommendations in this report are based on limited subsurface information. The nature and extent of variation across the site may not become evident until construction. If variations are then exposed, it will be necessary to re-evaluate our recommendations. In the event that subsurface conditions differ from those anticipated, we as the GEoR will provide recommendations if deemed necessary.

6.0 Report Limitations

This report has been prepared for the exclusive use of Mr. Scott Bowles for specific application to the project site. Our recommendations have been prepared using generally accepted standards of geotechnical engineering practice in the Commonwealth of Kentucky. No other warranty is expressed or implied.

The recommendations provided are based on the subsurface information and other findings obtained by Solid Ground as well as information provided by you. If there are revisions to the plans for this project or if subsurface conditions detailed in this report are encountered during construction that are different than our exploration, we should be notified immediately to modify the foundation recommendations if deemed necessary. We cannot be held responsible for the impact of those conditions on the project if those impacts are not made known to us.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic materials. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

7.0 Associated Geotechnical Risks

The analytical tools which are used by the geotechnical engineer in this area are generally empirical and must be used in conjunction with professional engineering judgment and experience. Therefore, the recommendations presented in this geotechnical exploration should not be considered risk-free and are not a guarantee that the proposed structure will perform as planned. The engineering recommendations presented in this are based on the information gathered during the subsurface exploration, information provided by you and past experience with similar projects.

APPENDICES

APPENDIX A – SOIL BORING LOGS

APPENDIX B – ROCK CORE LOGS

APPENDIX C – LABORATORY RESULTS

APPENDIX D – L-PILE ANALYSIS

APPENDIX C – LABORATORY RESULTS

Compressive Strength Results of Bedrock

Boring Number	Approximate Elevation of Boring (ft.)	Approximate Elevation of Rock Core Sample (ft.)	Compressive Strength Results (psi)
B-1	967.9	957.2	11,294
B-4	962.0	945.5	6,151
B-5	957.5	934.9	11,830
B-6	959.9	928.6	13,071
B-9	963.4	933.4	10,464

BORING B-1

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 1: 5.6-15.6 FEET

- RECOVERY = 93%
- RQD = 54%

0.0-5.6: SOIL OVERBURDEN
5.6-6.0: MEDIUM GRAY, SLIGHTLY WEATHERED LIMESTONE WITH INTERBEDDED CLAY, AS BELOW
6.0-6.4: STIFF YELLOW/BROWN CLAY, MOIST
6.4-7.6: DARK GRAY, SLIGHTLY WEATHERED LIMESTONE
7.6-10.0: DARK GRAY, MODERATELY WEATHERED LIMESTONE, CLOSELY FRACTURED
10.0-15.6: DARK GRAY, FRESH LIMESTONE, MEDIUM TO CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-1

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 2: 15.6-25.6 FEET

- RECOVERY = 100%
- RQD = 51%

15.6-16.2: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED, FOSSILIFEROUS LIMESTONE, VERY CLOSELY FRACTURED

16.2-16.5: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED, FOSSILIFEROUS LIMESTONE, CLOSELY FRACTURED

16.5-16.6: LIGHT GRAY, WEATHERED BENTONITE

16.6-18.2: MEDIUM TO DARK GRAY, FRESH LIMESTONE, MODERATELY FRACTURED, INTERBEDDED LIMEY SHALE

18.2-19.0: DARK TO VERY DARK GRAY SHALE, THICKLY INTERBEDDED DARK GRAY LIMESTONE, FEW FOSSILS

19.1-20.4: DRAK GRAY LIMEY SHALE, INTERBEDDED MEDIUM GRAY LIMESTONE, MODERATELY FRACTURED, FEW FOSSILS

20.4-22.6: MEDIUM GRAY LIMESTONE, CLOSELY FRACTURED, TRACE DARK GRAY SHALE

22.6-25.6: LIGHT TO MEDIUM GRAY, FRESH, COARSE-GRAINED LIMESTONE, CLOSELY FRACTURED, FEW SHALE PARTINGS

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-1

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 5.0 FEET

RUN 3: 25.6-31.6 FEET

- RECOVERY = 83%
- RQD = 33%

25.6-31.6: LIGHT TO MEDIUM GRAY, FRESH, COARSE-GRAINED LIMESTONE, CLOSELY FRACTURED, FEW SHALE PARTINGS

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-2

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 5.5 FEET

RUN 1: 10.5-16.0 FEET

- RECOVERY = 98%
- RQD = 55%

0.0-10.5: SOIL OVERBURDEN
10.5-12.3: MEDIUM GRAY, SLIGHTLY WEATHERED LIMESTONE, CLOSELY FRACTURED
12.3-13.2: MEDIUM GRAY, MODERATELY WEATHERED LIMESTONE AND LIMEY SHALE, CLOSELY FRACTURED
13.2-15.3: MEDIUM GRAY, SLIGHTLY WEATHERED LIMESTONE, CLOSELY TO MEDIUM FRACTURED
15.3-15.5: MEDIUM GRAY, HIGHLY WEATHERED LIMESTONE, VERY CLOSELY FRACTURED, FINE GRAINED
15.5-16.0: MEDIUM GRAY, SLIGHTLY WEATHERED LIMESTONE, VERY CLOSELY FRACTURED, COARSE GRAINED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-2

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 2: 16.0-26.0 FEET

- RECOVERY = 100%
- RQD = 5%

16.0-23.2: MEDIUM TO DARK GRAY, MODERATELY WEATHERED LIMESTONE, CLOSELY TO VERY CLOSELY FRACTURED

23.2-23.9: MEDIUM GRAY, SLIGHTLY WEATHERED LIMESTONE, NO FRACTURING

23.9-26.0: MEDIUM TO DARK GRAY, MODERATELY WEATHERED LIMESTONE, CLOSELY TO VERY CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-2

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 3: 26.0-36.0 FEET

- RECOVERY = 100%
- RQD = 17%

26.0-28.1: MEDIUM TO DARK GRAY, MODERATELY WEATHERED LIMESTONE AND LIMEY SHALE, CLOSELY FRACTURED

28.1-28.6: DARK GRAY, SLIGHTLY WEATHERED SHALE, INTERBEDDED LIMESTONE, CLOSELY FRACTURED

28.6-36.0: MEDIUM TO DARK GRAY, MODERATELY WEATHERED LIMESTONE, INTERBEDDED SHALE, MEDIUM TO CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-2

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 4: 36.0-46.0 FEET

- RECOVERY = 98%
- RQD = 85%

36.0-46.0: MEDIUM TO DARK GRAY, MODERATELY WEATHERED LIMESTONE, INTEREBEDDED SHALE, WIDELY TO MEDIUM FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-3

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 6.5 FEET

RUN 1: 9.1-15.6 FEET

- RECOVERY = 100%
- RQD = 62%

0.0-9.1: SOIL OVERBURDEN
9.1-9.5: DARK GRAY, SLIGHTLY WEATHERED, FINE-GRAINED LIMESTONE, INTERBEDDED SHALE
9.5-11.1: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED, FINE GRAINED LIMESTONE AND LIMEY SHALE, MEDIUM TO CLOSELY FRACTURED
11.1-11.7: MEDIUM GRAY, SLIGHTLY WEATHERED LIMESTONE AND SHALE STRINGERS, MEDIUM FRACTURED
11.7-11.8: MEDIUM GRAY, HEAVILY WEATHERED SHALE
11.8-15.6: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, INTERBEDDED SHALE STRINGERS, MEDIUM TO CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-3

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 2: 15.6-25.6 FEET

- RECOVERY = 100%
- RQD = 37%

15.6-18.3: MEDIUM GRAY, SLIGHTLY WEATHERED LIMESTONE, SOME SHALE STRINGERS, MEDIUM TO CLOSELY FRACTURED

18.3-18.4: BROWN/GRAY, MODERATELY WEATHERED SHALE, CLOSELY FRACTURED

18.4-25.6: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, INTERBEDDED SHALE AND SHALE STRINGERS, MEDIUM TO CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-3

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 3: 25.6-35.6 FEET

- RECOVERY = 100%
- RQD = 87%

25.6-35.6: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, INTERBEDDED SHALE AND SHALE STRINGERS, MEDIUM TO CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-4

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 5.5 FEET

RUN 1: 10.4-15.9 FEET

- RECOVERY = 93%
- RQD = 44%

0.0-10.4: SOIL OVERBURDEN

10.4-11.3: DARK GRAY, SLIGHTLY WEATHERED, FINE-GRAINED LIMESTONE AND DARK GRAY SHALE, CLOSELY FRACTURED

11.3-12.2: MEDIUM TO DARK GRAY, FRESH, FINE-GRAINED LIMESTONE, FEW FOSSILS, MODERATELY FRACTURED

12.2-13.7: MEDIUM GRAY LIMESTONE WITH MANY RIP-UP CLASTS AND FEW FOSSILS, THICKLY INTERBEDDED WITH DARK GRAY SHALE

13.7-15.9: LIGHT TO MEDIUM GRAY, MEDIUM GRAINED LIMESTONE, MODERATELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-4

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 2: 15.9-25.9 FEET

- RECOVERY = 100%
- RQD = 63%

15.9-16.8: LIGHT TO MEDIUM GRAY, FINE GRAINED LIMESTONE, MODERATELY FRACTURED, FEW SHALE STRINGERS

16.8-20.8: LIGHT TO MEDIUM GRAY, COARSE GRAINED LIMESTONE, CLOSELY FRACTURED, FEW SHALE STRINGERS

20.8-25.9: LIGHT TO MEDIUM GRAY, COARSE GRAINED LIMESTONE, CLOSELY FRACTURED, MANY SHALE STRINGERS

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-4

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 3: 25.9-35.9 FEET

- RECOVERY = 100%
- RQD = 65%

25.9-28.0: MEDIUM GRAY, COARSE GRAINED LIMESTONE, CLOSELY FRACTURED, THINLY INTERBEDDED WITH SHALE

28.0-28.3: DARK GRAY SHALE AND MEDIUM GRAY LIMESTONE

28.3-30.6: MEDIUM GRAY, COARSE GRAINED LIMESTONE, FEW FOSSILS, INTERBEDDED WITH DARK GRAY SHALE

30.6-35.9: MEDIUM GRAY, COARSE GRAINED LIMESTONE, FEW FOSSILS, SOME RIP-UP CLASTS, INTERBEDDED WITH DARK GRAY SHALE

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-5

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 8.5 FEET

RUN 1: 8.2-16.7 FEET

- RECOVERY = 100%
- RQD = 12%

0.0-8.2: SOIL OVERBURDEN

8.2-11.5: DARK GRAY, SLIGHTLY WEATHERED, FINE-GRAINED LIMESTONE, INTERBEDDED DARK GRAY SHALE, FEW FOSSILS, UNDULATIONS, CLOSELY TO VERY CLOSELY FRACTURED

11.5-16.7: LIGHT TO MEDIUM GRAY, COARSE-GRAINED LIMESTONE, SHALE STRINGERS, FEW FOSSILS, UNDULATIONS

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-5

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 2: 16.7-26.7 FEET

- RECOVERY = 100%
- RQD = 33%

16.7-20.2: LIGHT TO MEDIUM GRAY, COARSE-GRAINED LIMESTONE, SHALE STRINGERS, FEW FOSSILS, UNDULATIONS

20.2-22.1: MEDIUM TO DARK GRAY, COARSE-GRAINED LIMESTONE, SHALE STRINGERS

22.1-23.7: DARK GRAY, MEDIUM GRAINED LIMESTONE, INTERBEDDED DARK GRAY SHALE, SOME FOSSILS

23.7-24.4: DARK GRAY LIMESTONE, NUMEROUS FOSSILS

24.4-26.7: DARK GRAY, FINE-GRAINED LIMESTONE, INTERBEDDED DARK GRAY SHALE, FEW FOSSILS

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-5

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 3: 26.7-36.7 FEET

- RECOVERY = 100%
- RQD = 79%

26.7-36.7: DARK GRAY, FINE-GRAINED LIMESTONE, INTERBEDDED DARK GRAY SHALE, FEW FOSSILS

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-6

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 5.5 FEET

RUN 1: 10.5-16.0 FEET

- RECOVERY = 96%
- RQD = 29%

0.0-10.5: SOIL OVERBURDEN
10.5-11.1: MEDIUM GRAY, FINE-GRAINED LIMESTONE, FOSSILIFEROUS
11.1-11.8: MEDIUM GRAY, MEDIUM GRAINED LIMESTONE, SHALE STRINGER, FEW FOSSILS
11.8-12.0: DARK GRAY, FINE-GRAINED SHALE
12.0-12.4: MEDIUM GRAY LIMESTONE AND DARK GRAY SHALE IN BIOTURBID LAYERS
12.4-12.5: DARK GRAY, FINE-GRAINED LIMESTONE
12.5-12.7: DARK GRAY, FINE-GRAINED SHALE
12.7-13.6: DARK GRAY, FINE-GRAINED LIMESTONE AND VERY DARK GRAY SHALE IN BIOTURBID LAYERS, FOSSILIFEROUS, CLOSELY FRACTURED
13.6-15.6: MEDIUM GRAY, MEDIUM-GRAINED LIMESTONE, SHALE STRINGERS, CLOSELY FRACTURED
15.6-16.0: LIGHT GRAY, COARSE-GRAINED LIMESTONE, NUMEROUS SHALE STRINGERS, CLOSELY TO VERY CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-6

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 2: 16.0-26.0 FEET

- RECOVERY = 100%
- RQD = 32%

16.0-26.0: LIGHT GRAY, COARSE-GRAINED LIMESTONE, NUMEROUS SHALE STRINGERS, CLOSELY TO VERY CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-6

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 3: 26.0-36.0 FEET

- RECOVERY = 100%
- RQD = 69%

26.0-28.3: LIGHT GRAY, COARSE-GRAINED LIMESTONE, NUMEROUS SHALE STRINGERS, CLOSELY TO VERY CLOSELY FRACTURED

28.3-30.2: MEDIUM GRAY, MEDIUM- TO COARSE-GRAINED LIMESTONE, MODERATELY FRACTURED

30.2-36.0: MEDIUM GRAY, MEDIUM GRAINED LIMESTONE, CLOSELY FRACTURED, FEW FOSSILS

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-7

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 7.5 FEET

RUN 1: 8.6-16.1 FEET

- RECOVERY = 95%
- RQD = 49%

0.0-8.6: SOIL OVERBURDEN
8.6-11.0: DARK GRAY, FINE-GRAINED LIMESTONE, NUMEROUS FOSSILS, THIN SHALE LAYERS
11.0-11.1: DARK GRAY, FINE-GRAINED SHALE
11.1-12.1: DARK GRAY LIMESTONE WITH INTERBEDDED DARK GRAY SHALE
12.1-14.3: MEDIUM GRAY, MEDIUM-GRAINED FOSSILIFEROUS LIMESTONE, SHALE STRINGERS,
14.3-16.1: LIGHT GRAY, COARSE-GRAINED LIMESTONE, SHALE STRINGERS

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-7

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 2: 16.1-26.1 FEET

- RECOVERY = 100%
- RQD = 52%

16.1-22.2: LIGHT GRAY, COARSE-GRAINED LIMESTONE, SHALE STRINGERS
22.2-23.4: MEDIUM GRAY, COARSE-GRAINED LIMESTONE
23.4-23.7: DARK GRAY SHALE, DARK GRAY LIMESTONE, BLACK CHERT NODULE
23.7-25.6: MEDIUM GRAY, COARSE-GRAINED LIMESTONE
25.6-26.1: DARK GRAY, FINE-GRAINED LIMESTONE

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-7

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 6.0 FEET

RUN 3: 26.1-32.1 FEET

- RECOVERY = 100%
- RQD = 62%

26.1-26.3: DARK GRAY, FINE-GRAINED LIMESTONE
26.3-27.6: DARK GRAY SHALE, MEDIUM GRAY LIMESTONE
27.6-32.1: MEDIUM GRAY, MEDIUM-GRAINED LIMESTONE, SHALE LAYERS

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-8

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 6.7 FEET

RUN 1: 7.5-14.2 FEET

- RECOVERY = 85%
- RQD = 28%

0.0-7.5: SOIL OVERBURDEN
7.5-12.7: DARK GRAY, MODERATELY WEATHERED LIMESTONE, INTERBEDDED SHALE, MEDIUM TO VERY CLOSELY FRACTURED
12.7-12.8: DARK GRAY BENTONITE
12.8-14.2: DARK GRAY, MODERATELY WEATHERED LIMESTONE, INTERBEDDED SHALE, MEDIUM TO VERY CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-8

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 2.8 FEET

RUN 2: 14.2-17.0 FEET

- RECOVERY = 100%
- RQD = 29%

14.2-15.0: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, INTERBEDDED SHALE, MEDIUM TO CLOSELY FRACTURED

15.0-15.2: DARK GRAY, HIGHLY WEATHERED SHALE

15.2-17.0: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, INTERBEDDED SHALE, MEDIUM TO CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-8

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 3: 17.0-27.0 FEET

- RECOVERY = 100%
- RQD = 59%

17.0-18.3: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, INTERBEDDED SHALE, MEDIUM TO CLOSELY FRACTURED

18.3-27.0: MEDIUM GRAY, SLIGHTLY WEATHERED LIMESTONE, SHALE STRINGERS, MEDIUM TO CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-8

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 5.0 FEET

RUN 4: 27.0-32.0 FEET

- RECOVERY = 100%
- RQD = 72%

27.0-32.0: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, INTERBEDDED SHALE, MEDIUM TO CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-9

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 8.5 FEET

RUN 1: 8.3-16.8 FEET

- RECOVERY = 93%
- RQD = 68%

0.0-8.3: SOIL OVERBURDEN
8.3-9.3: DARK GRAY, MODERATELY WEATHERED, FINE-GRAINED LIMESTONE, MEDIUM FRACTURED, FOSSILIFEROUS
9.3-9.6: DARK BROWN/GRAY, MODERATELY WEATHERED SHALE
9.6-11.6: DARK GRAY, MODERATELY WEATHERED, FINE-GRAINED LIMESTONE, MEDIUM FRACTURED, FOSSILIFEROUS
11.6-11.9: STIFF BROWN CLAY, MOIST
11.9-13.6: DARK GRAY, MODERATELY WEATHERED, FINE-GRAINED LIMESTONE, MEDIUM FRACTURED, FOSSILIFEROUS
13.6-13.8: DARK GRAY, HIGHLY WEATHERED SHALE
13.8-16.0: DARK GRAY, MODERATELY WEATHERED, FINE-GRAINED LIMESTONE, MEDIUM FRACTURED, FOSSILIFEROUS
16.0-16.8: MEDIUM GRAY, SLIGHTLY WEATHERED LIMESTONE, MEDIUM TO CLOSELY FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-9

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 10.0 FEET

RUN 2: 16.8-26.8 FEET

- RECOVERY = 100%
- RQD = 82%

16.8-17.6: DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, INTERBEDDED SHALE, MEDIUM FRACTURED

17.6-17.8: DARK GRAY, HIGHLY WEATHERED LIMESTONE, VERY CLOSELY FRACTURED

17.8-20.4: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, INTERBEDDED SHALE, MEDIUM FRACTURED

20.4-26.8: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, SHALE STRINGERS, MEDIUM TO CLOSE FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

BORING B-9

TOP OF ROCK CORE IN UPPER RIGHT CORNER

CORE RUN – 5.0 FEET

RUN 3: 26.8-31.8 FEET

- RECOVERY = 100%
- RQD = 72%

26.8-31.8: MEDIUM TO DARK GRAY, SLIGHTLY WEATHERED LIMESTONE, SHALE STRINGERS, MEDIUM TO CLOSE FRACTURED

BOTTOM OF ROCK CORE IN LOWER LEFT CORNER

Project Number: 21-426	Boring Log B-1	SOLID GROUND CONSULTING ENGINEERS, PLLC Engineering Innovation; Providing Solutions to Your Challenges.
Project Name: UK PS8		

Weather: Clear	Date: November 16, 2021	*Approximate Surface Elevation:	967.9 feet
Location of Boring: As Mapped	Drill Rig: Lonestar LST1G+HAD		
Auger Size: 3.25 ID	Method: Hollow Stem Auger	Hammer Type: Automatic	
Groundwater Prior to Drilling : -- After Drilling: 6.9' ▼	Engineer: Aaron B. Davis, PE	Driller: Horn & Associates, Inc.	

*Approximate Surface Elevation (ft.)	*Approximate Depth from existing grade (ft.)	Material Description	Symbol	Sample Depth (ft)	Sample Type	Blows per 6 inch increment	SPT "N" Value	Recovery (inches)	Atterberg Limits	Moisture Content (%)	Percent Fines	Unconfined Compressive Strength (PSI)
967.9	0.0	Topsoil (5 inches)		0.0	SPT	3, 7, 7,	14					
966.9	1.0	STIFF brown, silty LEAN CLAY (CL), rock fragments, moist										
966.4	1.5			1.5	SPT	6 6 4	10					
965.4	2.5	FIRM to STIFF brown/tan, silty LEAN CLAY (CL), trace sand seams, moist										
964.9	3.0											
963.9	4.0			4.0	SPT	4, 7, 7,	14					
962.9	5.0											
962.3	5.6											
		Auger Refusal at 5.6' Begin Coring		**Run**		**Recovery**	**RQD**					
962.3	5.6	medium gray, slightly weathered LIMESTONE, interbedded clay, as below		5.6-	RC	93	54					
961.9	6.0			15.6								
961.9	6.0	yellow/brown clay, trace sand, moist										
961.5	6.4											
961.5	6.4 ▼	dark gray, slightly weathered LIMESTONE										
960.3	7.6											
960.3	7.6	dark gray, moderately weathered LIMESTONE, closely fractured										
960.3	8.5											
959.4	10.0											
957.9	10.0	dark gray, fresh LIMESTONE, medium to closely fractured										
957.9	12.0											11,294
955.9	14.0											
953.9	15.6											
952.3	15.6	medium to dark gray, slightly weathered, fossiliferous LIMESTONE, very closely fractured		15.6-	RC	100	51					
952.3	16.2			25.6								
951.7	16.2	medium to dark gray, slightly weathered, fossiliferous LIMESTONE, closely fractured										
951.4	16.5											
951.4	16.5	light gray, weathered BENTONITE										
951.3	16.6											
951.3	16.6	medium to dark gray, fresh LIMESTONE, moderately fragtured, interbedded limey shale										
949.7	18.2											
949.7	18.2	dark to very dark gray SHALE, interbedded limestone, few fossils										
948.9	19.0											
948.9	19.0	dark gray, limey SHALE, interbedded limstone, moderately fractured, few fossils										
947.5	20.4											
947.5	20.4	medium gray LIMESTONE, closely fractured, trace shale										
945.3	22.6											
945.3	22.6	light to medium gray, fresh, coarse grained LIMESTONE, closely fractured, few shale partings										
943.9	24.0											
942.9	25.0											
942.3	25.6			25.6-	RC	83	33					
939.9	28.0			31.6								
937.9	30.0											
936.3	31.6											
935.9	32.0	**Coring Terminated at 31.6'**										
934.9	33.0											

Boring Logs are for informational purposes only.
Boring includes conditions observed during the site visit and for this particular location.
Soil was visually classified in the field.
***Depths are considered approximate.**

Project Number: 21-426	Boring Log B-2	SOLID GROUND CONSULTING ENGINEERS, PLLC Engineering Innovation; Providing Solutions to Your Challenges.
Project Name: UK PS8		

Weather: Clear | **Date:** November 15, 2021 | ***Approximate Surface Elevation:** 960.8 feet

Location of Boring: As Mapped | **Drill Rig:** Lonestar LST1G+HAD

Auger Size: 3.25 ID | **Method:** Hollow Stem Auger | **Hammer Type:** Automatic

Groundwater Prior to Drilling : -- **After Drilling:** 7.0' ▼ | **Engineer:** Aaron B. Davis, PE | **Driller:** Horn & Associates, Inc.

*Approximate Surface Elevation (ft.)	*Approximate Depth from existing grade (ft.)	Material Description	Symbol	Sample Depth (ft)	Sample Type	Blows per 6 inch increment	SPT "N" Value	Recovery (inches)	Atterberg Limits	Moisture Content (%)	Percent Fines	Unconfined Compressive Strength (PSI)
960.8	0.0	Topsoil (5 inches)		0.0	SPT	2, 6, 7,	13					
959.8	1.0	FILL: STIFF brown, clayey SILT (ML), topsoil, rock fragments, moist										
959.3	1.5			1.5	SPT	4 6 6	12					
958.3	2.5	FILL: STIFF brown, clayey SILT (ML), trace and seams, rock fragments, moist										
957.8	3.0											
956.8	4.0	SOFT to FIRM brown/tan, silty LEAN CLAY (CL), rock fragments, trace sand seams, moist		4.0	SPT	2, 2, 2,	4					
955.8	5.0											
955.3	5.5											
954.8	6.0											
954.3	6.5			6.5	SPT	2 2 5	7					
953.8	7.0 ▼											
952.8	8.0											
951.8	9.0	VERY STIFF brown/tan, silty LEAN CLAY (CL), rock fragments, moist		9.0	SPT	5, 7, 50,	50					
950.8	10.0											
950.3	10.5											
		Auger Refusal at 10.5' Begin Coring										
				Run		**Recovery**	**RQD**					
950.3	10.5	medium gray, slightly weathered LIMESTONE, closely fractured		10.5-16.0	RC	98	55					
948.5	12.3											
948.5	12.3	medium gray, moderately weathered LIMESTONE and limey shale, closely fractured										
947.6	13.2											
947.6	13.2	medium gray, slightly weathered LIMESTONE, closely to medium fractured										
945.5	15.3											
945.5	15.3	medium gray, highly weathered LIMESTONE, very closely fractured, fine grained										
945.3	15.5											
945.3	15.5	medium gray, slightly weathered LIMESTONE, very closely fractured, coarse grained										
944.8	16.0											
944.8	16.0	medium to dark gray, moderately weathered LIMESTONE, closely to very closely fractured		16.0-26.0	RC	100	5					
942.8	18.0											
940.8	20.0											
938.8	22.0											
937.6	23.2											
937.6	23.2	medium gray, slightly weathered LIMESTONE, no fracturing										
936.9	23.9											
936.9	23.9	medium to dark gray, moderately weathered LIMESTONE, closely to very closely fractured										
934.8	26.0											
934.8	26.0	medium to dark gray, moderately weathered LIMESTONE and limey shale, closely fractured		26.0-36.0	RC	100	17					
932.7	28.1											
932.7	28.1	dark gray, slightly weathered SHALE, interbedded limestone, closely fractured										
932.2	28.6											
932.2	28.6	medium to dark gray, moderately weathered LIMESTONE, interbedded shale, medium to closely fractured										
930.8	30.0											
928.8	32.0											
926.8	34.0											
924.8	36.0											
924.8	36.0	medium to dark gray, moderately weathered LIMESTONE, interbedded shale, widely to medium fractured		36.0-46.0	RC	98	85					
922.8	38.0											
920.8	40.0											
918.8	42.0											
916.8	44.0											
914.8	46.0											
913.8	47.0	**Coring Terminated at 46.0'**										
912.8	48.0											

Boring Logs are for informational purposes only.
Boring includes conditions observed during the site visit and for this particular location.
Soil was visually classified in the field.
***Depths are considered approximate.**

Project Number: 21-426	Boring Log B-3	SOLID GROUND CONSULTING ENGINEERS, PLLC Engineering Innovation; Providing Solutions to Your Challenges.
Project Name: UK PS8		

Weather: Clear | **Date:** November 15, 2021 | ***Approximate Surface Elevation:** 957.6 feet

Location of Boring: As Mapped | **Drill Rig:** Lonestar LST1G+HAD

Auger Size: 3.25 ID | **Method:** Hollow Stem Auger | **Hammer Type:** Automatic

Groundwater Prior to Drilling : -- **After Drilling:** 5.0' ▼ | **Engineer:** Aaron B. Davis, PE | **Driller:** Horn & Associates, Inc.

*Approximate Surface Elevation (ft.)	*Approximate Depth from existing grade (ft.)	Material Description	Symbol	Sample Depth (ft)	Sample Type	Blows per 6 inch increment	SPT "N" Value	Recovery (inches)	Atterberg Limits	Moisture Content (%)	Percent Fines	Unconfined Compressive Strength (PSI)
957.6	0.0	Topsoil (5 inches)		0.0	SPT	2, 4, 5,	9					
956.6	1.0	FILL: FIRM brown, clayey SILT (ML), trace sand seams, rock fragments, topsoil, moist										
956.1	1.5			1.5	SPT	3 3 3	6					
955.1	2.5	FIRM brown, silty LEAN CLAY (CL), trace sand seams, rock fragments, moist										
954.6	3.0											
953.6	4.0			4.0	SPT	2, 3, 3,	6					
952.6	5.0 ▼											
952.1	5.5											
951.6	6.0	FIRM brown, silty LEAN CLAY (CL), trace sand seams, rock fragments, very moist		6.0	SPT	5 6 2	8					
951.1	6.5											
950.6	7.0											
949.6	8.0											
948.5	9.1											
		Auger Refusal at 9.1' Begin Coring		**Run**		**Recovery**	**RQD**					
948.5	9.1	dark gray, slightly weathered, fine-grained LIMESTONE, interbedded shale		9.1-15.6	RC	100	62					
948.1	9.5											
948.1	9.5	medium to dark gray, slightly weathered, fine grained LIMESTONE and limey shale, medium to closely fractured										
946.5	11.1											
946.5	11.1	medium gray, slightly weathered LIMESTONE and shale stringers, medium fractured										
945.9	11.7											
945.9	11.7	medium gray, heavily weathered SHALE										
945.8	11.8											
945.8	11.8	medium to dark gray, slightly weathered LIMESTONE, interbedded shale stringers, medium to closely fractured										
944.6	13.0											
942.0	15.6											
942.0	15.6	medium gray, slightly weathered LIMESTONE, some shale stringers, medium to closely fractured		15.6-25.6	RC	100	37					
939.3	18.3											
939.3	18.3	brown/gray, moderately weathered SHALE, closely fractured										
939.2	18.4											
939.2	18.4	medium to dark gray, slightly weathered LIMESTONE, interbedded shale and shale stringers, medium to closely fractured		25.6-35.6	RC	100	87					
937.6	20.0											
935.6	22.0											
933.6	24.0											
932.6	25.0											
932.0	25.6											
929.6	28.0											
927.6	30.0											
925.6	32.0											
923.6	34.0											
922.0	35.6											
921.6	36.0	Coring Terminated at 35.6'										
920.6	37.0											

Boring Logs are for informational purposes only.
Boring includes conditions observed during the site visit and for this particular location.
Soil was visually classified in the field.
***Depths are considered approximate.**

Project Number: 21-426	Boring Log B-4	SOLID GROUND CONSULTING ENGINEERS, PLLC Engineering Innovation; Providing Solutions to Your Challenges.
Project Name: UK PS8		

Weather: Clear	Date: November 16, 2021	*Approximate Surface Elevation: 962.0 feet
Location of Boring: As Mapped	Drill Rig: Lonestar LST1G+HAD	
Auger Size: 3.25 ID	Method: Hollow Stem Auger	Hammer Type: Automatic
Groundwater Prior to Drilling : -- After Drilling: 7.0' ▼	Engineer: Aaron B. Davis, PE	Driller: Horn & Associates, Inc.

*Approximate Surface Elevation (ft.)	*Approximate Depth from existing grade (ft.)	Material Description	Symbol	Sample Depth (ft)	Sample Type	Blows per 6 inch increment	SPT "N" Value	Recovery (inches)	Atterberg Limits	Moisture Content (%)	Percent Fines	Unconfined Compressive Strength (PSI)
962.0	0.0	Topsoil (5 inches)		0.0	SPT	3, 4, 5,	9					
961.0	1.0	FIRM brown, silty LEAN CLAY (CL), rock fragments, topsoil, moist										
960.5	1.5											
959.5	2.5	SOFT to VERY STIFF brown/tan, silty LEAN CLAY (CL), rock fragments, moist		2.5	SPT	5, 5, 2,	7					
959.0	3.0											
958.0	4.0											
957.0	5.0			5.0	SPT	2 1 2	3					
956.0	6.0											
955.5	6.5 ▼											
954.5	7.5			7.5	SPT	4 5 5	10					
954.0	8.0											
953.0	9.0			9.0	SPT	3 4 50	50					
952.0	10.0											
951.6	10.4											
		Auger Refusal at 10.4' Begin Coring										
				Run		**Recovery**	**RQD**					
951.6	10.4	dark gray, slightly weathered, fine-grained LIMESTONE and dark gray shale, closely fractured		10.4-15.9	RC	93	44					
950.7	11.3											
950.7	11.3	medium to dark gray, fresh, fine-grained LIMESTONE, few fossils, moderately fractured										
949.8	12.2											
949.8	12.2	medium gray LIMESTONE with many rip-up clasts and few fossils, thickly interbedded with dark gray shale										
948.3	13.7											
948.3	13.7	light to medium gray, medium grained LIMESTONE, moderately fractured										
946.1	15.9											
946.1	15.9	light to medium gray, fine grained LIMESTONE, moderately fractured, few shale stringers		15.9-25.9	RC	100	63					
945.2	16.8											
945.2	16.8	light to medium gray, coarse grained LIMESTONE, closely fractured, few shale stringers										6,151
944.0	18.0											
941.2	20.8											
941.2	20.8	light to medium gray, coarse grained LIMESTONE, closely fractured, many shale stringers										
940.0	22.0											
938.0	24.0											
936.1	25.9											
936.1	25.9	medium gray, coarse grained LIMESTONE, closely fractured, thinly interbedded with shale		25.9-35.9	RC	100	65					
934.0	28.0											
934.0	28.0	dark gray SHALE and medium gray limestone										
933.7	28.3											
933.7	28.3	medium gray, coarse grained LIMESTONE, few fossils, interbedded with dark gray shale										
931.4	30.6											
931.4	30.6	medium gray, coarse grained LIMESTONE, few fossils, some rip-up clasts, interbedded with dark gray shale										
930.0	32.0											
928.0	34.0											
926.1	35.9											
926.0	36.0	Coring Terminated at 35.9'										
925.0	37.0											

Boring Logs are for informational purposes only.
Boring includes conditions observed during the site visit and for this particular location.
Soil was visually classified in the field.
***Depths are considered approximate.**

Project Number: 21-426	Boring Log B-5	SOLID GROUND CONSULTING ENGINEERS, PLLC Engineering Innovation; Providing Solutions to Your Challenges.

Project Name: UK PS8

Weather: Clear | **Date: November 16, 2021** | ***Approximate Surface Elevation: 957.5 feet**

Location of Boring: As Mapped | **Drill Rig: Lonestar LST1G+HAD**

Auger Size: 3.25 ID | **Method: Hollow Stem Auger** | **Hammer Type: Automatic**

Groundwater Prior to Drilling : -- After Drilling: 3.5' ▼ | **Engineer: Aaron B. Davis, PE** | **Driller: Horn & Associates, Inc.**

*Approximate Surface Elevation (ft.)	*Approximate Depth from existing grade (ft.)	Material Description	Symbol	Sample Depth (ft)	Sample Type	Blows per 6 inch increment	SPT "N" Value	Recovery (inches)	Atterberg Limits	Moisture Content (%)	Percent Fines	Unconfined Compressive Strength (PSI)
957.5	0.0	Topsoil (5 inches)		0.0	SPT	2, 3, 6,	9					
956.5	1.0	FIRM brown/tan, silty LEAN CLAY (CL), rock fragments, topsoil, moist										
956.0	1.5											
955.5	2.0	FIRM to VERY STIFF brown/tan, silty LEAN CLAY (CL), rock fragments, moist		2.0	SPT	3, 3, 3,	6					
954.5	3.0 ▼											
953.5	4.0											
952.5	5.0			5.0	SPT	4 5 4	9					
951.5	6.0											
951.0	6.5											
950.0	7.5			7.5	SPT	5 50	50					
949.5	8.0											
949.3	8.2											
		Auger Refusal at 8.2' Begin Coring		**Run**		**Recovery**	**RQD**					
949.3	8.2	dark gray, slightly weathered, fine-grained LIMESTONE, interbedded dark gray shale, few fossils, undulations, closely to very closely fractured		8.2-16.7	RC	100	12					
947.5	10.0											
946.0	11.5											
946.0	11.5	light to medium gray, coarse-grained LIMESTONE, shale stringers, few fossils, undulations										
944.5	13.0											
942.5	15.0											
940.8	16.7											
940.8	16.7	light to medium gray, coarse-grained LIMESTONE, shale stringers, few fossils, undulations		16.7-26.7	RC	100	33					
939.5	18.0											
937.3	20.2											
937.3	20.2	medium to dark gray, coarse-grained LIMESTONE, shale stringers										
935.4	22.1											
935.4	22.1	dark gray, medium grained LIMESTONE, interbedded dark gray shale, some fossils										11,830
933.8	23.7											
933.8	23.7	dark gray LIMESTONE, numerous fossils										
933.1	24.4											
933.1	24.4	dark gray, fine-grained LIMESTONE, interbedded dark gray shale, few fossils		26.7-36.7	RC	100	79					
930.8	26.7											
929.5	28.0											
927.5	30.0											
925.5	32.0											
923.5	34.0											
921.5	36.0											
920.8	36.7											
919.5	38.0	**Coring Terminated at 36.7'**										
917.5	40.0											

Boring Logs are for informational purposes only.
Boring includes conditions observed during the site visit and for this particular location.
Soil was visually classified in the field.
***Depths are considered approximate.**

Project Number: 21-426	Boring Log B-6	SOLID GROUND CONSULTING ENGINEERS, PLLC Engineering Innovation; Providing Solutions to Your Challenges.
Project Name: UK PS8		

Weather: Clear | **Date:** November 17, 2021 | ***Approximate Surface Elevation:** 959.9 feet

Location of Boring: As Mapped | **Drill Rig:** Lonestar LST1G+HAD

Auger Size: 3.25 ID | **Method:** Hollow Stem Auger | **Hammer Type:** Automatic

Groundwater Prior to Drilling : -- **After Drilling:** 1.5' ▼ | **Engineer:** Aaron B. Davis, PE | **Driller:** Horn & Associates, Inc.

*Approximate Surface Elevation (ft.)	*Approximate Depth from existing grade (ft.)	Material Description	Symbol	Sample Depth (ft)	Sample Type	Blows per 6 inch increment	SPT "N" Value	Recovery (inches)	Atterberg Limits	Moisture Content (%)	Percent Fines	Unconfined Compressive Strength (PSI)
959.9	0.0	Topsoil (5 inches)		0.0	SPT	4, 9, 9,	18					
958.9	1.0	FILL: VERY STIFF brown, silty LEAN CLAY (CL), rock fragments, topsoil, moist										
958.4	1.5 ▼											
957.4	2.5	FILL: SOFT to VERY STIFF brown/tan, silty LEAN CLAY (CL), rock and concrete fragments, trace sand seams, moist		2.5	SPT	17, 21, 15,	36					
956.9	3.0											
955.9	4.0											
955.4	4.5			4.5	SPT	3 2 2	4					
954.9	5.0											
953.9	6.0											
952.4	7.5	STIFF to VERY STIFF brown/tan, silty LEAN CLAY (CL), trace sand seams, moist		7.5	SPT	3 5 8	13					
951.9	8.0											
950.9	9.0											
950.4	9.5			9.5	SPT	7, 50,	50					
949.9	10.0											
949.4	10.5											
		Auger Refusal at 10.5' Begin Coring		**Run**		**Recovery**	**RQD**					
949.4	10.5	medium gray, fine-grained LIMESTONE, fossiliferous		10.5-16.0	RC	96	29					
948.8	11.1											
948.8	11.1	medium gray, medium grained LIMESTONE, shale stringer, few fossils										
948.1	11.8											
948.1	11.8	dark gray, fine-grained SHALE										
947.9	12.0											
947.9	12.0	medium gray LIMESTONE and dark gray shale in bioturbid layers										
947.5	12.4											
947.5	12.4	dark gray, fine-grained LIMESTONE										
947.4	12.5											
947.4	12.5	dark gray, fine-grained SHALE										
947.2	12.7											
947.2	12.7	dark gray, fine-grained LIMESTONE and very dark gray shale in bioturbid layers, fossiliferous, closely fractured										
946.3	13.6											
946.3	13.6	medium gray, medium-grained LIMESTONE, shale stringers, closely fractured										
944.3	15.6											
944.3	15.6	light gray, coarse-grained LIMESTONE, numerous shale stringers, closely to very closely fractured										
943.9	16.0			16.0-26.0	RC	100	32					
941.9	18.0											
939.9	20.0											
937.9	22.0											
935.9	24.0											
933.9	26.0			26.0-36.0	RC	100	69					
931.6	28.3											
931.6	28.3	medium gray, medium- to coarse-grained LIMESTONE, moderately fractured										
929.7	30.2											
929.7	30.2	medium gray, medium grained LIMESTONE, closely fractured, few fossils										
927.9	32.0											13,071
925.9	34.0											
923.9	36.0											
922.9	37.0	**Coring Terminated at 36.0'**										
921.9	38.0											

Boring Logs are for informational purposes only.
Boring includes conditions observed during the site visit and for this particular location.
Soil was visually classified in the field.
***Depths are considered approximate.**

Project Number: 21-426	Boring Log B-7	SOLID GROUND CONSULTING ENGINEERS, PLLC Engineering Innovation; Providing Solutions to Your Challenges.
Project Name: UK PS8		

Weather: Clear	**Date: November 16, 2021**	***Approximate Surface Elevation:**	**958.9 feet**
Location of Boring: As Mapped	**Drill Rig: Lonestar LST1G+HAD**		
Auger Size: 3.25 ID	**Method: Hollow Stem Auger**	**Hammer Type: Automatic**	
Groundwater Prior to Drilling : -- After Drilling: 8.0' ▼	**Engineer: Aaron B. Davis, PE**	**Driller: Horn & Associates, Inc.**	

*Approximate Surface Elevation (ft.)	*Approximate Depth from existing grade (ft.)	Material Description	Symbol	Sample Depth (ft)	Sample Type	Blows per 6 inch increment	SPT "N" Value	Recovery (inches)	Atterberg Limits	Moisture Content (%)	Percent Fines	Unconfined Compressive Strength (PSI)
958.9	0.0	Topsoil (3 inches)		0.0	SPT	3, 5, 3,	8					
957.9	1.0	FILL: FIRM brown, silty LEAN CLAY (CL), glass and building refuse, moist										
957.4	1.5											
956.9	2.0	FILL: FIRM brown, silty LEAN CLAY (CL), coal fragments, moist		2.0	SPT	2, 3, 4,	7					
955.9	3.0											
954.9	4.0											
954.4	4.5	FIRM brown, silty LEAN CLAY (CL), rock fragments, moist		4.5	SPT	4 4 4	8					
953.9	5.0											
952.9	6.0											
951.9	7.0	VERY STIFF brown/tan, silty LEAN CLAY (CL), moist		7.0	SPT	2 3 50	50					
950.9	8.0 ▼											
950.3	8.6											
		Auger Refusal at 8.6' Begin Coring		**Run**		**Recovery**	**RQD**					
950.3	8.6	dark gray, fine-grained LIMESTONE, numerous fossils, thin shale layers		8.6-16.1	RC	95	49					
948.9	10.0											
947.9	11.0											
947.9	11.0	dark gray, fine-grained SHALE										
947.8	11.1											
947.8	11.1	dark gray LIMESTONE with interbedded dark gray shale										
946.8	12.1											
946.8	12.1	medium gray, medium-grained fossiliferous LIMESTONE, shale stringers										
944.6	14.3											
944.6	14.3	light gray, coarse-grained LIMESTONE, shale stringers										
942.8	16.1											
942.8	16.1	light gray, coarse-grained LIMESTONE, shale stringers		16.1-26.1	RC	100	52					
938.9	20.0											
936.7	22.2											
936.7	22.2	medium gray, coarse-grained LIMESTONE										
935.5	23.4											
935.5	23.4	dark gray shale, dark gray LIMESTONE, black chert nodule										
935.2	23.7											
935.2	23.7	medium gray, coarse-grained LIMESTONE										
933.3	25.6											
933.3	25.6	dark gray, fine-grained LIMESTONE										
932.9	26.0											
932.8	26.1			26.1-32.1	RC	100	62					
932.6	26.3											
932.6	26.3	dark gray SHALE, medium gray limestone										
931.3	27.6											
931.3	27.6	medium gray, medium-grained LIMESTONE, shale layers										
928.9	30.0											
926.8	32.1											
926.9	32.0	**Coring Terminated at 32.1'**										
925.9	33.0											

Boring Logs are for informational purposes only.
Boring includes conditions observed during the site visit and for this particular location.
Soil was visually classified in the field.
***Depths are considered approximate.**

Project Number: 21-426	Boring Log B-8	SOLID GROUND CONSULTING ENGINEERS, PLLC Engineering Innovation; Providing Solutions to Your Challenges.
Project Name: UK PS8		

Weather: Clear | **Date:** November 17, 2021 | ***Approximate Surface Elevation:** 962.0 feet

Location of Boring: As Mapped | **Drill Rig:** Lonestar LST1G+HAD

Auger Size: 3.25 ID | **Method:** Hollow Stem Auger | **Hammer Type:** Automatic

Groundwater Prior to Drilling : -- **After Drilling:** 3.5' ▼ | **Engineer:** Aaron B. Davis, PE | **Driller:** Horn & Associates, Inc.

*Approximate Surface Elevation (ft.)	*Approximate Depth from existing grade (ft.)	Material Description	Symbol	Sample Depth (ft)	Sample Type	Blows per 6 inch increment	SPT "N" Value	Recovery (inches)	Atterberg Limits	Moisture Content (%)	Percent Fines	Unconfined Compressive Strength (PSI)
962.0	0.0	Topsoil (4 inches)		0.0	SPT	3, 7, 7,	14					
961.0	1.0	FILL: VERY STIFF brown/tan, silty LEAN CLAY (CL), topsoil, coal fragments, moist										
960.5	1.5											
959.5	2.5	FILL: FIRM brown/tan, silty LEAN CLAY (CL), coal fragments, moist		2.5	SPT	3, 4, 5,	9					
959.0	3.0 ▼											
958.0	4.0											
957.0	5.0											
956.0	6.0											
955.5	6.5	FIRM brown/tan, silty LEAN CLAY (CL), rock fragments, moist		6.5	SPT	3 4 5	9					
955.0	7.0											
954.5	7.5											
		Auger Refusal at 7.5' Begin Coring		**Run**		**Recovery**	**RQD**					
954.5	7.5	dark gray, moderately weathered LIMESTONE, interbedded shale, medium to very closely fractured		7.5-14.2	RC	85	28					
953.0	9.0											
949.3	12.7											
949.3	12.7	dark gray BENTONITE										
949.2	12.8											
949.2	12.8	dark gray, moderately weathered LIMESTONE, interbedded shale, medium to very closely fractured										
947.8	14.2											
947.8	14.2	medium to dark gray, slightly weathered LIMESTONE, interbedded shale, medium to closely fractured		14.2-17.0	RC	100	29					
947.0	15.0											
947.0	15.0	dark gray, highly weathered SHALE										
946.8	15.2											
946.8	15.2	medium to dark gray, slightly weathered LIMESTONE, interbedded shale, medium to closely fractured										
945.0	17.0			17.0-27.0	RC	100	59					
943.7	18.3											
943.7	18.3	medium gray, slightly weathered LIMESTONE, shale stringers, medium to closely fractured										
942.0	20.0											
940.0	22.0											
938.0	24.0											
936.0	26.0											
935.0	27.0											
935.0	27.0	medium to dark gray, slightly weathered LIMESTONE, interbedded shale, medium to closely fractured		27.0-32.0	RC	100	72					
933.0	29.0											
931.0	31.0											
930.0	32.0											
929.0	33.0	**Coring Terminated at 32.0'**										
928.0	34.0											

Boring Logs are for informational purposes only.
Boring includes conditions observed during the site visit and for this particular location.
Soil was visually classified in the field.
***Depths are considered approximate.**

Project Number: 21-426	Boring Log B-9	SOLID GROUND CONSULTING ENGINEERS, PLLC — Engineering Innovation; Providing Solutions to Your Challenges.
Project Name: UK PS8		

Weather: Clear | **Date:** November 15, 2021 | ***Approximate Surface Elevation:** 963.4 feet

Location of Boring: As Mapped | **Drill Rig:** Lonestar LST1G+HAD

Auger Size: 3.25 ID | **Method:** Hollow Stem Auger | **Hammer Type:** Automatic

Groundwater Prior to Drilling : -- **After Drilling:** 5.0' | **Engineer:** Aaron B. Davis, PE | **Driller:** Horn & Associates, Inc.

*Approximate Surface Elevation (ft.)	*Approximate Depth from existing grade (ft.)	Material Description	Symbol	Sample Depth (ft)	Sample Type	Blows per 6 inch increment	SPT "N" Value	Recovery (inches)	Atterberg Limits	Moisture Content (%)	Percent Fines	Unconfined Compressive Strength (PSI)
963.4	0.0	Topsoil (7 inches)		0.0	SPT	4, 5, 6,	11					
962.4	1.0	STIFF brown, silty LEAN CLAY (CL), topsoil, rock fragments, moist										
961.9	1.5											
960.9	2.5	FIRM to VERY STIFF brown/tan, silty LEAN CLAY (CL), rock fragments, moist		2.5	SPT	4, 5, 5,	10					
960.4	3.0											
959.4	4.0											
958.4	5.0 ▼			5.0	SPT	3 4 7	11					
957.4	6.0											
956.9	6.5											
955.9	7.5			7.5	SPT	7 50	50					
955.4	8.0											
955.1	8.3											
		Auger Refusal at 8.3' Begin Coring		**Run**		**Recovery**	**RQD**					
955.1	8.3	dark gray, moderately weathered, fine-grained LIMESTONE, medium fractured, fossiliferous		8.3-16.8	RC	93	68					
954.1	9.3											
954.1	9.3	dark brown/gray, moderately weathered SHALE										
953.8	9.6											
953.8	9.6	dark gray, moderately weathered, fine-grained LIMESTONE, medium fractured, fossiliferous										
951.8	11.6											
951.8	11.6	stiff brown clay, moist										
951.5	11.9											
951.5	11.9	dark gray, moderately weathered, fine-grained LIMESTONE, medium fractured, fossiliferous										
949.8	13.6											
949.8	13.6	dark gray, highly weathered SHALE										
949.6	13.8											
949.6	13.8	dark gray, moderately weathered, fine-grained LIMESTONE, medium fractured, fossiliferous										
947.4	16.0											
947.4	16.0	medium gray, slightly weathered LIMESTONE, medium to closely fractured										
946.6	16.8											
946.6	16.8	dark gray, slightly weathered LIMESTONE, interbedded shale, medium fractured		16.8-26.8	RC	100	82					
945.8	17.6											
945.8	17.6	dark gray, highly weathered LIMESTONE, very closely fractured										
945.6	17.8											
945.6	17.8	medium to dark gray, slightly weathered LIMESTONE, interbedded shale, medium fractured										
943.0	20.4											
943.0	20.4	medium to dark gray, slightly weathered LIMESTONE, shale stringers, medium to close fractured										
941.4	22.0											
939.4	24.0											
936.6	26.8			26.8-31.8	RC	100	72					
935.4	28.0											
933.4	30.0											10,464
931.6	31.8											
931.4	32.0	**Coring Terminated at 31.8'**										
930.4	33.0											

Boring Logs are for informational purposes only.
Boring includes conditions observed during the site visit and for this particular location.
Soil was visually classified in the field.
***Depths are considered approximate.**

Bhate Geosciences Corporation
Geotechnical, Materials, Environmental Engineers

February 3, 2022

Mr. Tim McClure, Vice President
Solid Ground Consulting Engineers (SGCE)
1419 Lexington Road
Richmond, Kentucky 40475

Subject: Revised Report of LPile Analysis for UK Parking Garage 8 Expansion
Richmond, Kentucky
BHATE Project Number: 122100

Dear Mr. McClure:

Bhate Geosciences Corporation (BHATE) has completed the revised LPile analyses of the subject project in general accordance with our proposal number 3005-21, dated December 22, 2021. The original analyses were revised at the request of Mr. Beck Smith (SGCE) to include an additional 10 feet of moderately stiff clay above the rock. The results of our revised analyses are appended at the end of this report.

1.0 PROJECT INFORMATION

Based on our conversations with Mr. Smith and our limited review of the Project RFP he provided, dated October 25, 2021, we understand the following about the planned development:

- Construction will consist of an expansion of the existing Parking Garage 8 at the University of Kentucky campus. The planned development area would be excavated approximately 10 feet to permit construction below grade.

- Auger refusal on Limestone was generally encountered within ten (10) feet of the existing ground surface.

- Foundations are preliminarily designed to be supported on drilled shafts with approximately 65% of the design load supported through end bearing on the underlying bedrock, and the remaining 35% derived from side resistance. The drilled shafts would be solely designed to be rock supported.

- The following preliminary loading information was provided within the Project RFP:

    - Typical Interior Column – 1,230 kips
    - Typical Interior Girder Column – 2,250 kips
    - Typical Exterior Column – 650 kips

2.0 LPILE INPUT PARAMETERS AND ANALYSIS

The following information was supplied by SGCE and used to perform Lpile analyses of the proposed drilled shafts:

- Drilled shaft diameters: 36, 42, 48, 54, 60, and 66 inches.
- The drilled shaft concrete compressive strength: 4,000 psi.
- The steel reinforcement: 0.5% of the gross area of the shaft.
- Two analyses were performed for each shaft diameter using the following loading conditions:
  - Typical exterior column (650 kips).
  - Typical interior girder column (2,250 kips).
- **Table 1** shows the soil and rock strength information used during the analyses:

Table 1: Soil and Rock Characteristics Used in L-Pile Analysis

Layer	p-y Curve Type Selected	Depth of Layer (from FSE)	Effective Unit Weight (pcf)	Undrained Cohesion (psf)	Uniaxial Compressive Strength (psi)
1	Mod. Stiff Clay w/out Free Water	0' to 10'	130	750	N/A
2	Vuggy Limestone	10' to 30'	160	N/A	5,000

- The maximum allowable deflection according to IBC 1810.3.3.2 is half of the maximum lateral load applied at the pile head that produces a gross lateral movement of one (1) inch. The shafts were analyzed as a fixed head condition.
- For the purposes of our analysis, the drilled shafts were assumed be embedded 10 feet into the underlying bedrock. The final length of the drilled shaft will be determined by the required embedment to resist the applied lateral and uplift loads, the shaft diameter, and the required embedment to support the applied axial loads.
- The provided loading information is preliminary, however, if the required embedment is determined to be less than 10 feet into the underlying bedrock, then additional analyses would be warranted as the maximum lateral load would likely be reduced.
- The Lpile plots appended to the end of this report were analyzed using a maximum deflection of 0.5". The maximum bending moment and corresponding shear is also indicated on the appended plots for each shaft diameter.

3.0 GENERAL REMARKS AND LIMITATIONS

The analyses performed were based on the values and information provided by SGCE. It is the responsibility of SGCE, as the Geotechnical Engineer of Record for the subject project, and the Structural Engineer of Record to properly interpret and apply the provided results to the subject project and to any applicable statewide or local design requirements, codes, and/or standards.

Bhate cannot be held responsible for any faulty analyses resulting from erroneous input design parameters provided by SGCE.

We appreciate the opportunity to work with you on this project. If you have any questions or need any additional information, please call us.

Respectfully submitted,
BHATE GEOSCIENCES CORPORATION

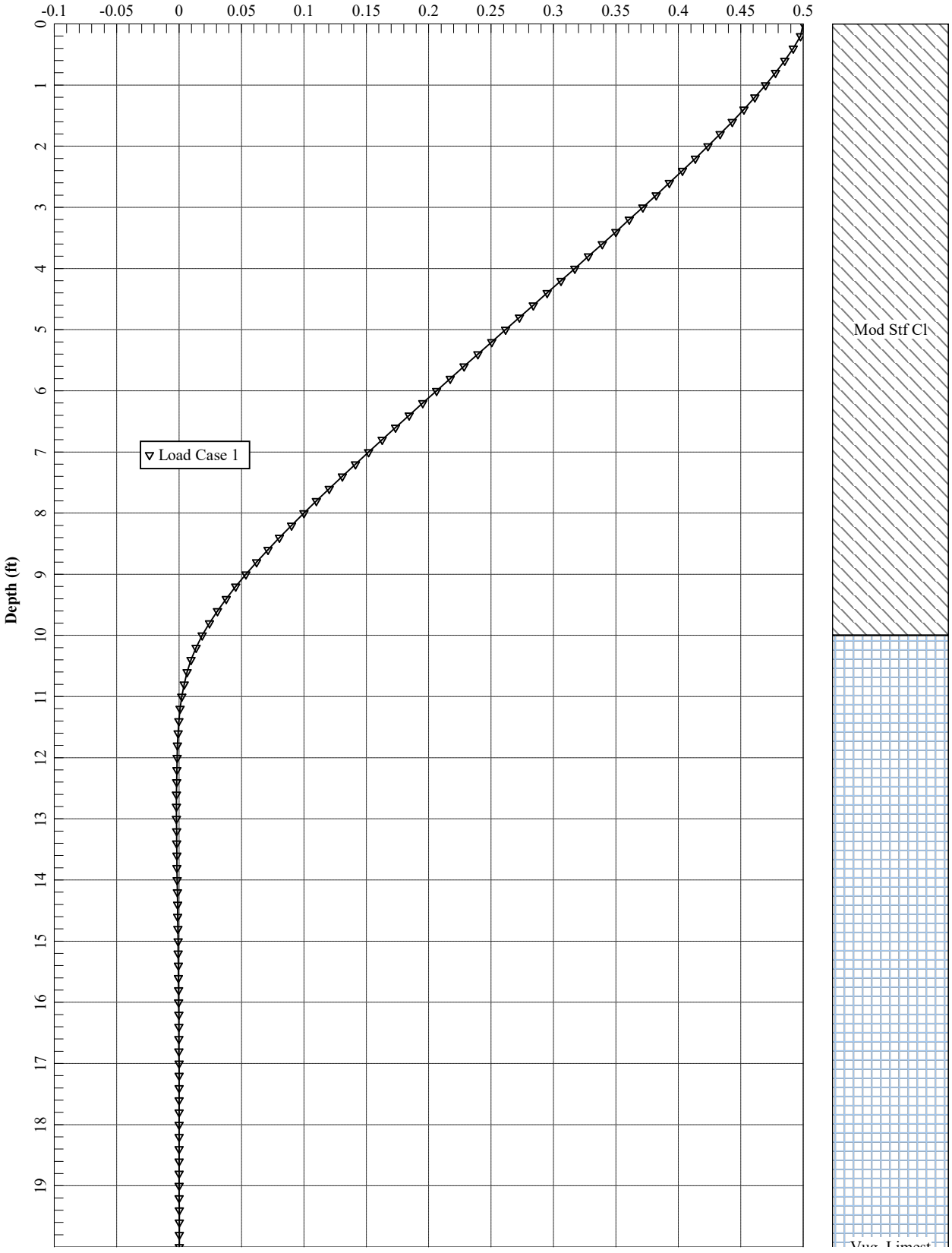
Joshua Curtis, P.E.
Assistant Chief Engineer
AL License No. 39273-E

APPENDIX

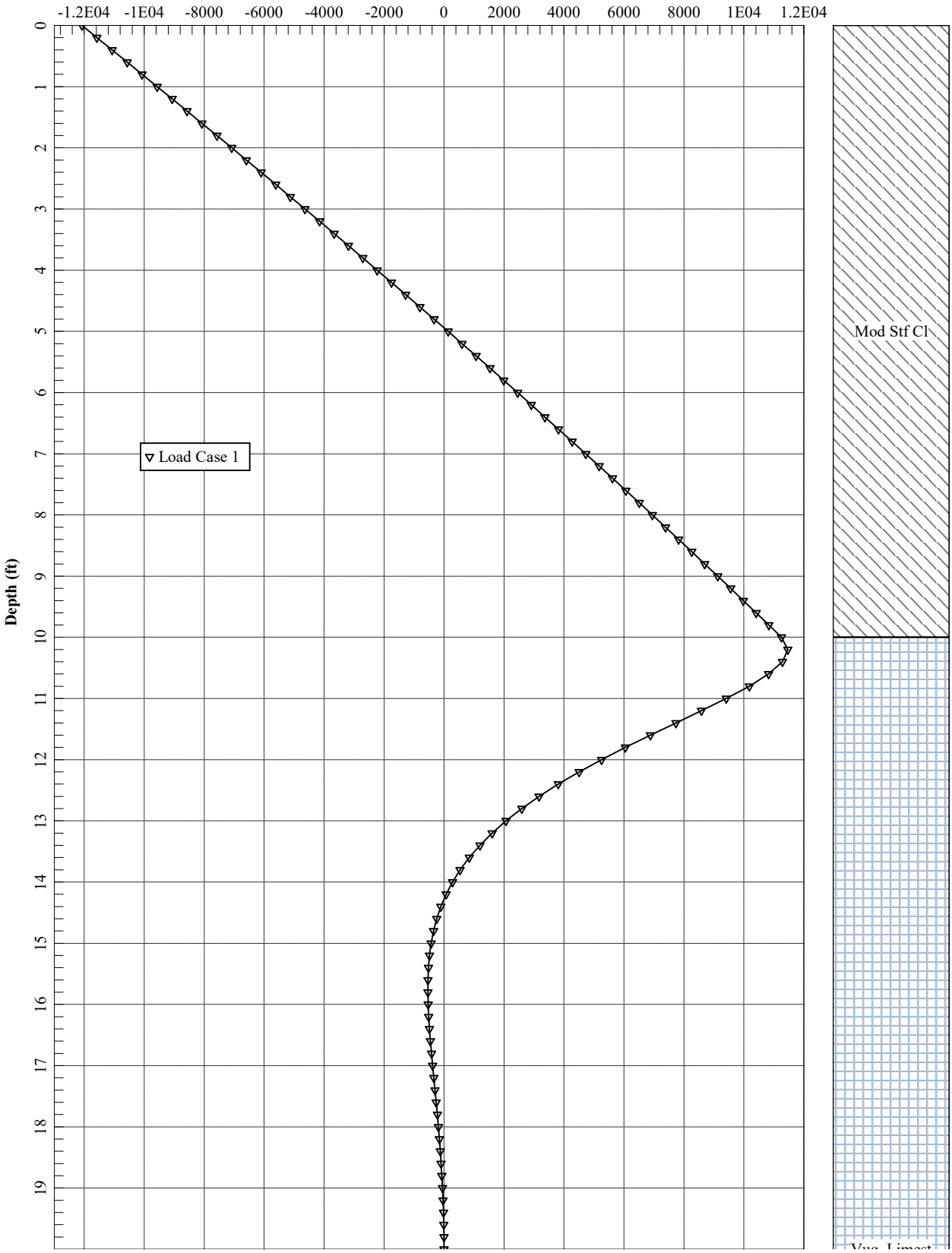
LPILE DEFLECTION, BENDING MOMENT, AND SHEAR PLOTS FOR EXTERIOR COLUMN

LPILE DEFLECTION, BENDING MOMENT, AND SHEAR PLOTS FOR INTERIOR GIRDER COLUMN

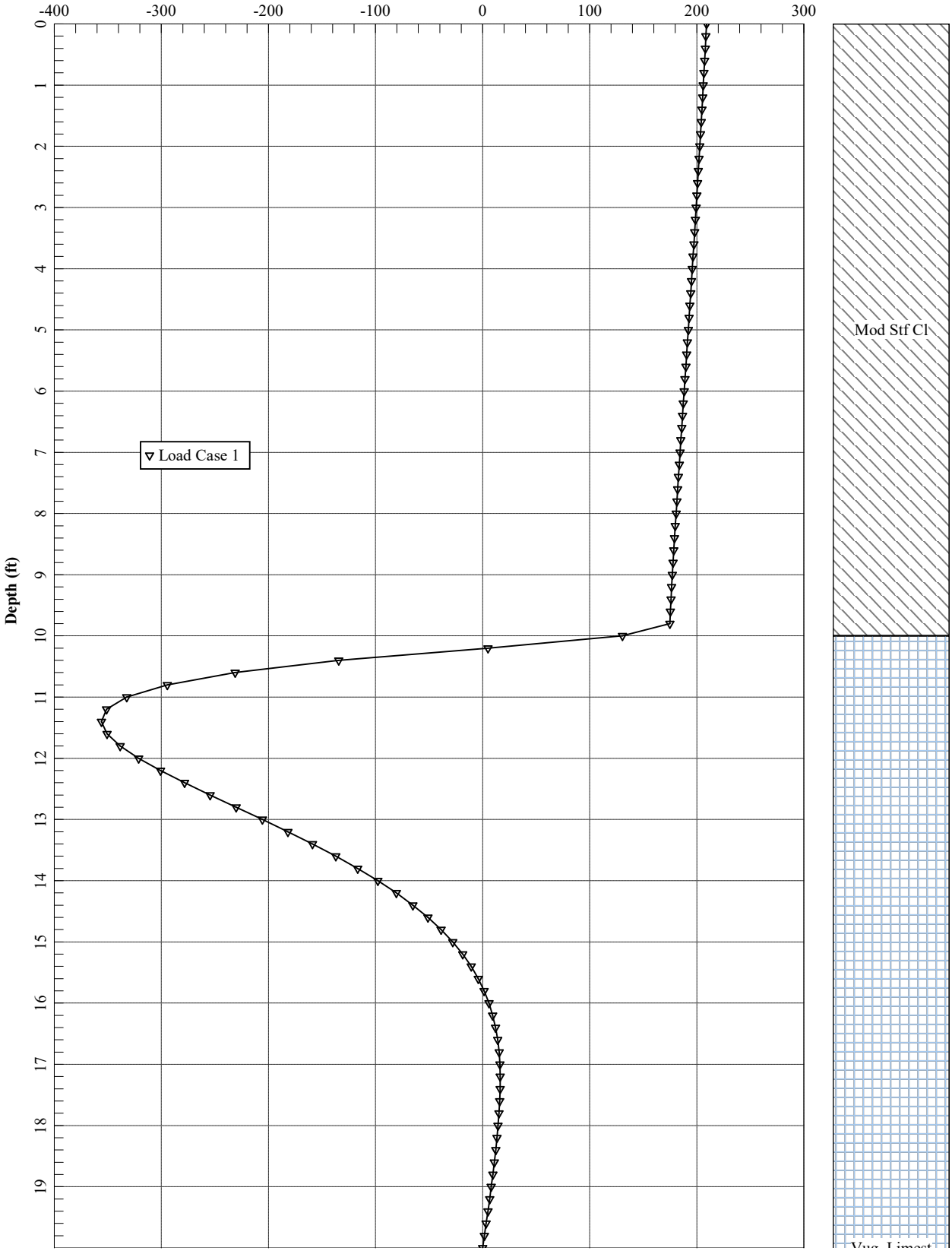
B-2 Exterior Column 36-in Drilled Shaft
Lateral Pile Deflection (inches)



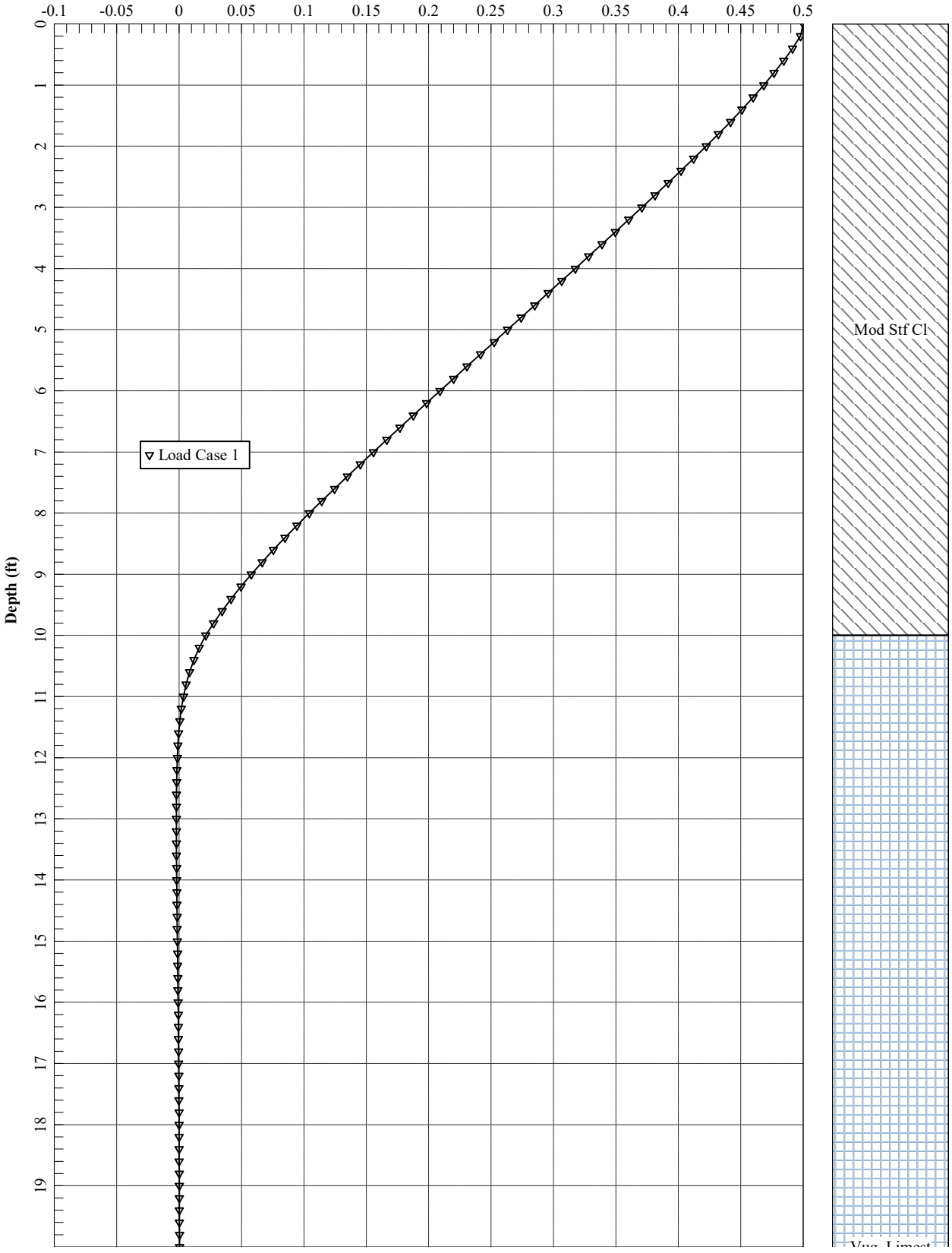
B-2 Exterior Column 36-in Drilled Shaft
Bending Moment (in-kips)



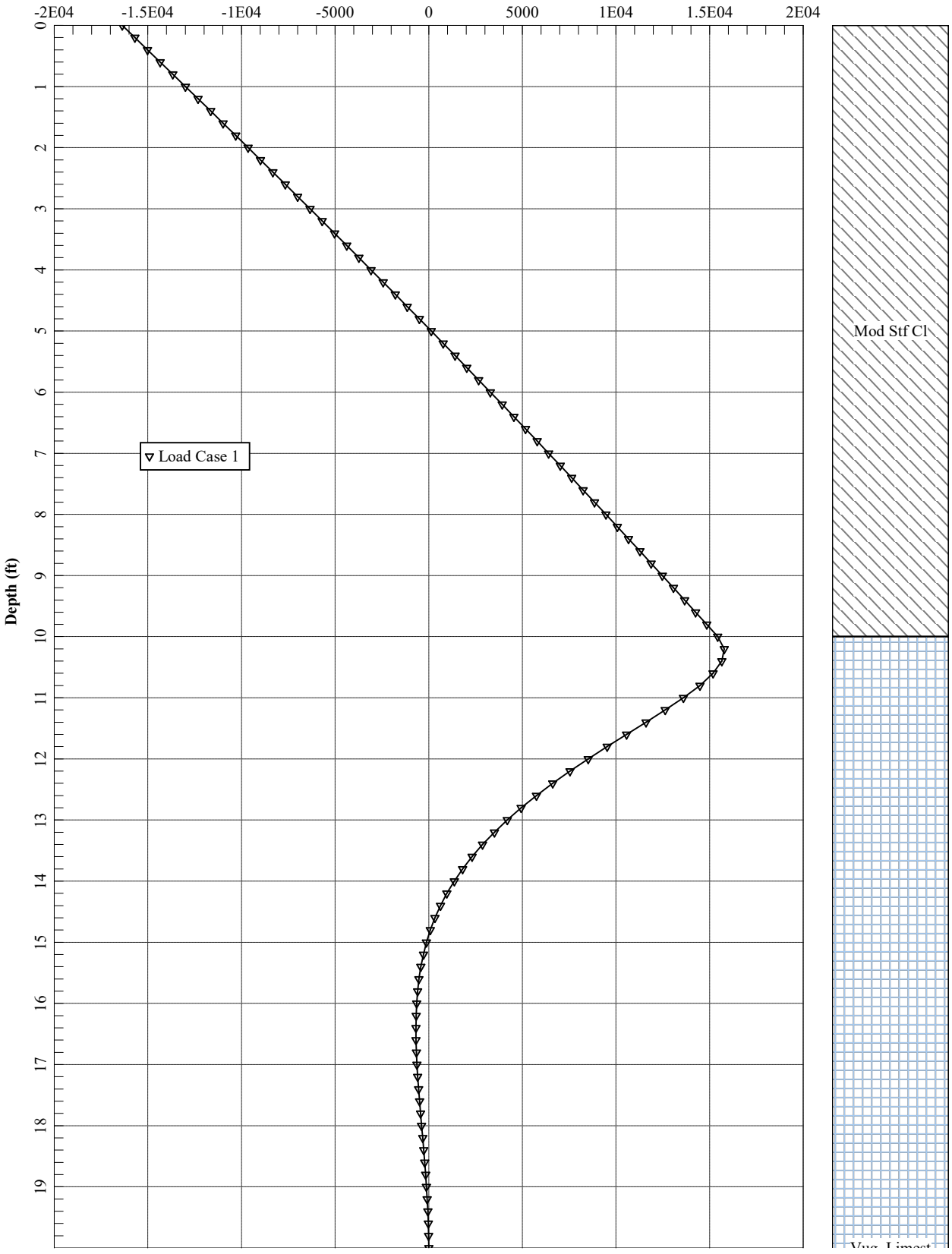
B-2 Exterior Column 36-in Drilled Shaft
Shear Force (kips)



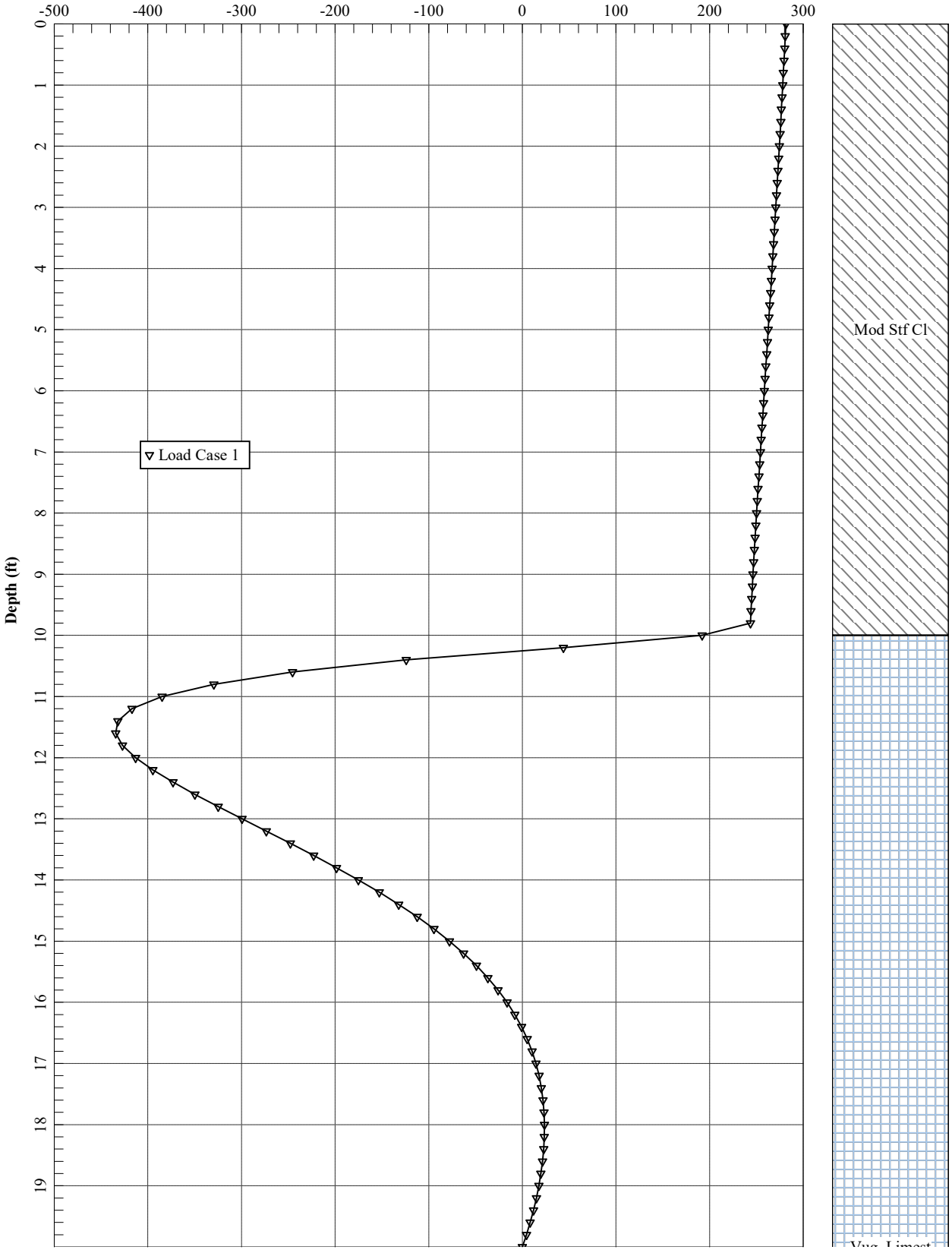
B-2 Exterior Column 42-in Drilled Shaft
Lateral Pile Deflection (inches)



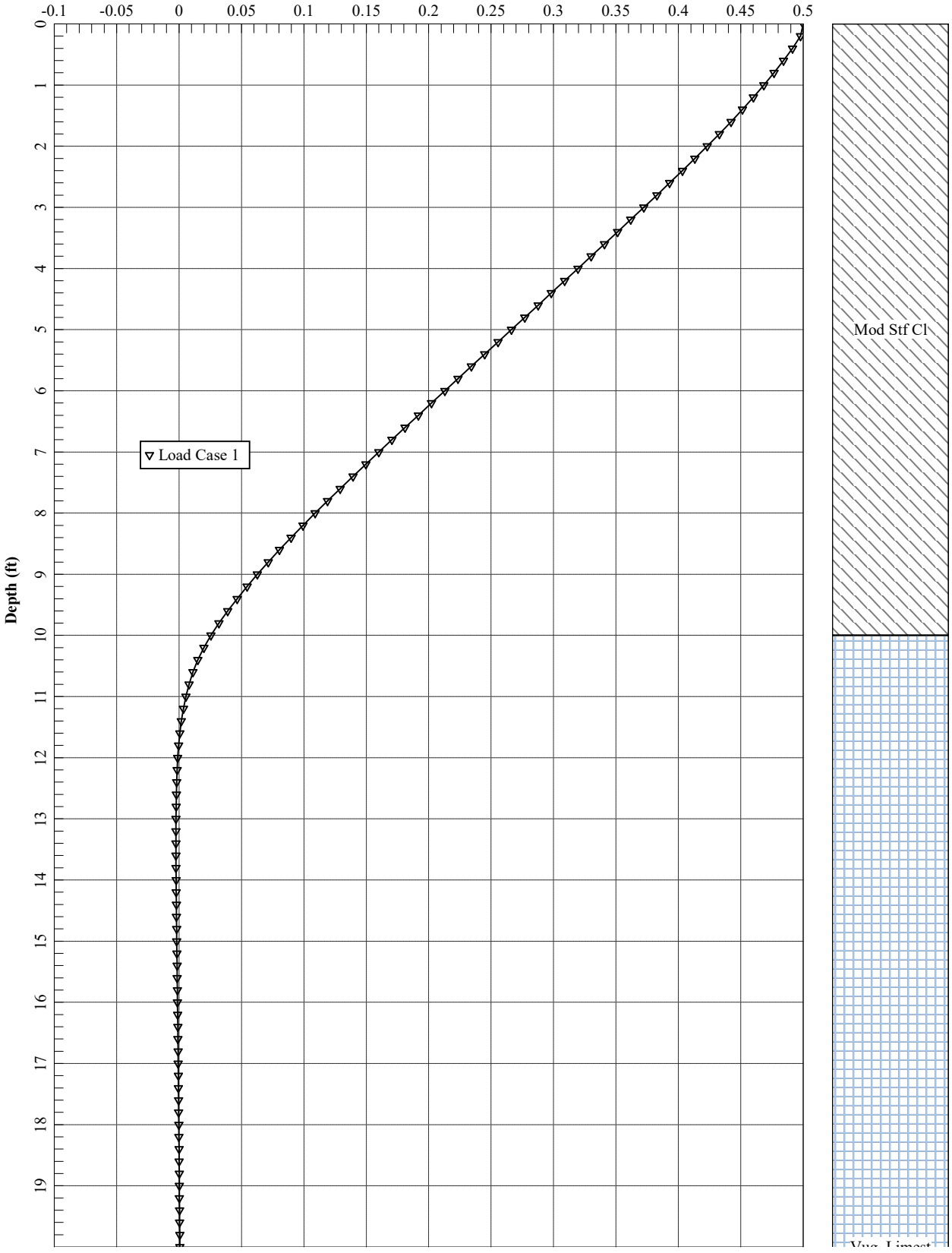
B-2 Exterior Column 42-in Drilled Shaft
Bending Moment (in-kips)



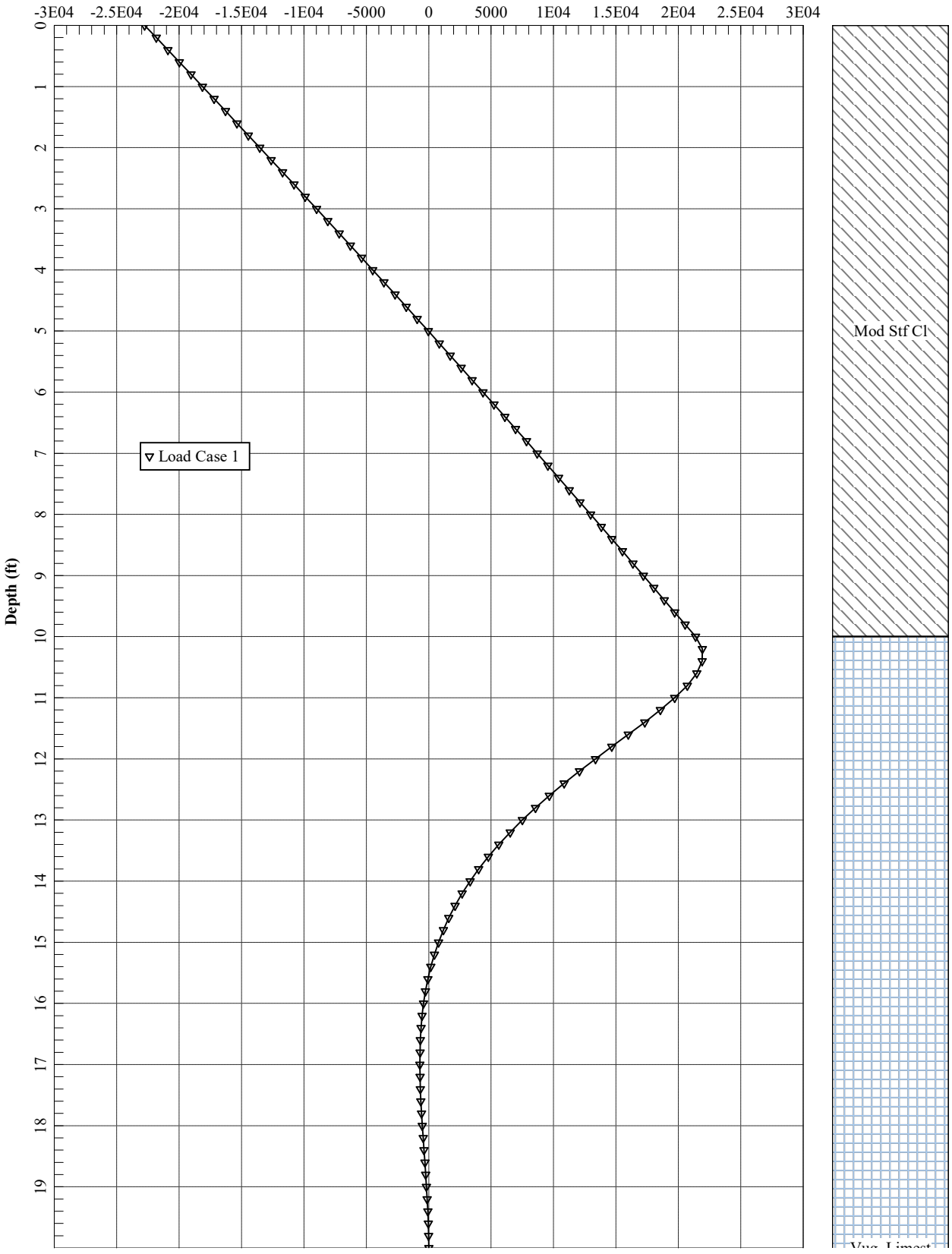
B-2 Exterior Column 42-in Drilled Shaft
Shear Force (kips)



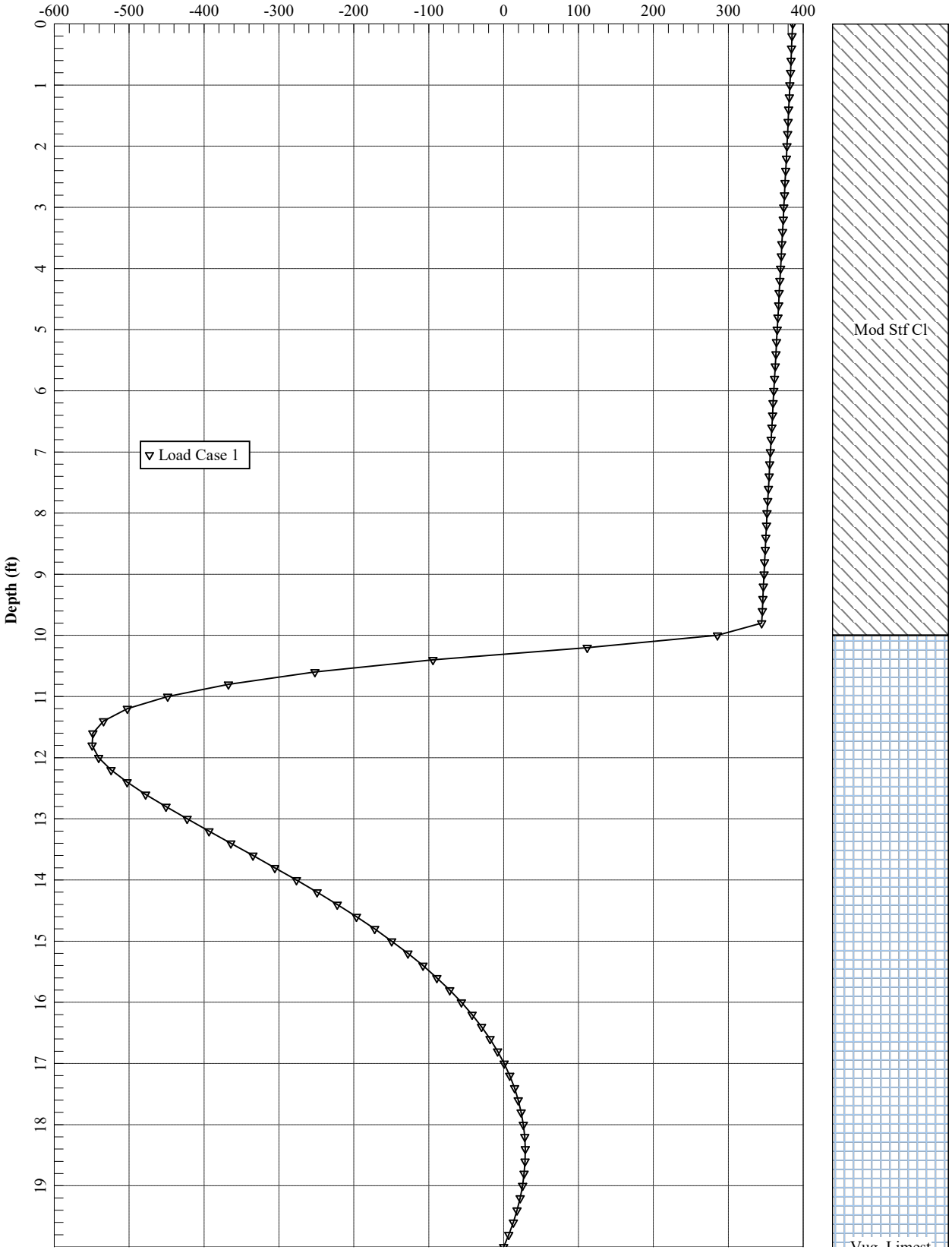
B-2 Exterior Column 48-in Drilled Shaft
Lateral Pile Deflection (inches)



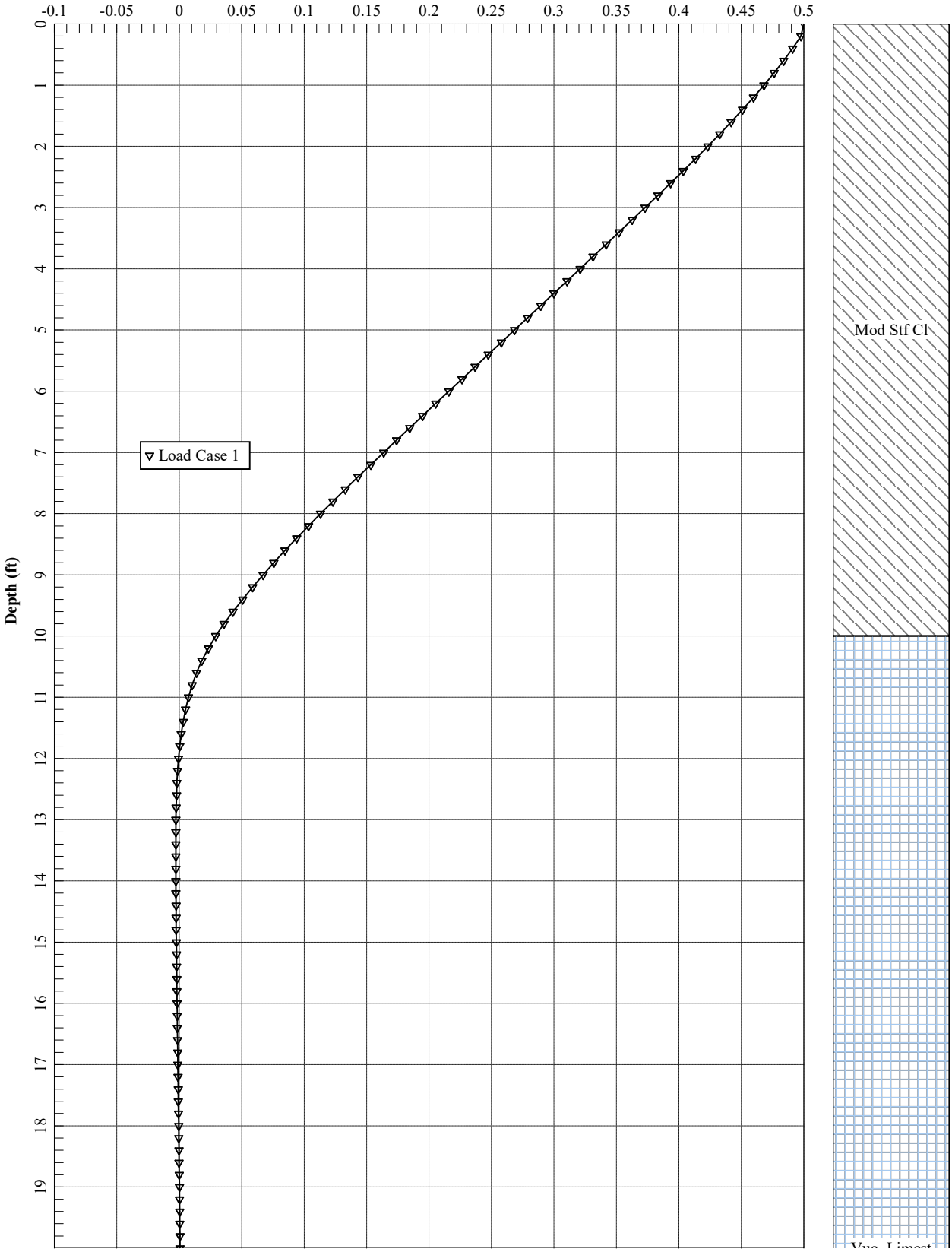
B-2 Exterior Column 48-in Drilled Shaft
Bending Moment (in-kips)



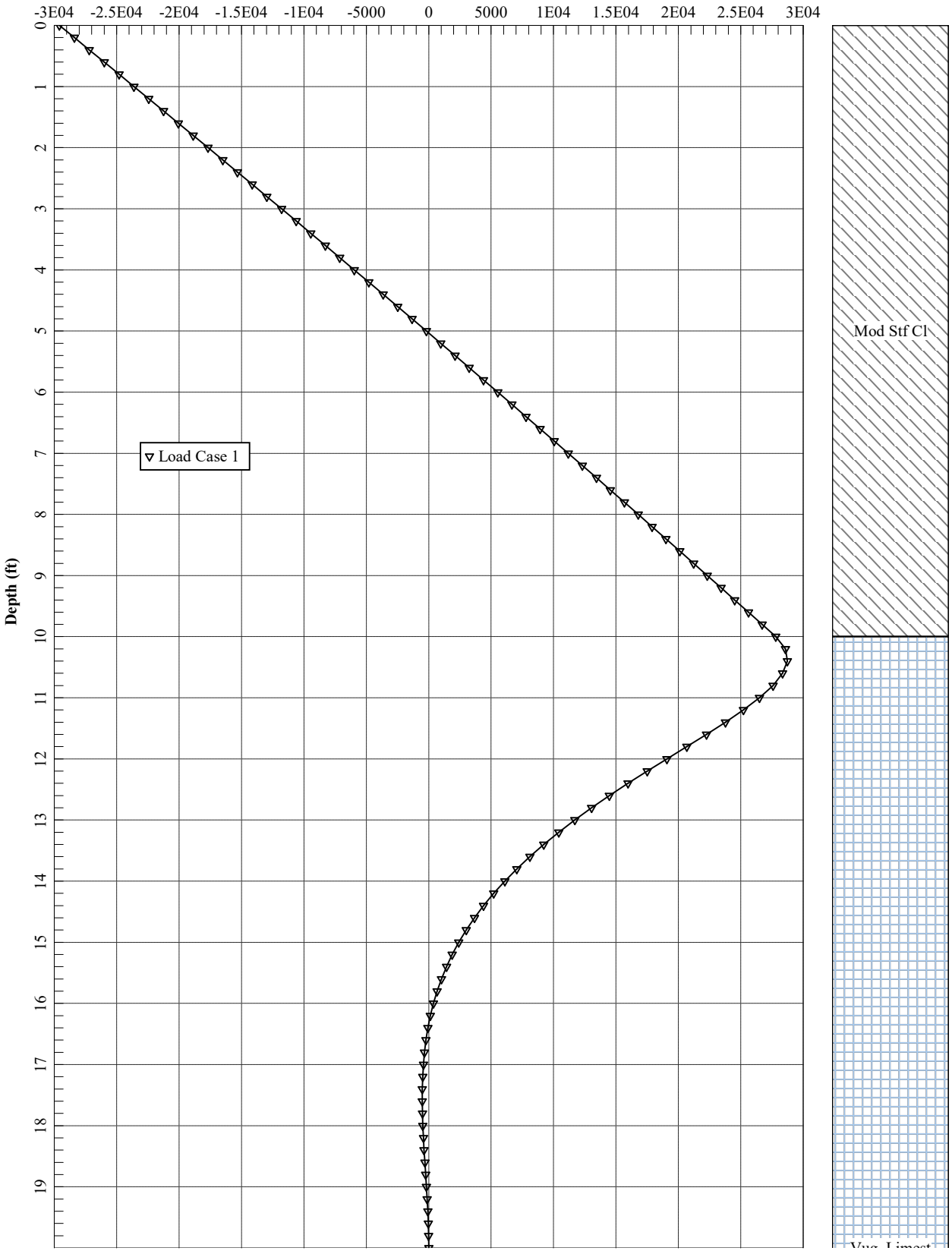
B-2 Exterior Column 48-in Drilled Shaft
Shear Force (kips)



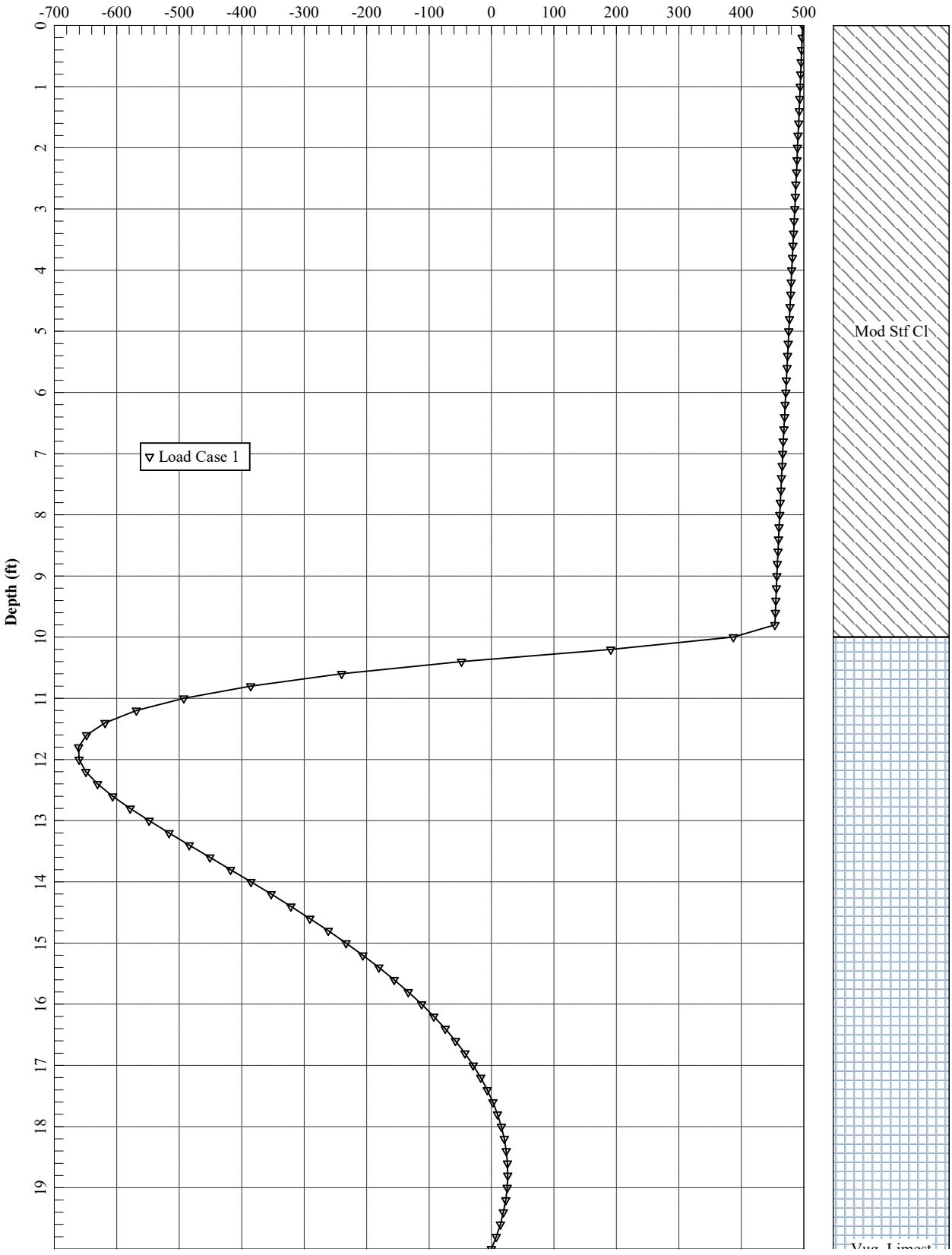
B-2 Exterior Column 54-in Drilled Shaft
Lateral Pile Deflection (inches)



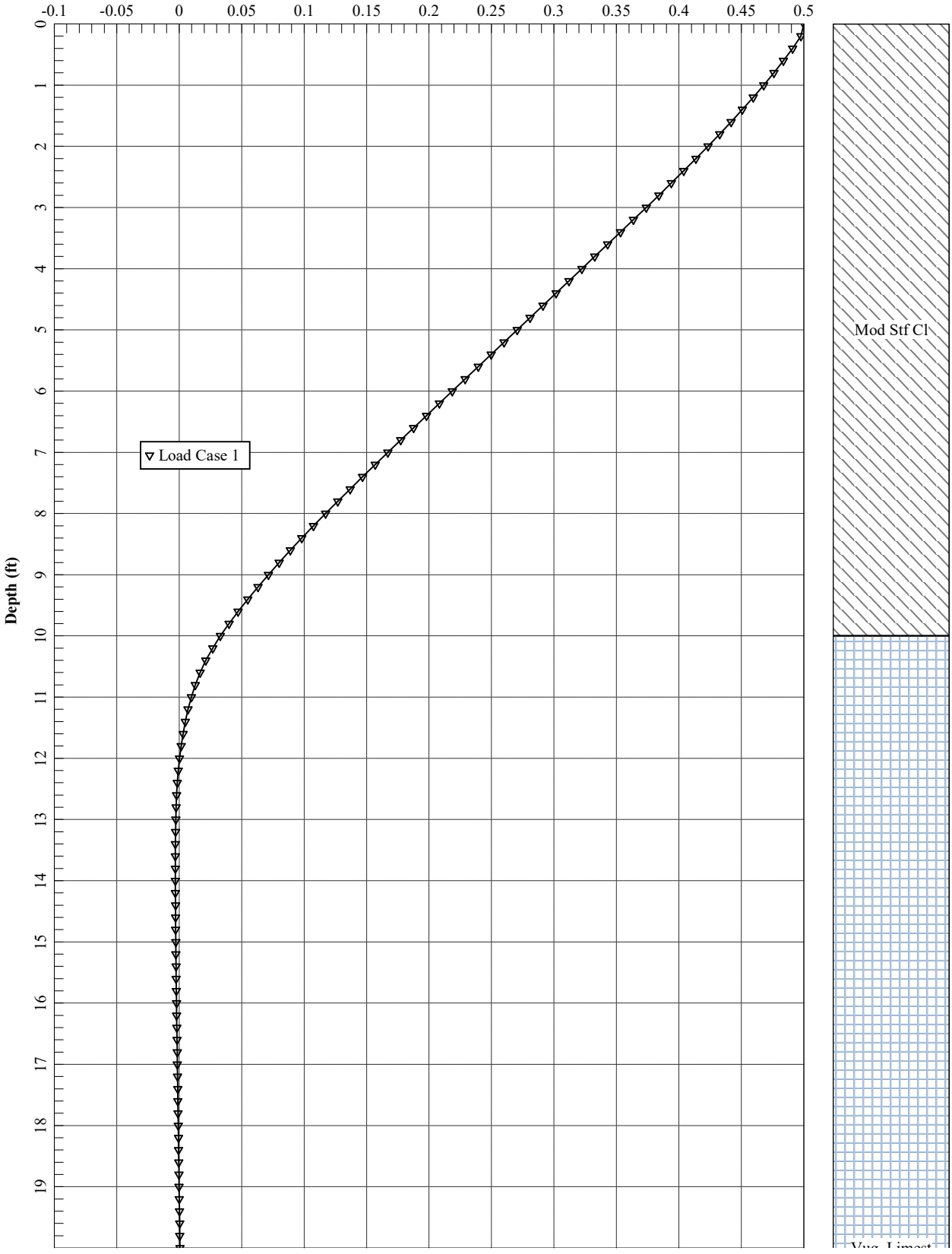
B-2 Exterior Column 54-in Drilled Shaft
Bending Moment (in-kips)



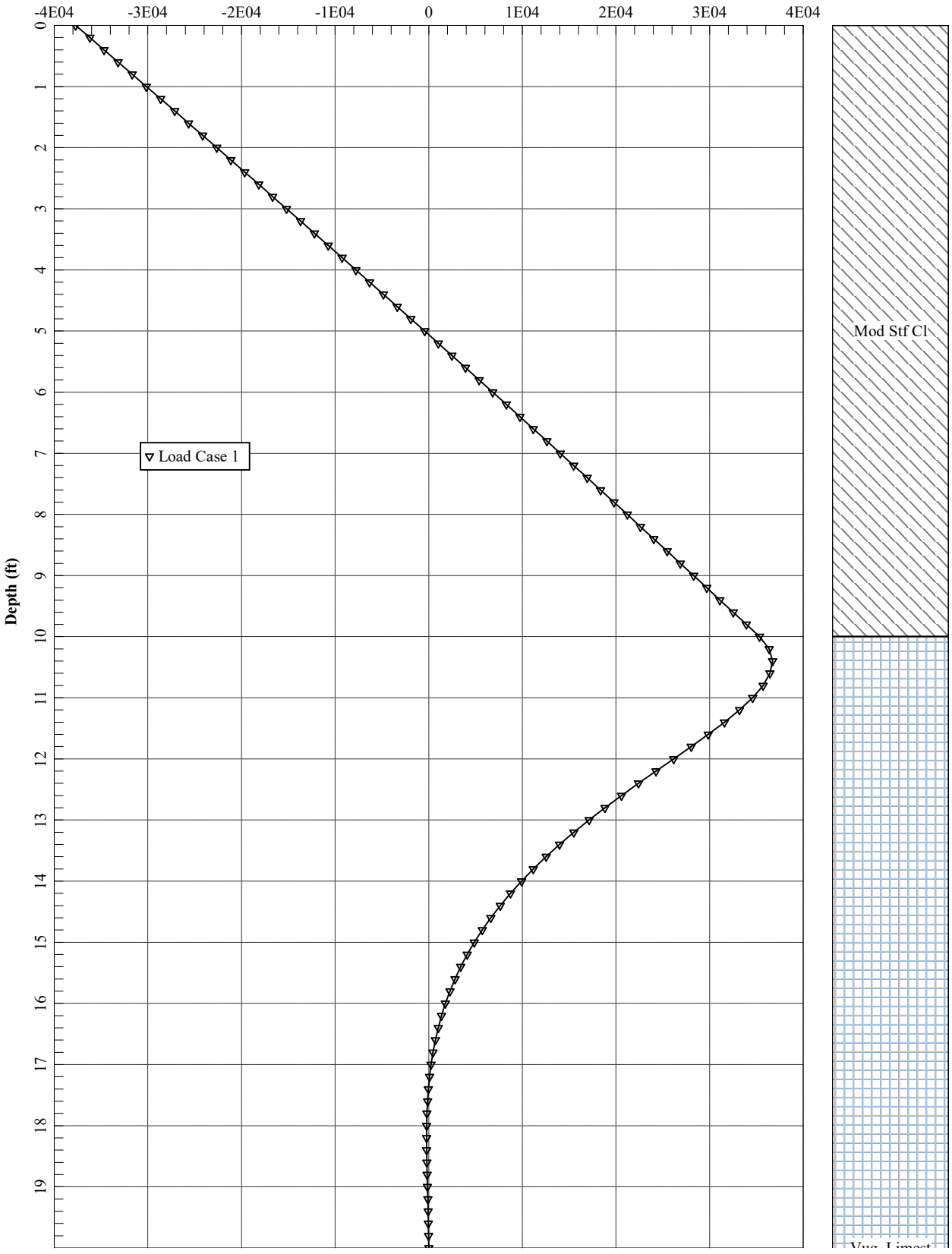
B-2 Exterior Column 54-in Drilled Shaft
Shear Force (kips)



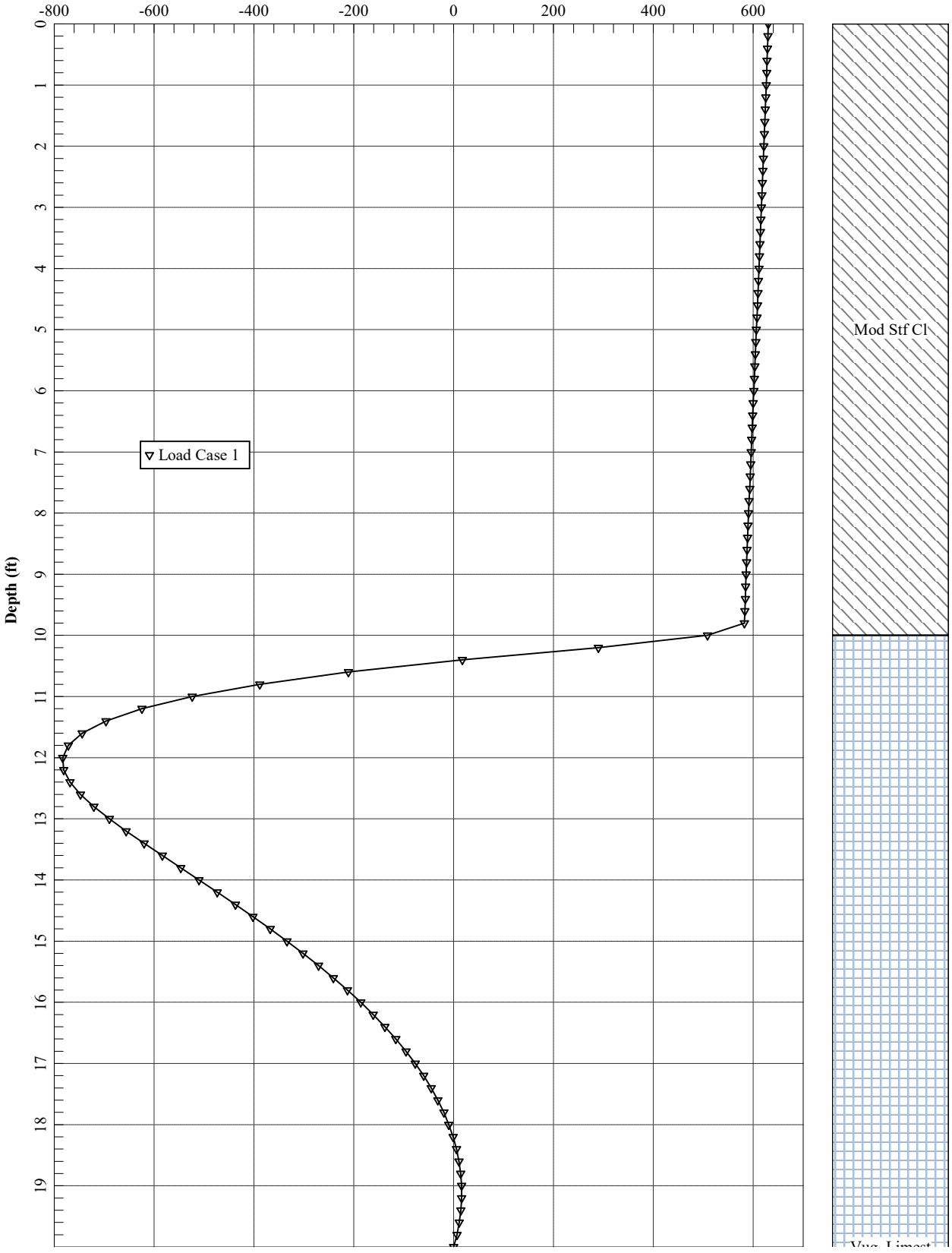
B-2 Exterior Column 60-in Drilled Shaft
Lateral Pile Deflection (inches)



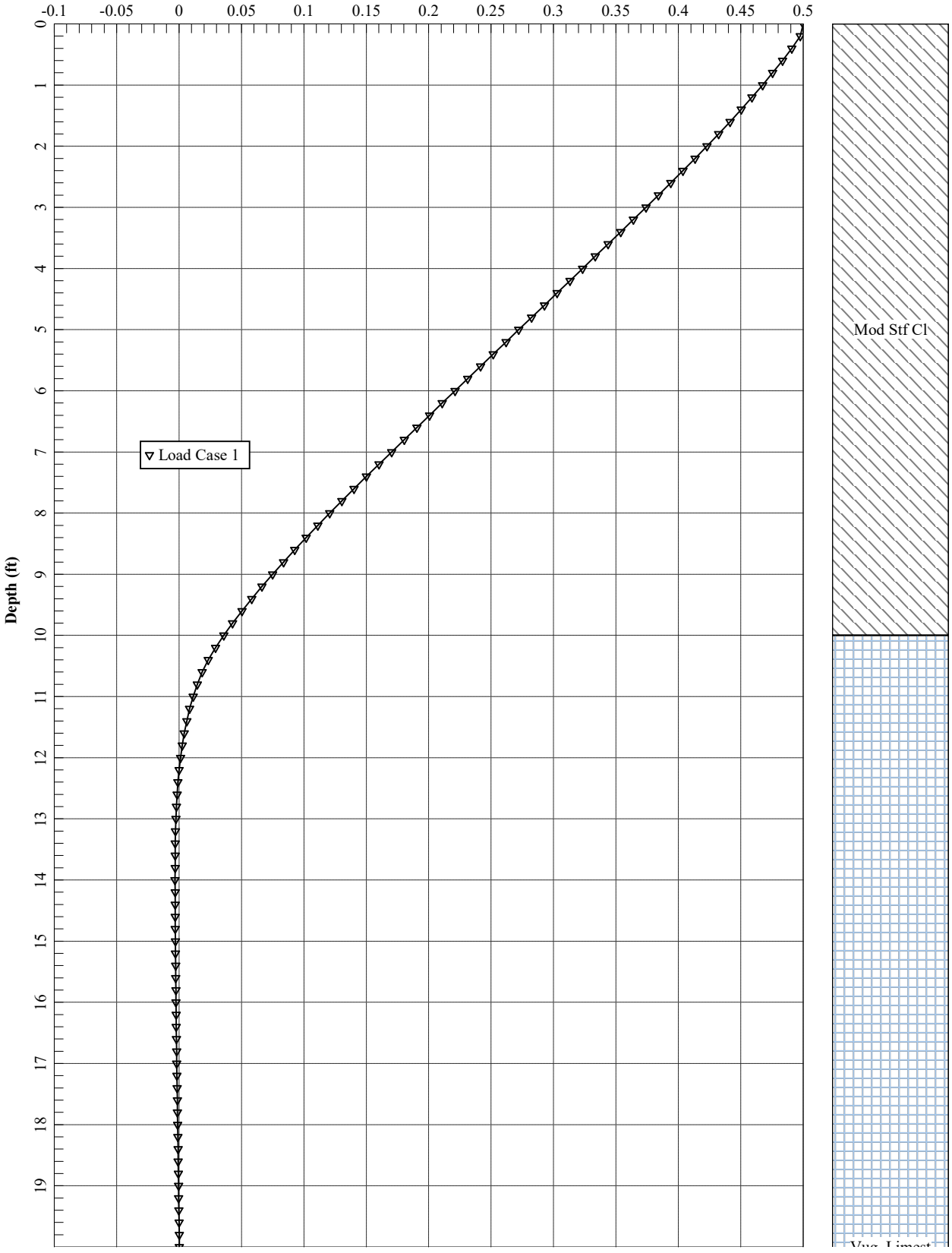
B-2 Exterior Column 60-in Drilled Shaft
Bending Moment (in-kips)



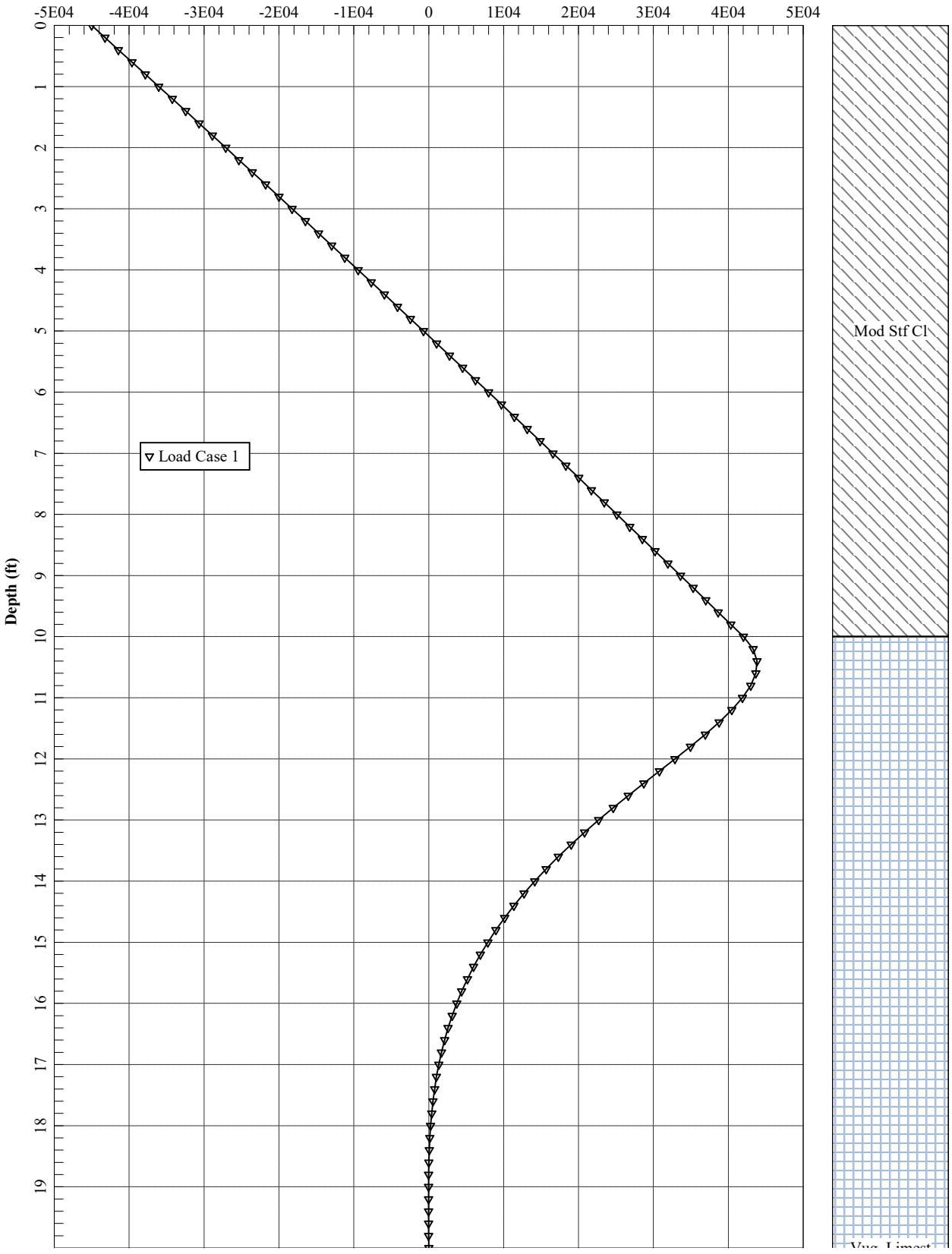
B-2 Exterior Column 60-in Drilled Shaft
Shear Force (kips)



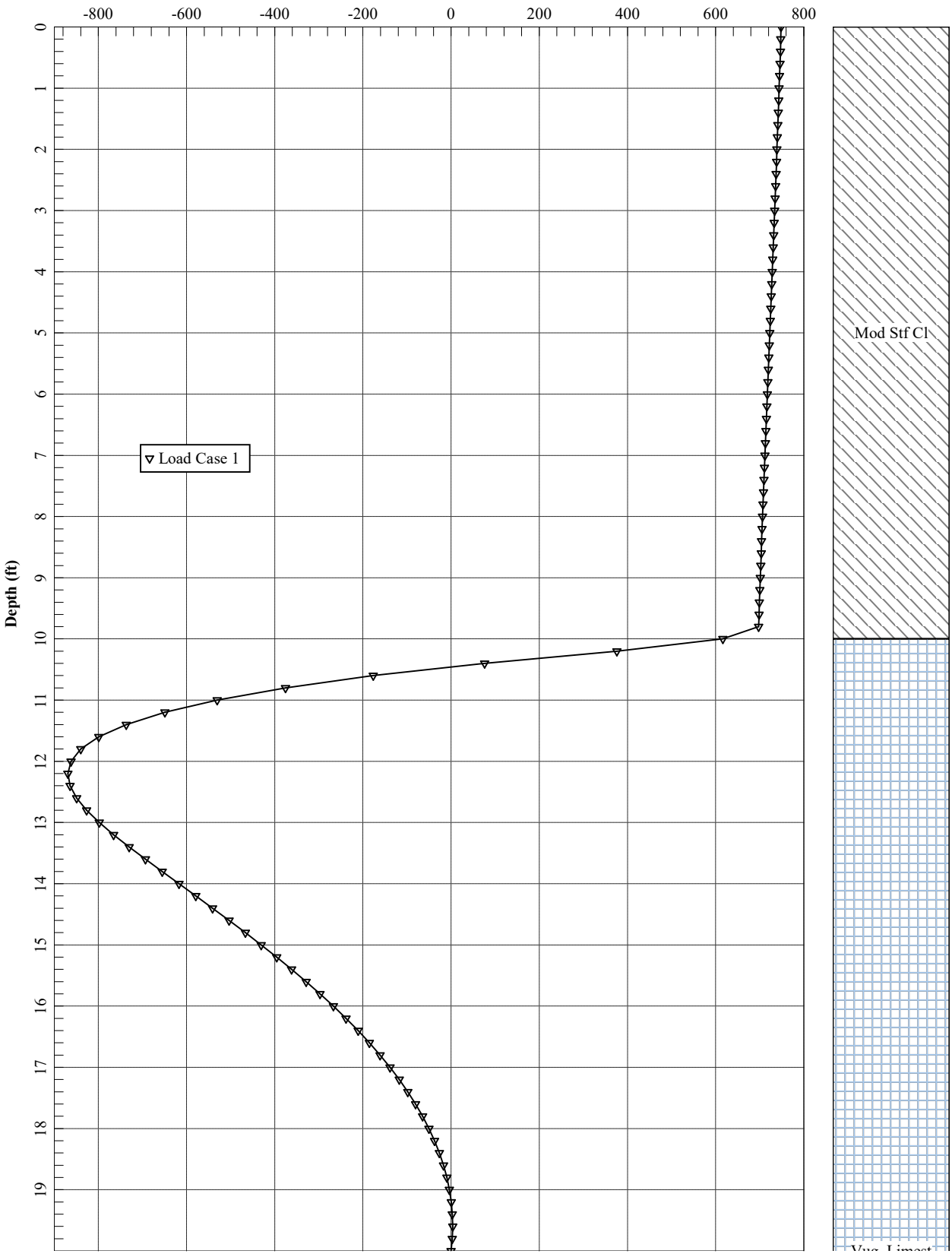
B-2 Exterior Column 66-in Drilled Shaft
Lateral Pile Deflection (inches)



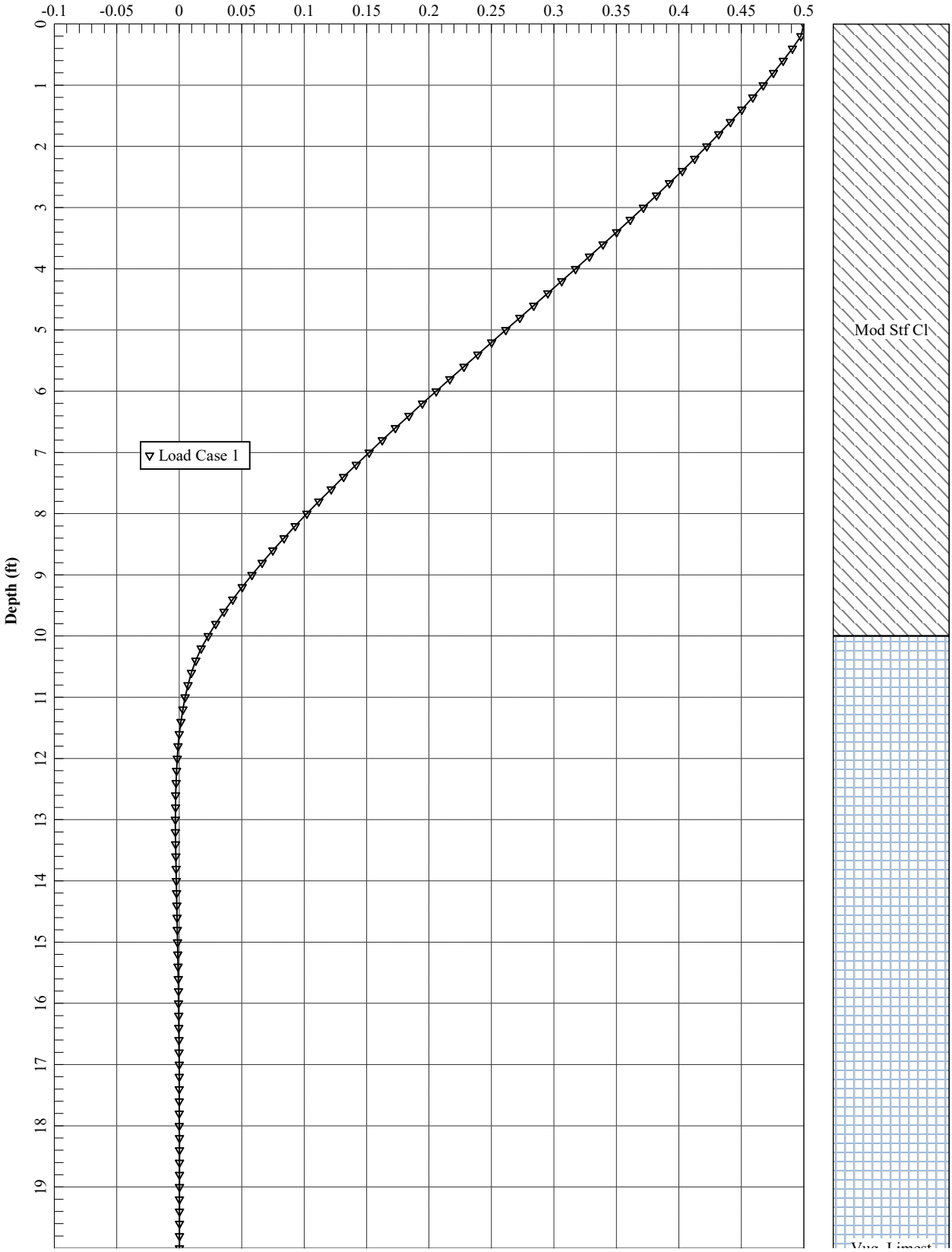
B-2 Exterior Column 66-in Drilled Shaft
Bending Moment (in-kips)



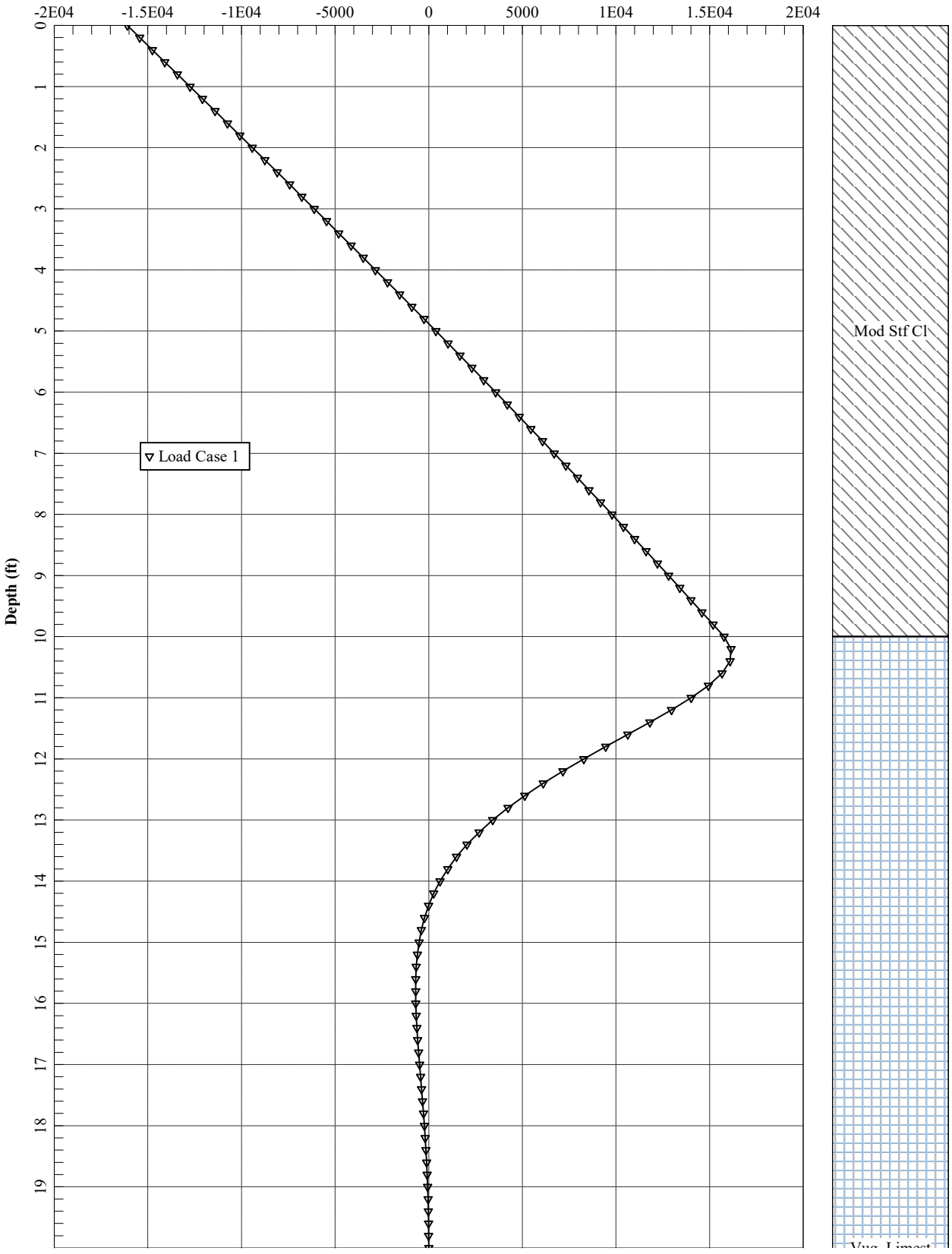
B-2 Exterior Column 66-in Drilled Shaft
Shear Force (kips)



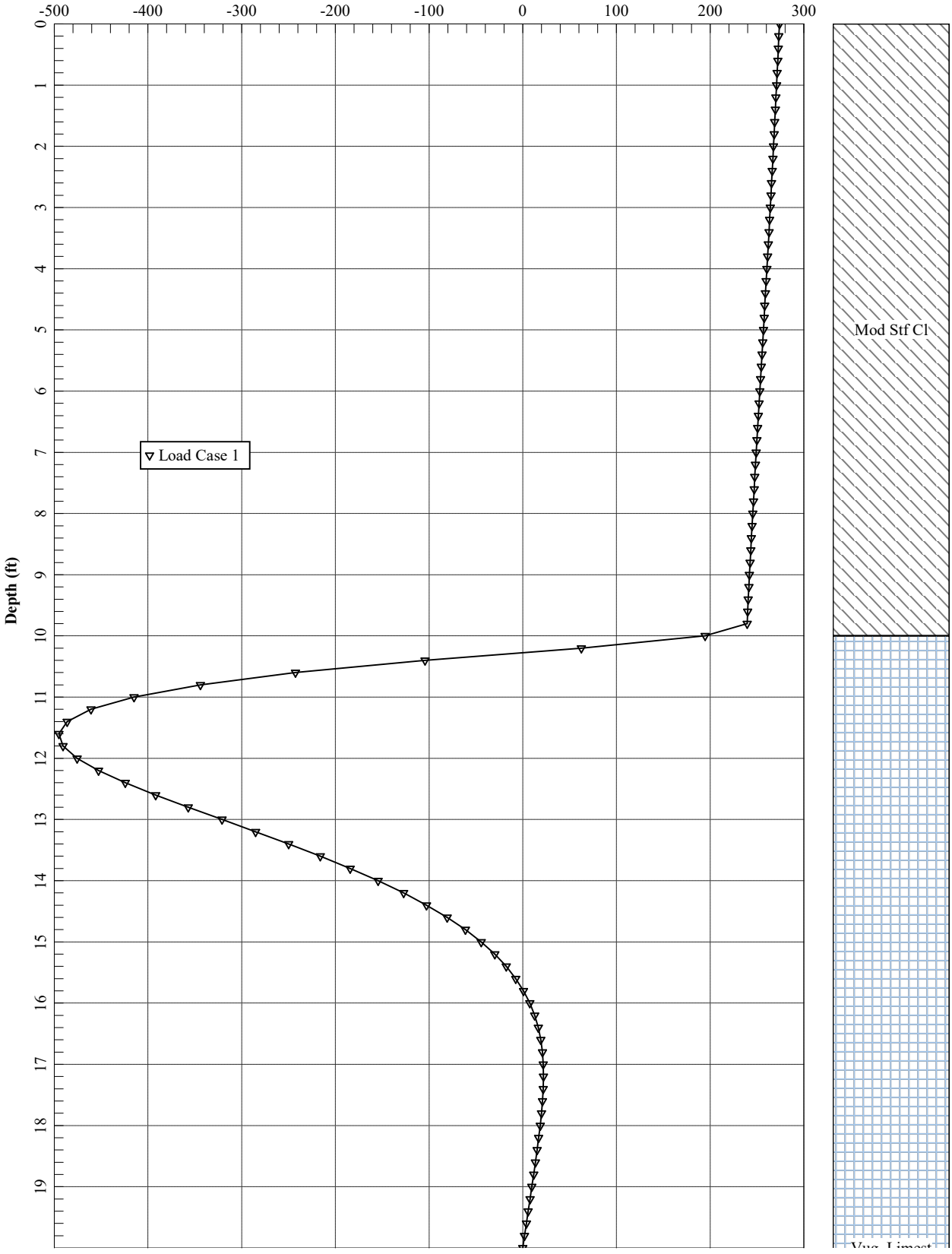
Interior Girder Column (B-5) 36-in Drilled Shaft
Lateral Pile Deflection (inches)



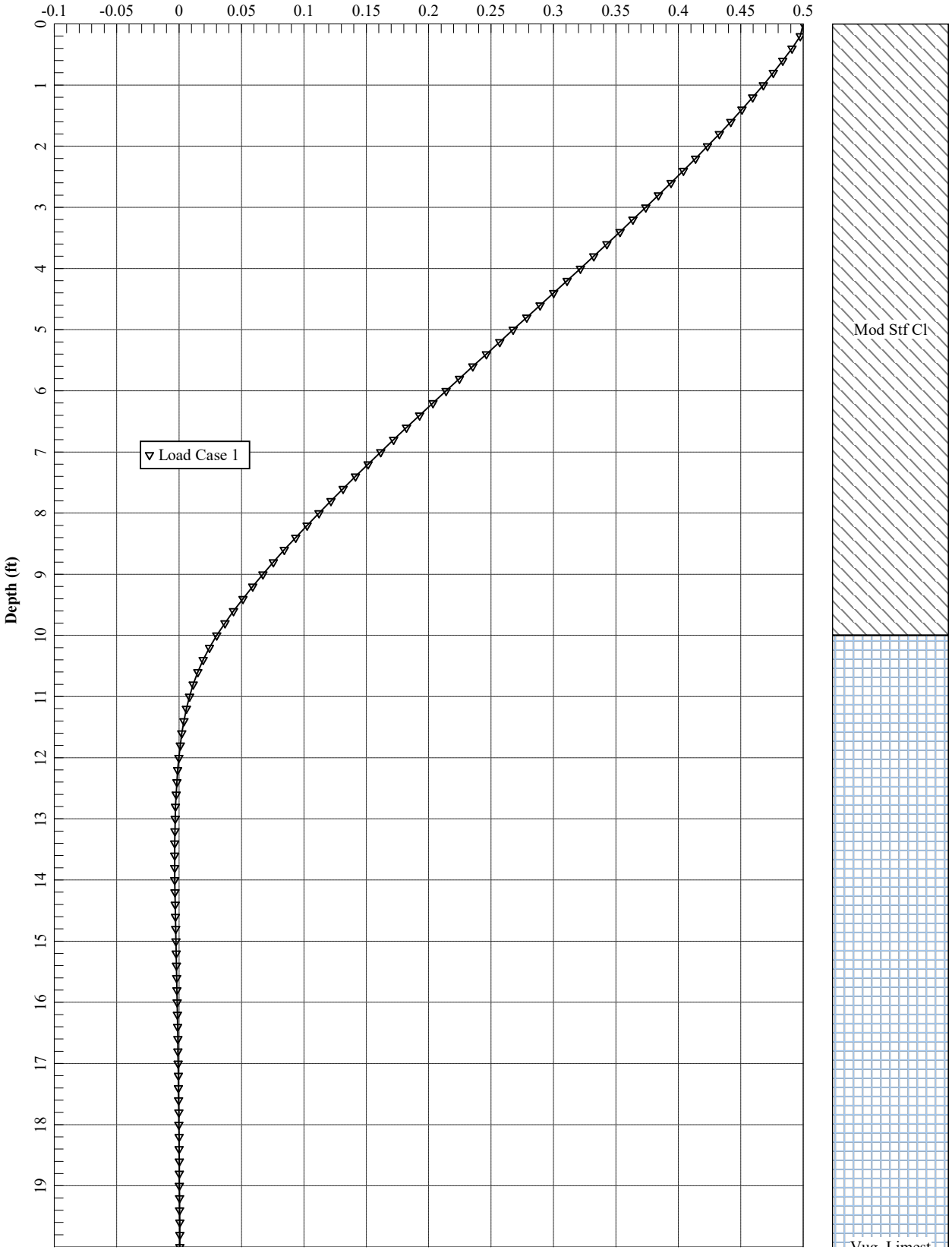
Interior Girder Column (B-5) 36-in Drilled Shaft
Bending Moment (in-kips)



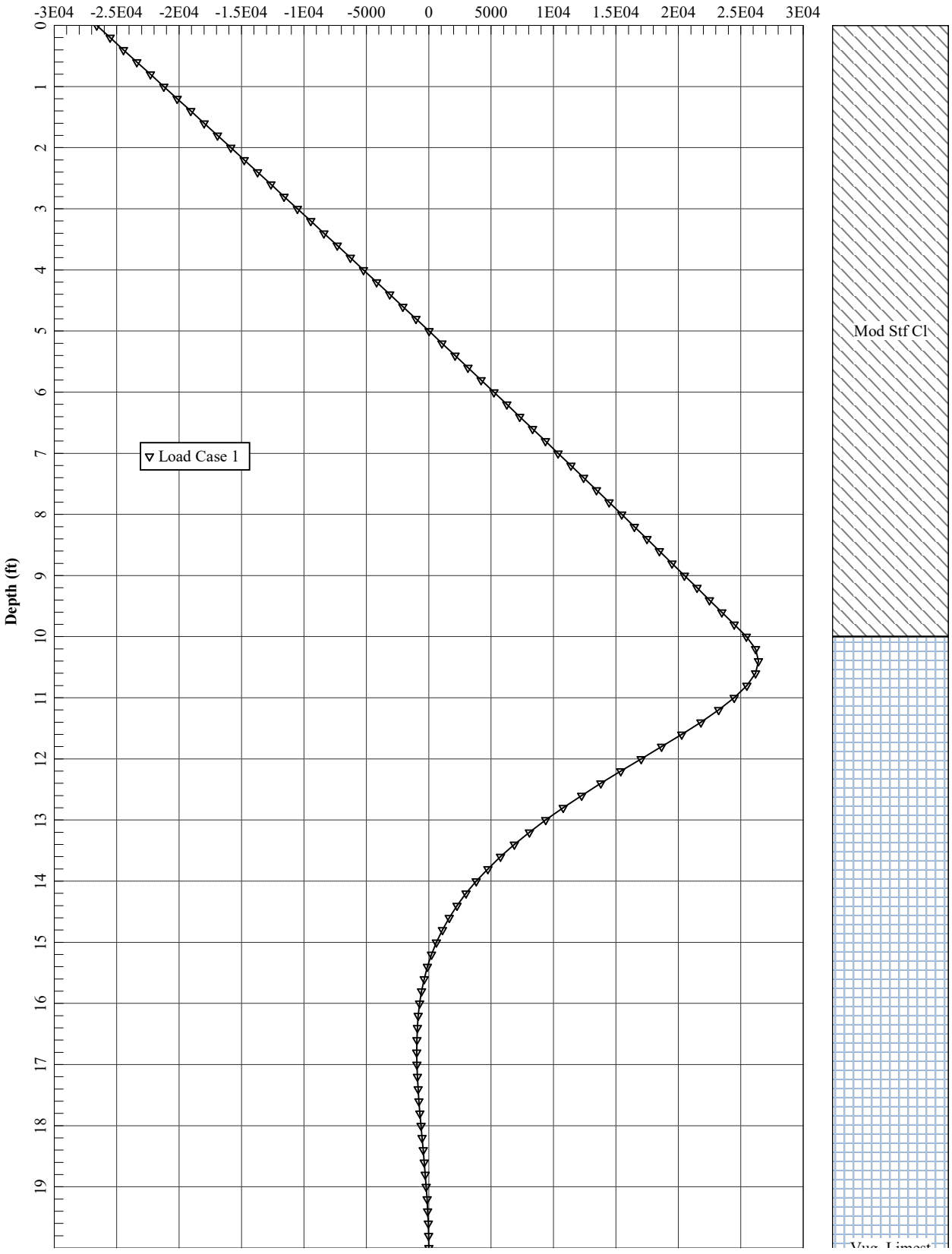
Interior Girder Column (B-5) 36-in Drilled Shaft
Shear Force (kips)



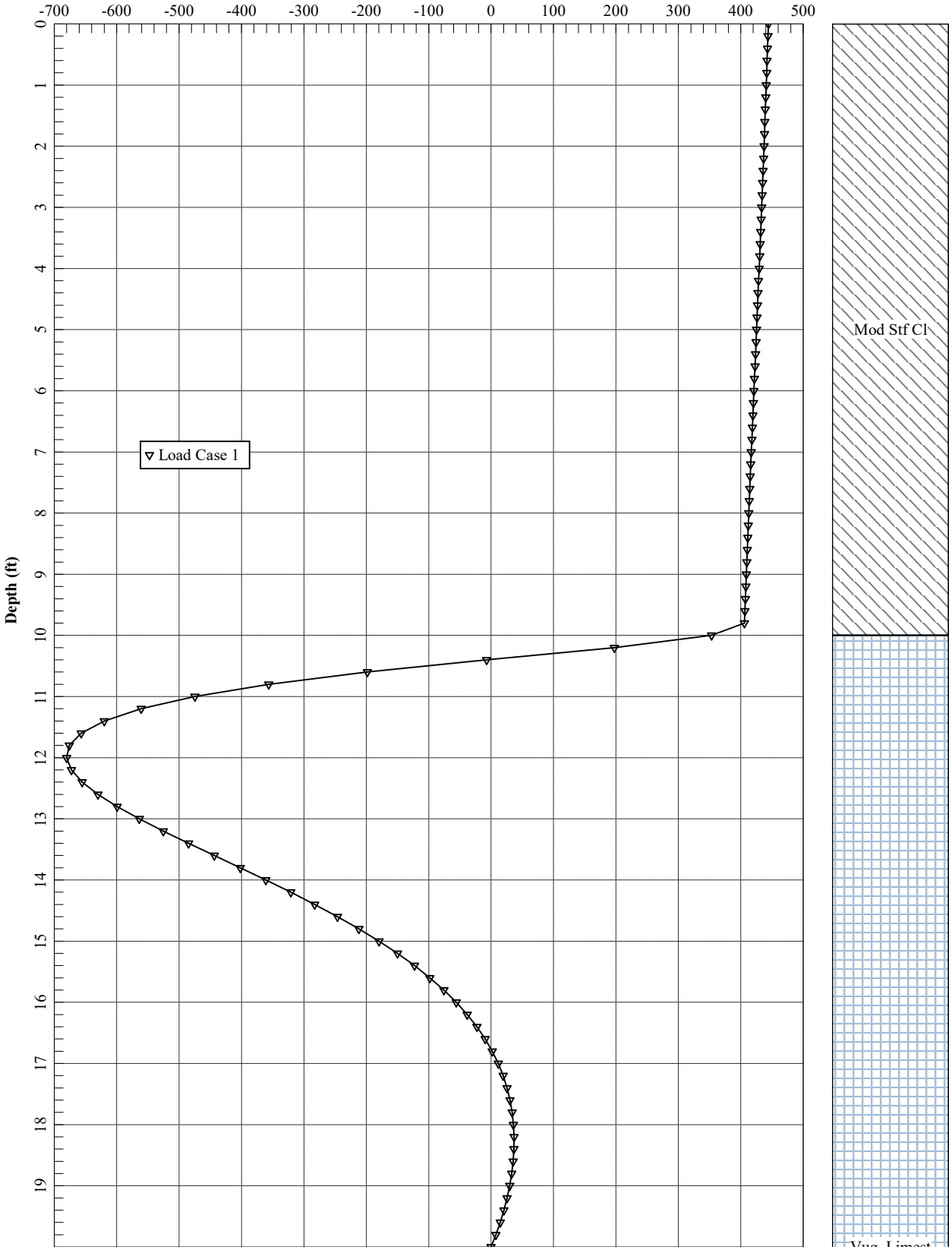
Interior Girder Column (B-5) 42-in Drilled Shaft
Lateral Pile Deflection (inches)



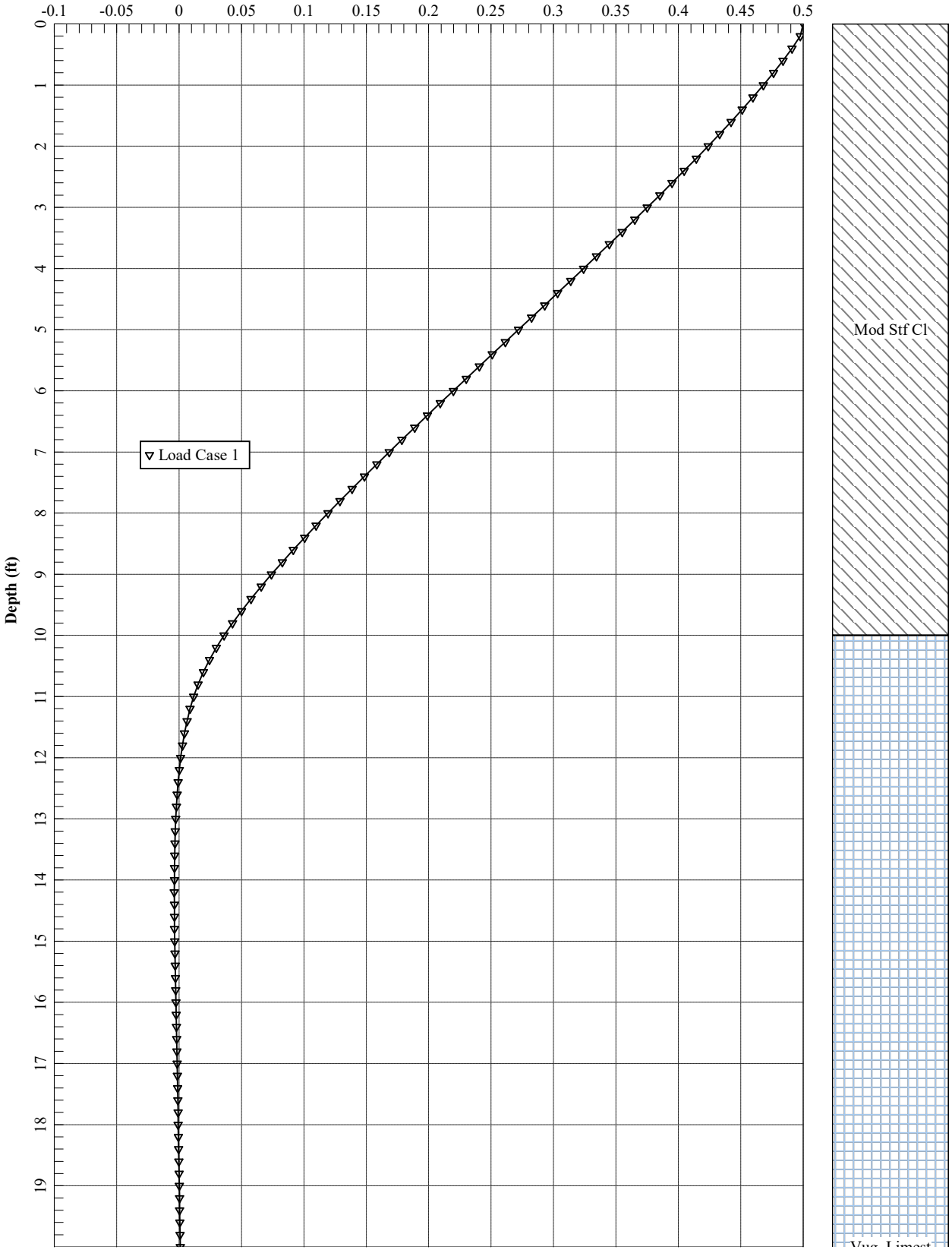
Interior Girder Column (B-5) 42-in Drilled Shaft
Bending Moment (in-kips)



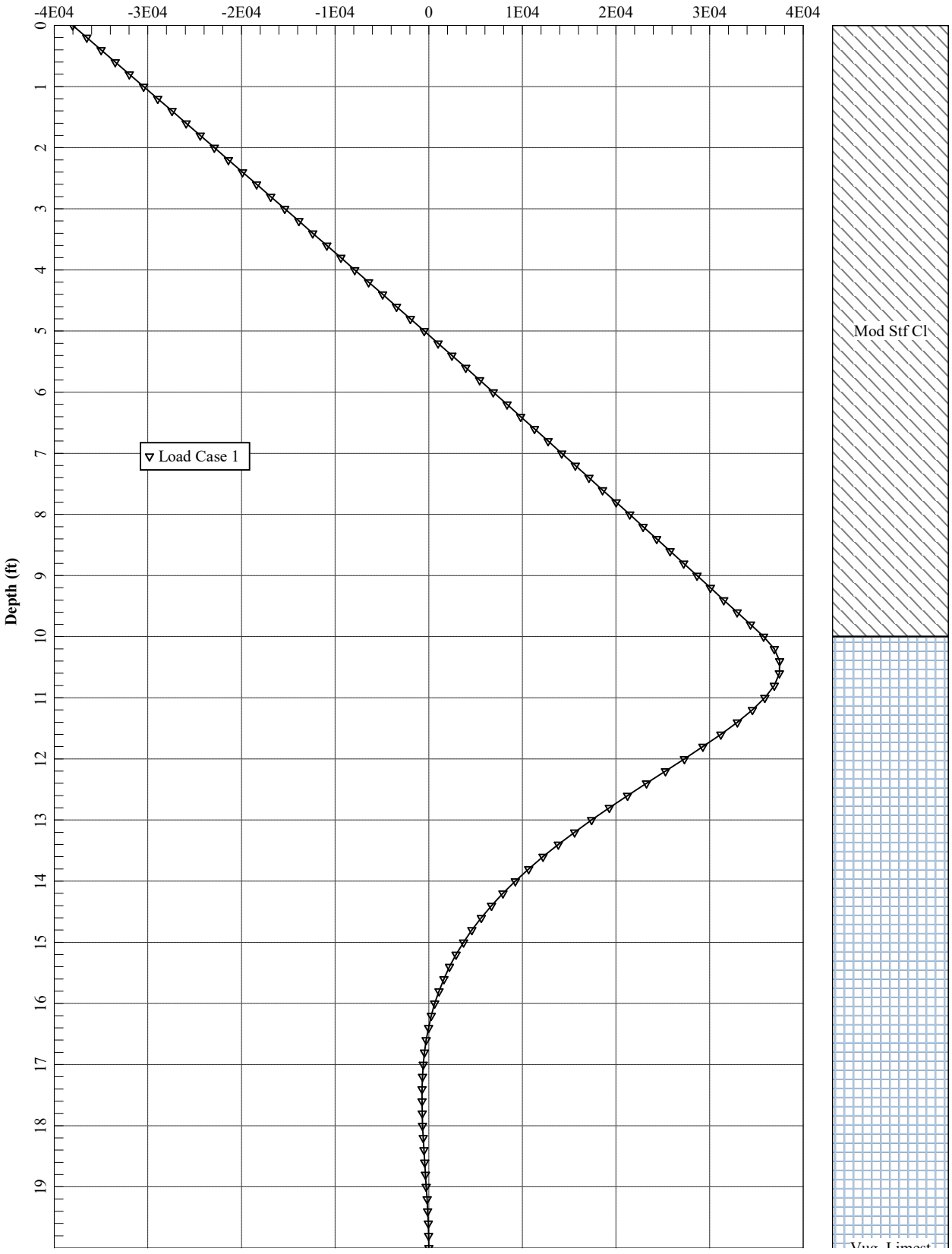
Interior Girder Column (B-5) 42-in Drilled Shaft
Shear Force (kips)



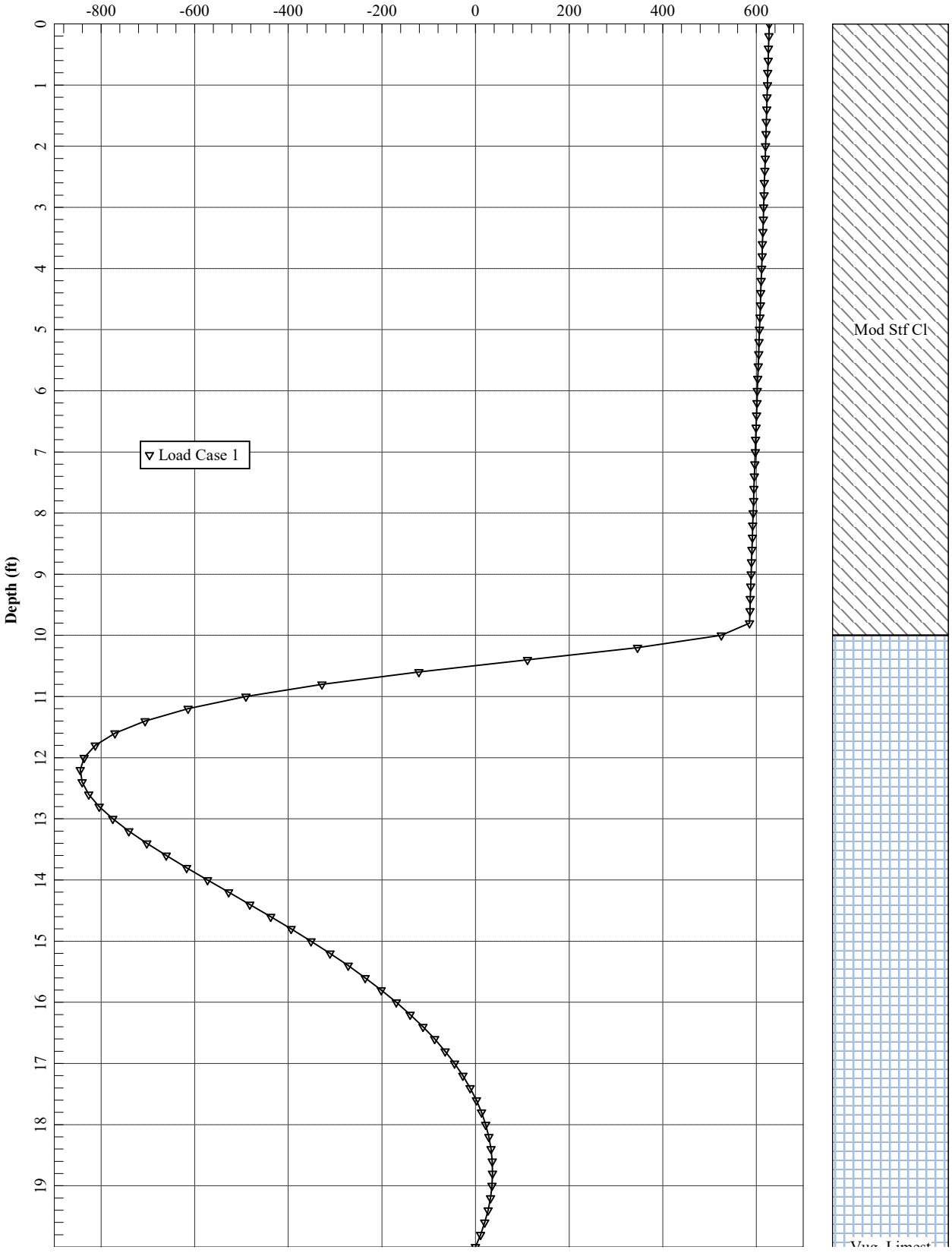
Interior Girder Column (B-5) 48-in Drilled Shaft
Lateral Pile Deflection (inches)



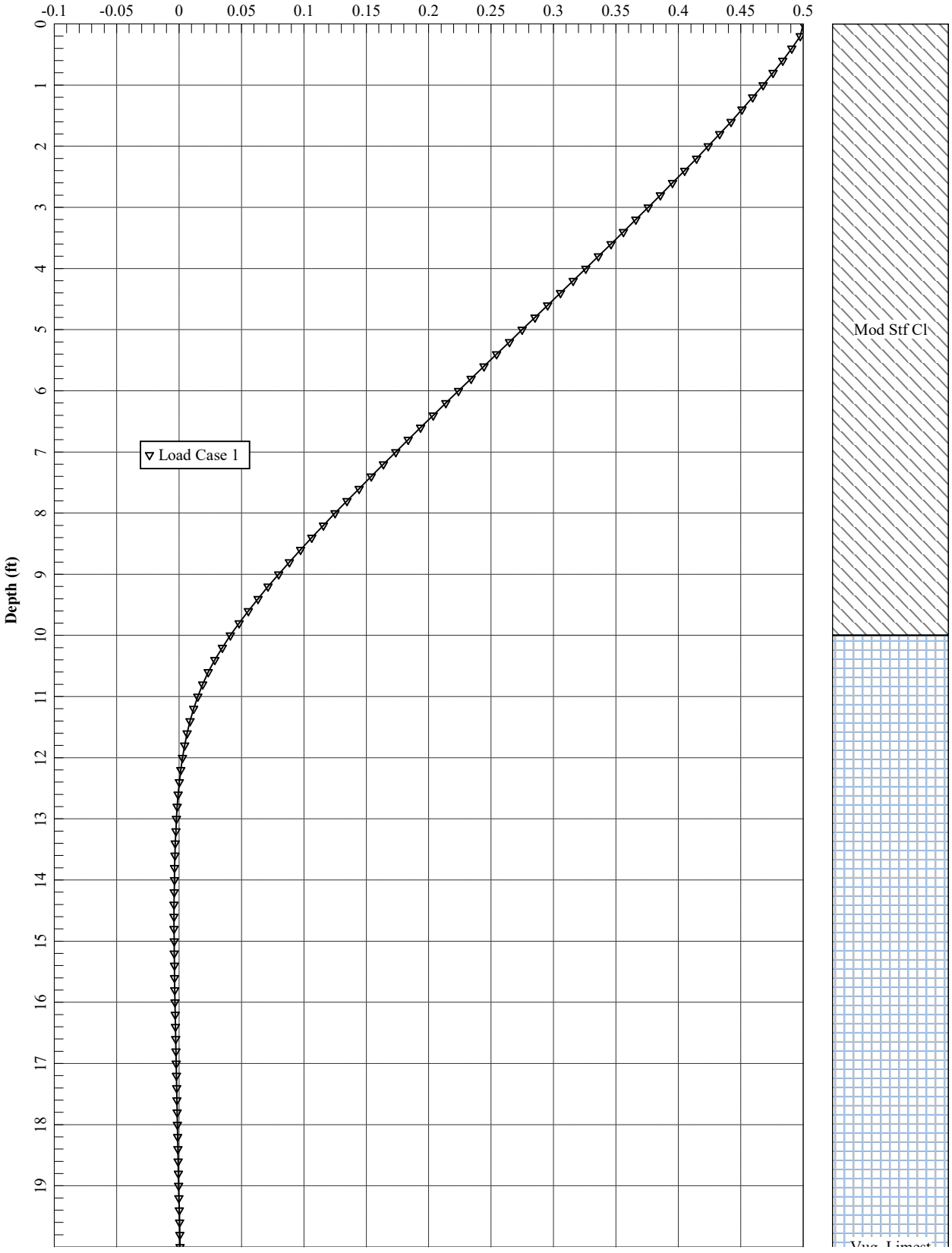
Interior Girder Column (B-5) 48-in Drilled Shaft
Bending Moment (in-kips)



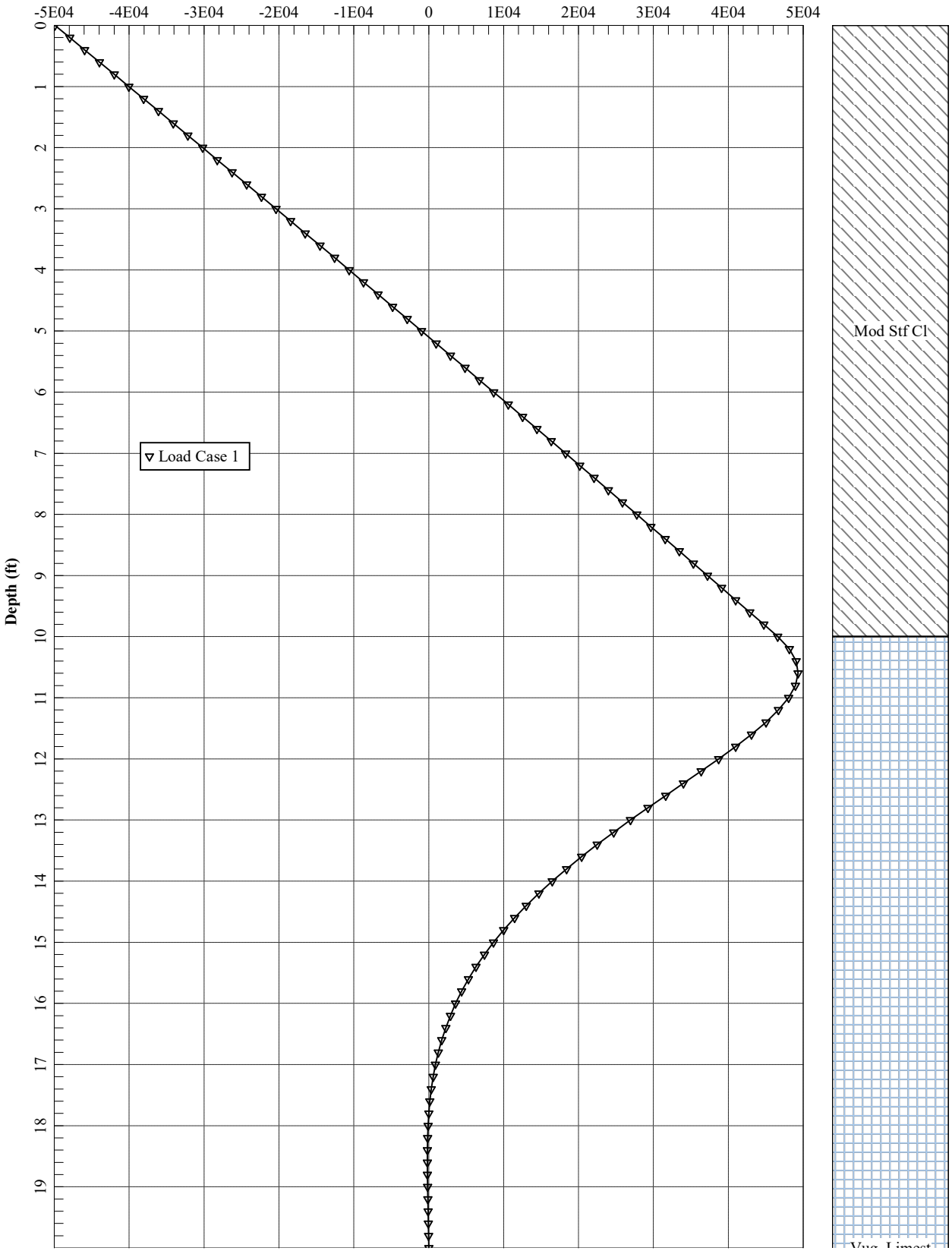
Interior Girder Column (B-5) 48-in Drilled Shaft
Shear Force (kips)



Interior Girder Column (B-5) 54-in Drilled Shaft
Lateral Pile Deflection (inches)



Interior Girder Column (B-5) 54-in Drilled Shaft
Bending Moment (in-kips)



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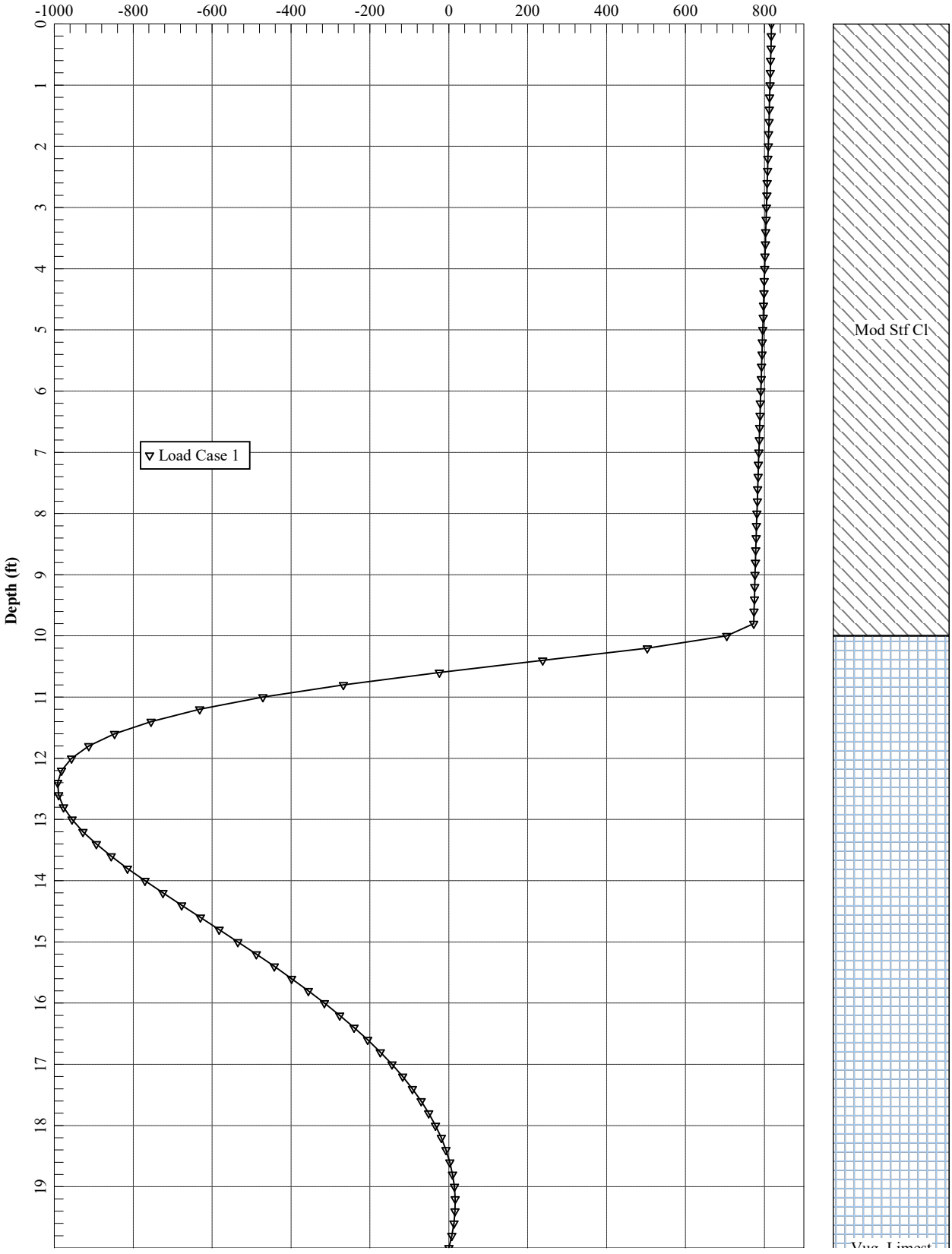
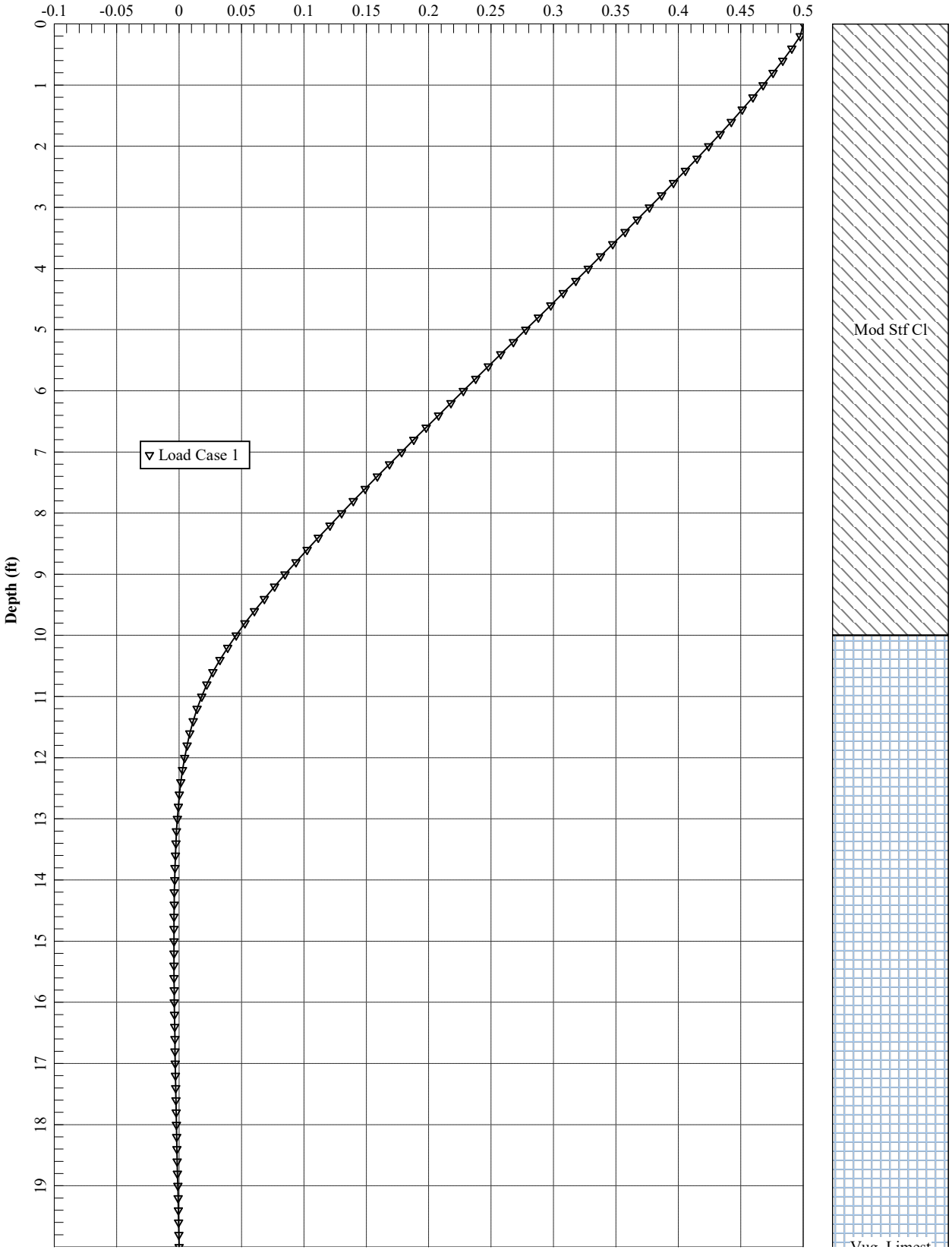
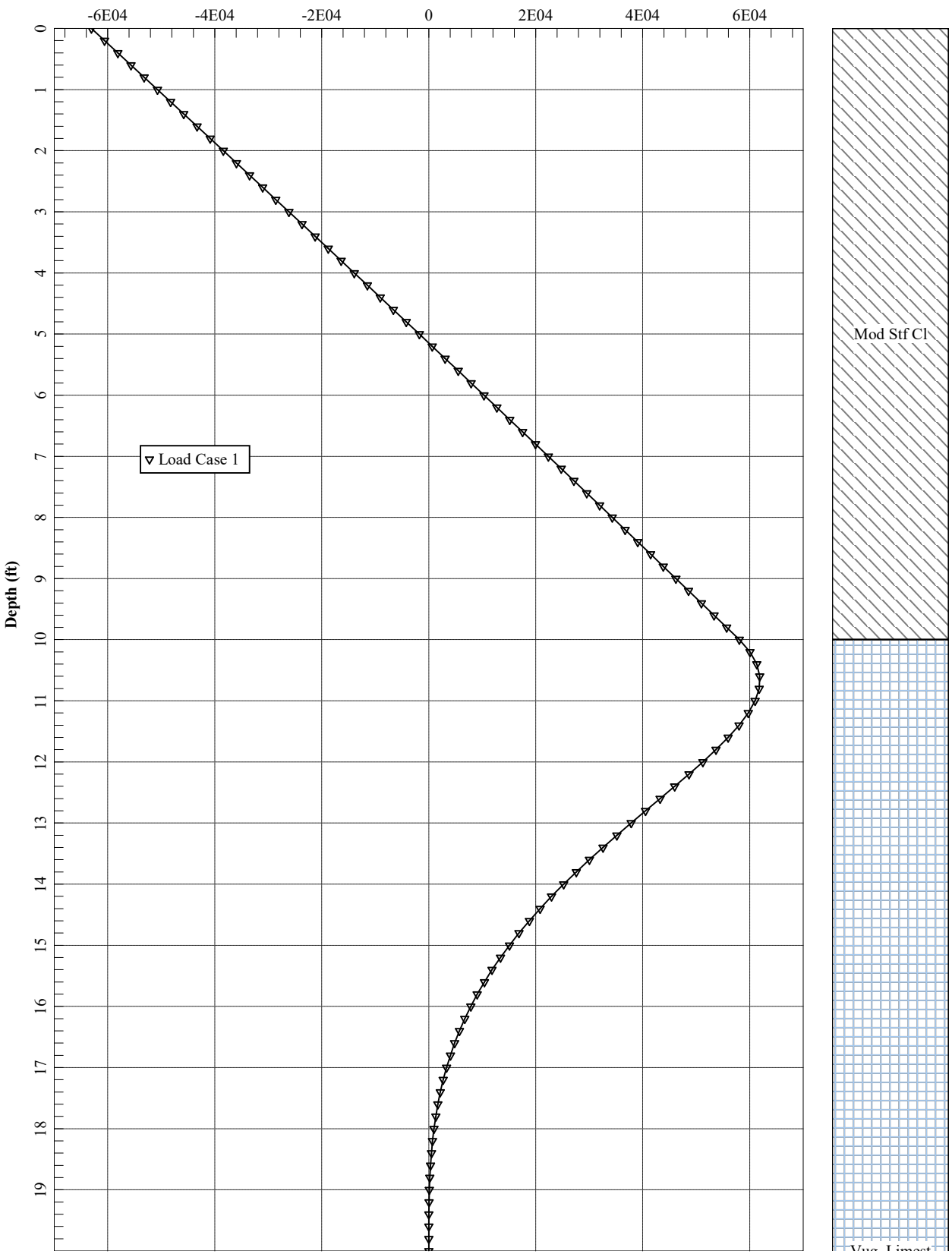
Shear Force (kips)



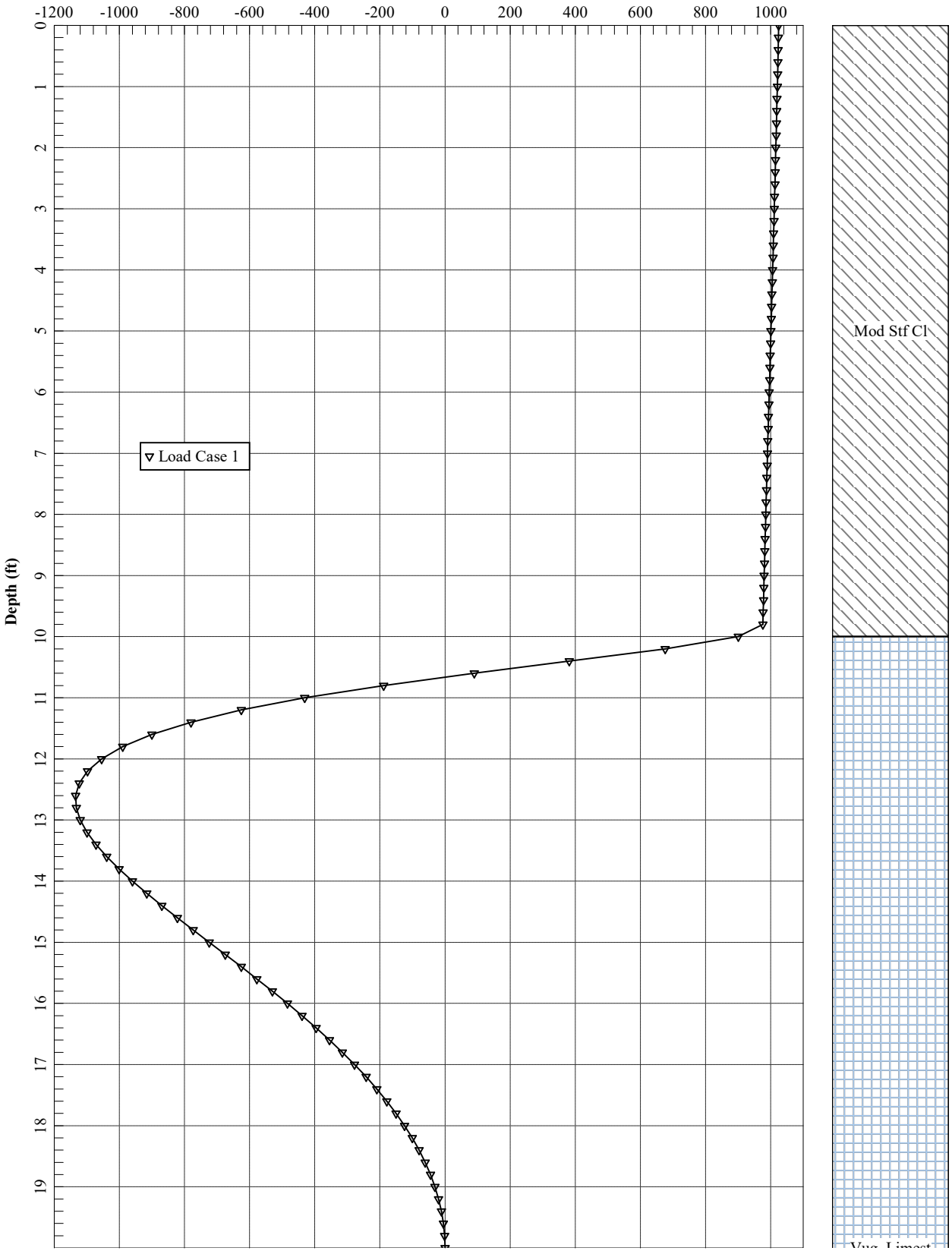
Interior Girder Column (B-5) 60-in Drilled Shaft
Lateral Pile Deflection (inches)



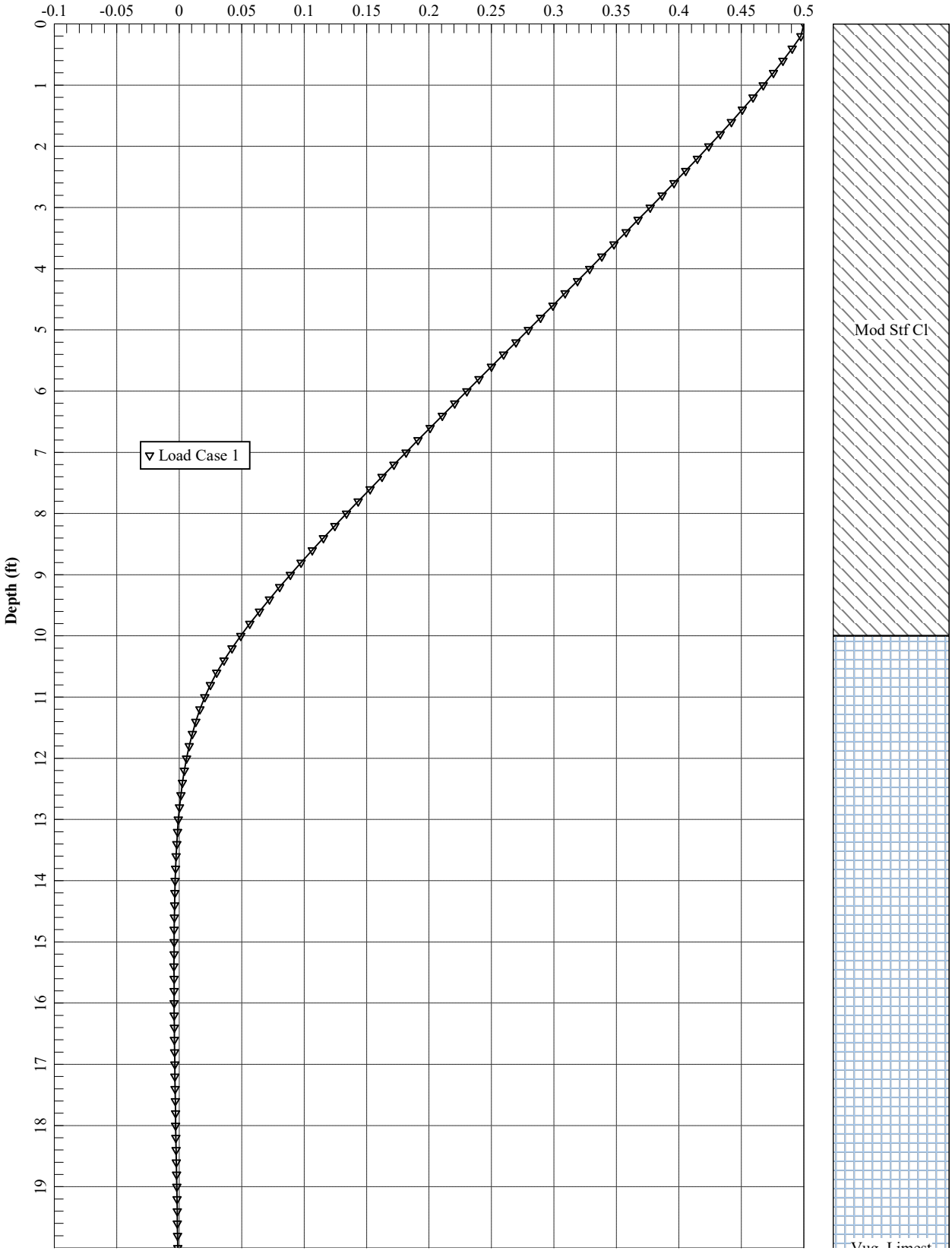
Interior Girder Column (B-5) 60-in Drilled Shaft
Bending Moment (in-kips)



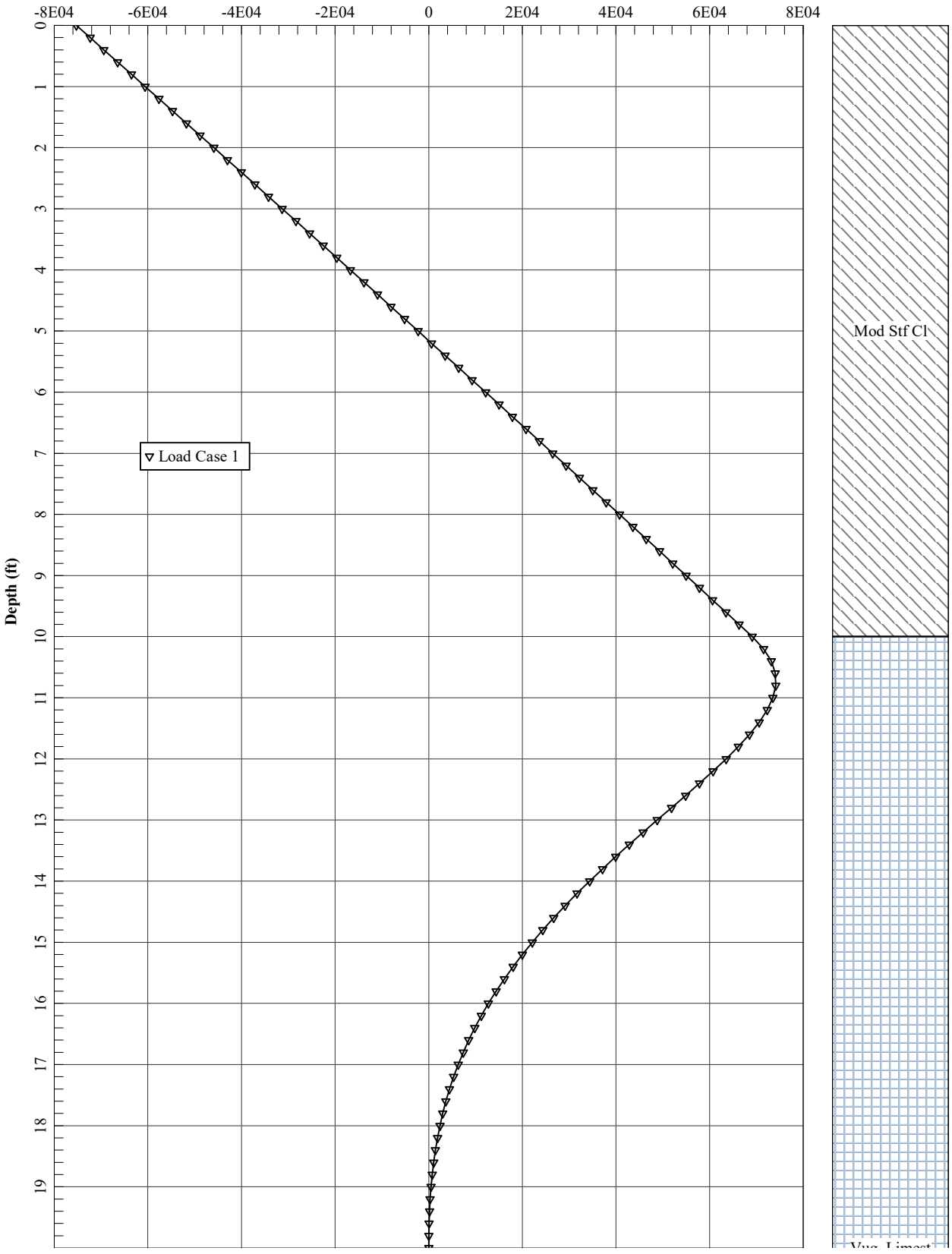
Interior Girder Column (B-5) 60-in Drilled Shaft
Shear Force (kips)



Interior Girder Column (B-5) 66-in Drilled Shaft
Lateral Pile Deflection (inches)



Interior Girder Column (B-5) 66-in Drilled Shaft
Bending Moment (in-kips)



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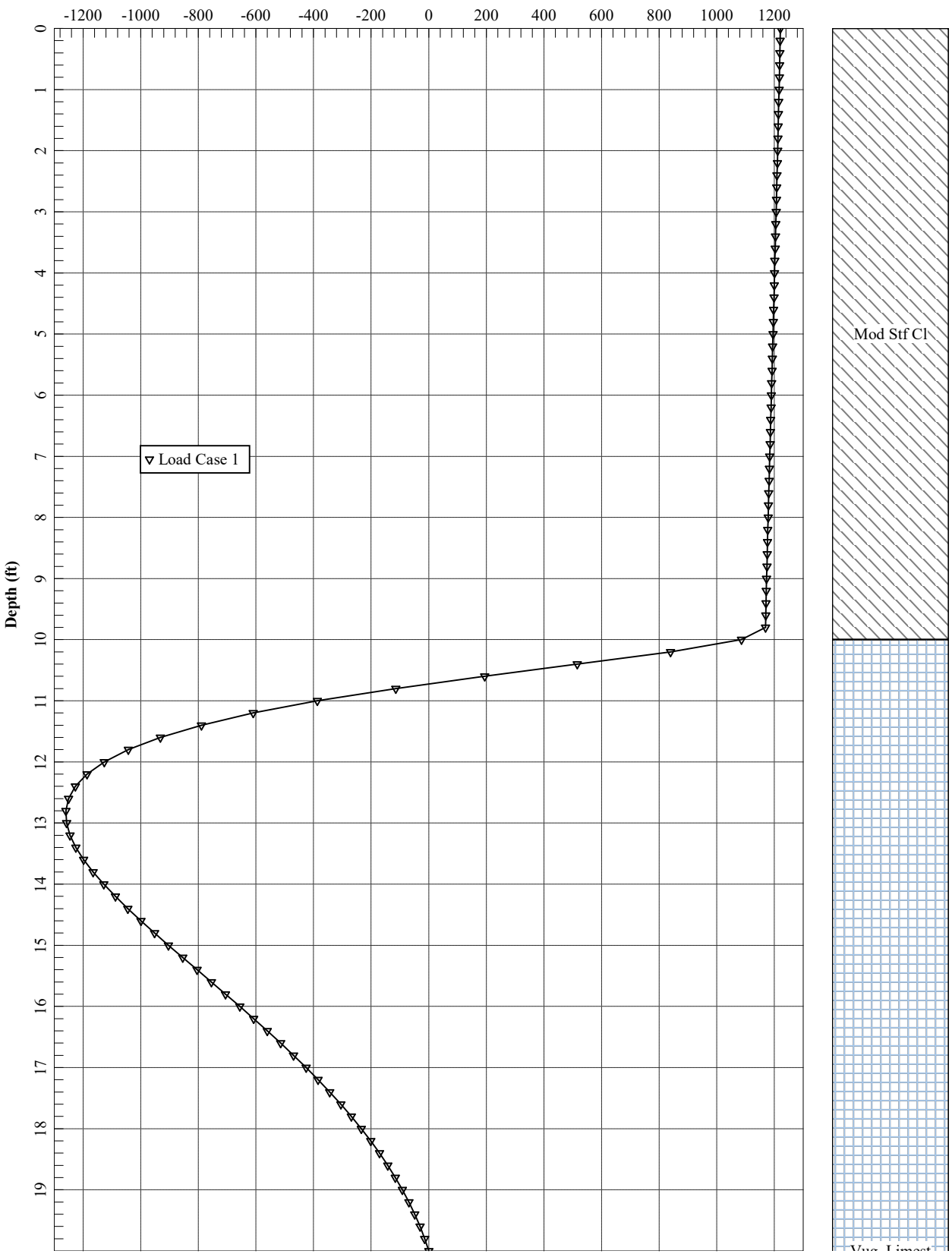
Shear Force (kips)



SECTION 00 31 43 – PERMIT APPLICATION

1.1 PERMIT APPLICATION INFORMATION

A. This document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations.

B. Permit Application: Complete permit applications and file with authorities having jurisdiction within five days of the date of execution of the Contract or when Shop Drawings are complete.

C. Permits and Fees submittals submitted and paid for by Architect include single submission to:
1. Kentucky Department of Housing Building and Construction
Division of Building Code Enforcement & Division of Plumbing
101 Sea Hero Road, Suite 100
Frankfort, KY 40601
a. Submitted Site and Foundation; Building Approval.

D. Permits, Shop Drawings, and Fees Submittals to KDHBC and other Agencies by Trade Contractors include, but are not limited to:
1. Sprinkler Fee
2. Fire Detection Fee
3. Stand Pipe Fee
4. Suppression Fee
5. Elevator Fee
6. Delegated Engineering Costs
7. LFUCG Sewer Capacity Tap Fee
8. KY Division of Water Fee

1.2 Attachments:

A. Fire Suppression Design Criteria

B. KDHBC Plan Application Plumbing Review

C. KDHBC Plan Application Building Review

D. DOW Permit – Sanitary

E. LFUCG Sanitary Sewer Capacity – Determination Letter & Approval Letter

F. NOI

END OF SECTION 00 31 13

PURSUANT TO: KRS 198.565 HBC FS-1 (REV. 07/13/06)

FIRE SUPPRESSION DESIGN CRITERIA

CASE NUMBER [1]: _____ DATE: 02-09-2023

PROJECT OR FACILITY NAME: UK Parking Structure 8 Addition

STREET ADDRESS: 110 Transcript Ave.

CITY: Lexington COUNTY: Fayette

WATER FLOW INFORMATION: (See work sheet on reverse side)

STATIC:	47.7	PSI
RESIDUAL:	37.7	PSI
WATER FLOW:	750	GPM
DURATION: [2]		MIN
SOURCE OF WATER SUPPLY: [3]	City Water	
SOURCE OF WATER FLOW DATA: [4]	Kentucky American Water Co.	
DATE AND TIME OF WATER FLOW TEST: [5]	02-16-2020	
ANTICIPATED WATER DEMAND: [6]	33	PSI
	446	GPM
CLASSIFICATION OF HAZARD(S): [7]	Light	
OCCUPANCY OF BUILDING: [8]	Office	
SPECIFIC TYPES OF SUPPRESSION SYSTEM(S):	Wet, Manual Dry Standpipe	
NFPA STANDARD(S) FOLLOWED IN DESIGN: [9]	13 & 14	

EXPLANATORY NOTES:

1. CASE NUMBER: (if known) This number is assigned by OHBC upon first plan submittal.
2. DURATION: The length of time that the water source is capable of providing adequate water during a fire condition
3. SOURCE OF WATER SUPPLY: Tank, Lake, Etc.
4. SOURCE OF WATER FLOW DATA: Person or persons who conducted test.
5. DATA AND TIME OF WATER FLOW TEST: Water flow test shall have been conducted within the past six months.
6. ANTICIPATED WATER DEMAND: Minimum water and pressure required to operate this system.
7. HAZARD CLASSIFICATION: Light, Ordinary Group 1, 2, 3, Extra Hazard Group 1, 2; Commodity Type (Rack/Piled)
8. OCCUPANCY OF BUILDING: Mercantile, Restaurant, Office, School, Industrial Plant, etc.
9. NFPA STANDARD(S) FOLLOWED IN DESIGN: 13, 14, 15, 22, 24 etc.

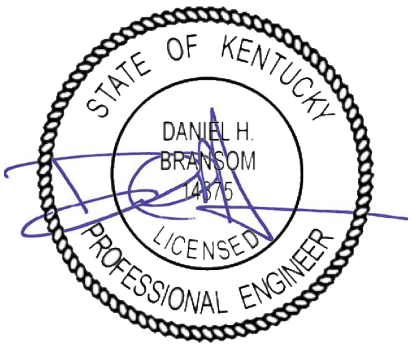
I Dan Branson, verify that the fire suppression design criteria is in accordance with all applicable codes and standards adopted by the Commonwealth and that the water flow information noted above is true and accurate. I further acknowledge that I have reviewed the anticipated water demand for this system and find the actual water flow and pressure adequate to serve this system. It is understood that I will be responsible for the approval of the final shop drawings prior to their submittal to the Division of Building Codes Enforcement:

COMPANY: KFI Engineers, Inc.

STREET: 3264 Lochness Drive

CITY: Lexington STATE: KY ZIP: 40517

PHONE: (859)405-0178



AFFIX SEAL AND SIGNATURE HERE

FIRE FLOW TEST DATA SHEET

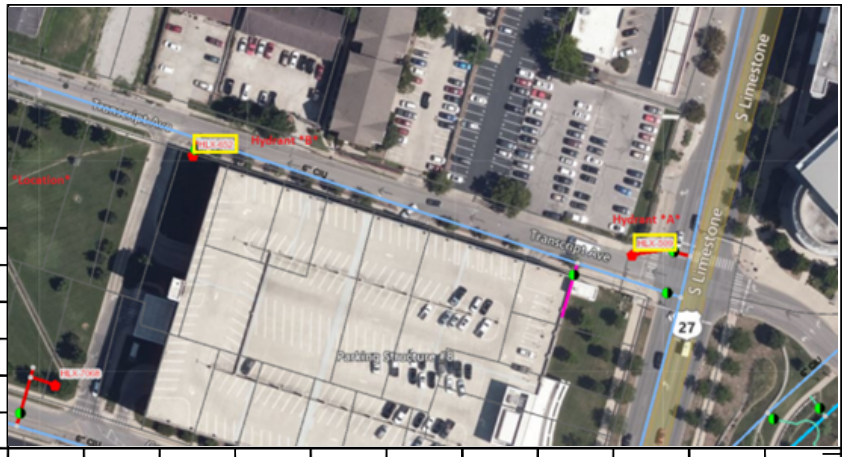
TEST DATA (2)

STATIC PRESSURE (PSI)	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	FLOW TABLE C – . ____	HYDRANT NOZZLE COEFFICIENT	HYDRANT #	HYDRANT BUTT #	FLOW OPENINGS (INCHES)	REMARKS
47.7	37.7				HLX-652			

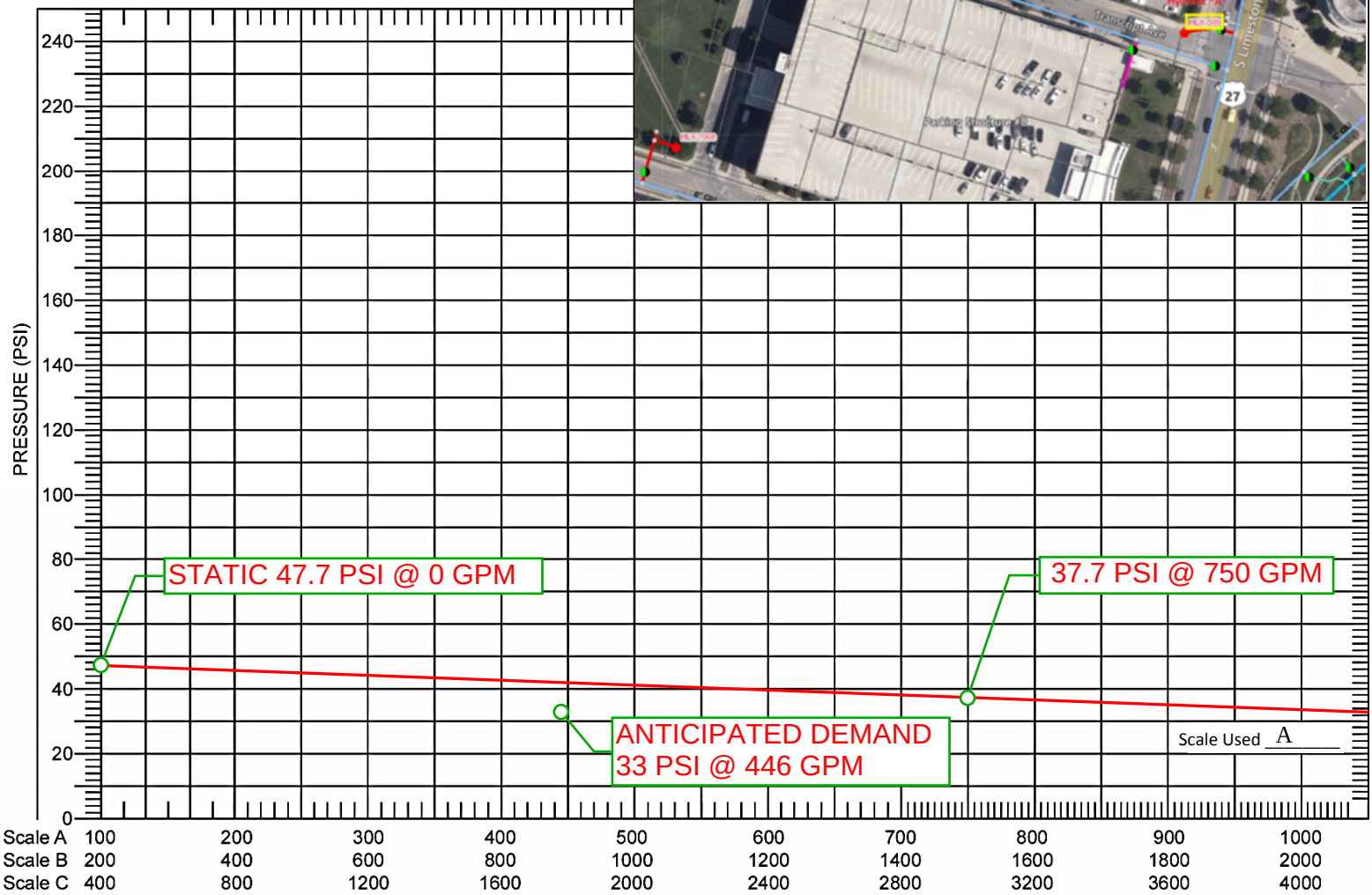
INSTRUCTIONS:

- Sketch site showing road(s), building(s), water main and location of test hydrants.
- Record test data in table provided.
- Plot and determine required design data.
- Transpose data to reverse side.

SKETCH OF TEST LOCATION



GRAPH (3)



PLAN APPLICATION FORM

PUBLIC PROTECTION CABINET
DEPARTMENT OF HOUSING, BUILDINGS AND CONSTRUCTION
DIVISION OF BUILDING CODE ENFORCEMENT & DIVISION OF PLUMBING
500 Mero Street, Floor 1
FRANKFORT, KENTUCKY 40601-5412

BUILDING CODES: 502/ 573-0373 PLUMBING: 502/ 573-0397

NOTE: Complete all applicable spaces **Today's Date:** April 10, 2023 REV.1/2020

NAME OF PERSON SUBMITTING PLANS Vanya Bistrekova Phone (859)221-0848 Ext
IS THE BCE PLAN REVIEW FEE INCLUDED WITH PLANS? ☐ Yes ☒ No

MAILING ADDRESS: 3264 Loch Ness Dr SUITE 2 (NUMBER / STREET, HWY, ROAD or P. O. BOX) Lexington (CITY) KY (STATE) 40517- (ZIP CODE)

FAX: **EMAIL:** vnbistrekova@kfi-eng.com **SEND APPROVAL LETTER VIA: FAX** ☐ **EMAIL** ☒ **POSTAL** ☐

BUSINESS & PROJECT NAME: University of Kentucky - Parking Structure 8 Expansion
(Or tenant name if multi-tenant building) ***PLEASE NOTE IF PROJECT IS INSIDE OR OUTSIDE LIMITS OF CITY NOTED BELOW***

PROJECT LOCATION: 110 Transcript Ave (NUMBER/STREET, HWY OR ROAD (Please do not indicate P.O. Box or Postal Routes)) Lexington (CITY) KY (STATE) 40508 (ZIP CODE)

IF PROJECT IS EXISTING, PLEASE NOTE PREVIOUS NAME:

PROJECT LOCATED WITHIN CITY LIMITS? ☒ **Yes** ☐ **No** COUNTY Fayette

OWNER (INDIVIDUAL & COMPANY) University of Kentucky CPMD PHONE ( ) - Ext

MAILING ADDRESS: 411 South Limestone Street, Suite 222 (NUMBER / STREET, HWY, ROAD or P. O. BOX) Lexington (CITY) KY 40508 - (STATE ZIP CODE)

FAX: **EMAIL:**

ARCHITECT (NAME & FIRM) JRA Architects PHONE (859) 257 -5911 Ext

AS THE ARCHITECT LISTED ABOVE, I AM RESPONSIBLE FOR CONSTRUCTION CONTRACT ADMINISTRATION ☐ **Yes** ☒ **No**

MAILING ADDRESS: 3225 Summit Square Pl # 200 (NUMBER / STREET, HWY, ROAD or P. O. BOX) Lexington (CITY) KY (STATE) 40509 (ZIP CODE)

FAX: **EMAIL:** mdeluca@jrarchitects.com

NOTE: DESIGN CERTIFICATION REQUIRED. All buildings or structures requiring professional design (Architect or Engineer) by Section 122 of the 2013 KBC shall include a statement from the design professional in responsible charge indicating the Seismic Design Category for this specific site and the applicability of seismic bracing requirements for architectural, mechanical and electrical components and a statement to that effect shall be included with the initial construction documents submitted to the building code official having jurisdiction. This does not apply for Plumbing submission only.

ENGINEER (NAME & FIRM) Matt Gurley PHONE (859)537-1060 Ext

MAILING ADDRESS: 3264 Loch Ness Dr SUITE 2 (NUMBER / STREET, HWY, ROAD or P. O. BOX) Lexington (CITY) KY (STATE) 40517- (ZIP CODE)

FAX: **EMAIL:** mcgurley@kfi-eng.com

PROJECT CONTRACTOR Messer Construction Co. PHONE (859)621 -5181 Ext

MAILING ADDRESS: 854 West Main Street (NUMBER / STREET, HWY, ROAD or P. O. BOX) Lexington (CITY) 40508 (STATE ZIP CODE)

FAX: **EMAIL:**

BUILDING INFORMATION

NUMBER OF BUILDINGS IN THIS SUBMITTAL:	2	**USE OF BUILDING(S) ie...restaurant, office, classroom, storage or other (please specify)**	Storage and Office

BUILDING(S) IN THIS PROJECT IS / ARE: ☒ NEW FREESTANDING BUILDING ☒ NEW ADDITION TO EXISTING STRUCTURE ☐ RENOVATION ONLY ☐ RENOVATION & ADDITION

TOTAL AREA IN NEW BLDG. OR ADDITION:	304,621 **FT²**	**NUMBER OF LEVELS** (INCLUDING BASEMENT):	7	**BASEMENT**	☐ **Yes**	☒ **No**	
TOTAL AREA IN EXISTING BLDG.:	606,296 **FT²**	**DATE CONSTRUCTION TO BEGIN:**	6/2023	**ESTIMATED COMPLETION DATE:**	4/2025		

TYPE OF PLAN SUBMITTALS

BUILDING PLAN SUBMITTALS (Check the type of evaluations requested at this time)

SHOP DRAWING PLAN SUBMITTALS (Check the type of evaluations requested at this time)

BUILDING PLAN REVIEW (BCE)
- Full Building Review ☐
- Expedited Site & Foundation Review ☐
- Other

PLUMBING PLAN REVIEW
- Plumbing Review ***ONLY*** ☒
- Water Supply Review ☐
- Waste Water Review ☐
- Other (please specify) ☐

- Suppression System (Sprinkler, CO^2, Etc.) ☐
- Alarm Systems ☐
- Boiler System ☐
- Bleacher Seating ☐
- Range Hood System ☐
- Fuel Tank ☐
- Elevator ☐
- Swimming Pool ☐
- Prefabricated Truss ☐

SUBMIT ONLY ONE SET FOR BCE | SUBMIT 3 SETS OF PLANS FOR PLB | ***SUBMIT ONLY ONE SET OF PLANS FOR THE ABOVE***

THE INFORMATION IN THIS SECTION IS FOR THE DIVISION OF PLUMBING (TO BE COMPLETED BY PERSON SUBMITTING PLANS)

DESIGN CAPACITY OF BUILDING: NO. OF MALES NO. OF FEMALES **ARE RESTROOMS ACCESSIBLE TO PUBLIC?** ☒ **Yes** ☐ **No**

SEWAGE DISPOSAL: **TYPE:** ☒ **Municipal** ☐ **Private** **ARE RESTROOMS ACCESSIBLE TO DISABLED?** ☒ **Yes** ☐ **No**

WATER SUPPLY:
☒ **PUBLIC** ☐ **DRILLED WELL** ☐ **CISTERN** ☐ **HAULED WATER** ☐ **ROOF WATER** ☐ **SPRING** ☐ **STREAM**

IF PRIVATE, INDICATE THE TYPE AND THE DESIGN:

BY WHOM:
NAME TITLE REGISTRATION NUMBER

THIS SECTION TO BE COMPLETED BY THE LOCAL HEALTH DEPARTMENT OFFICIAL (Must be completed prior to sending **Plumbing Plans** to Frankfort)

REVIEWED BY:

NAME

TITLE DATE

*APPROVED BY (*COUNTY OR DISTRICT HEALTH DEPARTMENT)

THIS AREA FOR OFFICE USE ONLY

Andy Beshear
Governor

Jacqueline Coleman
Lieutenant Governor

Ray A. Perry
Secretary

PUBLIC PROTECTION CABINET
Department of Housing, Buildings and Construction
Building Codes Enforcement
500 Mero Street, First Floor
Frankfort, KY 40601
Phone: 502-573-0373

Rick Rand
Commissioner

Max Fuller
Deputy Commissioner

April 25, 2023

Timothy Aldridge
6602 E 75th St Ste 210
Indianapolis, IN 46250

RE: 2303-002591
University of Kentucky
Parking Structure 8 Expansion
Building Addition
110 Transcript Ave
Lexington, KY 40508 / Fayette
Code Year: 2018 Kentucky Building Code
Conditional Approval

Dear Timothy Aldridge,

The Division of Building Code Enforcement has reviewed the plans submitted by your organization.

This letter is authorization to start or continue with the construction of the project as listed above and subject to any conditions listed below. Failure of this office to note all violations in the review of plans and specifications does not relieve contractors of the responsibility of complying with the applicable Codes and Regulations.

This authorization does not release the owner from complying with local planning and/or zoning requirements or the requirement to obtain a local building permit. Permits shall be obtained from the respective agencies prior to the installation of plumbing, mechanical, or electrical wiring.

Be Advised: Fire alarm shop drawings and sprinkler system shop drawings shall be submitted for separate review and approval. Include all associated manufacturers specification cut sheets with drawings and be advised that a separate review fee shall be required for each system. At the completion of construction, a final report of special inspections documenting completion of all required special inspections and correction of any discrepancies noted in the inspections shall be submitted to the building official by the design professional in responsible charge prior to issuance of a certificate of occupancy.

Deficiency List:

1. Submit a current boundary line survey bearing the seal and signature of a Kentucky licensed Land Surveyor. **No construction can begin until the land survey is reviewed and approved by this office.** (Section 105.3 (2) & 107.1, 2018 KBC)

Sincerely,

C. P. Luttrell

CP Luttrell, Building Codes Plan Reviewer I
cp.luttrell@ky.gov

Jim Bozeman

Jim Bozeman, Technical Advisor

CC: Justin Kimes, Building Codes Field Inspector I

Permit Number 2303-002591

PLAN APPLICATION FORM

PUBLIC PROTECTION CABINET
DEPARTMENT OF HOUSING, BUILDINGS AND CONSTRUCTION
DIVISION OF BUILDING CODE ENFORCEMENT & DIVISION OF PLUMBING
500 Mero Street, Floor 1
FRANKFORT, KENTUCKY 40601-5412

BUILDING CODES: 502/ 573-0373 PLUMBING: 502/ 573-0397

NOTE: Complete all applicable spaces **Today's Date:** REV.1/2020

NAME OF PERSON SUBMITTING PLANS Timothy Aldridge Phone (317) 842- 6890 Ext
IS THE BCE PLAN REVIEW FEE INCLUDED WITH PLANS? ☐ Yes ☒ No
MAILING ADDRESS: 6602 E 75th St., Suite 210 - - -
NUMBER / STREET, HWY, ROAD or P. O. BOX | CITY | STATE | ZIP CODE

FAX: **EM** TALDRIDGE@WALKERCONSULTANTS.COM **SEND APPROVAL LETTER VIA: FAX** ☐ **EMAIL** ☒ **POSTAL** ☐

BUSINESS & PROJECT NAME: University of Kentucky- Parking Structure 8 Expansion
(Or tenant name if multi-tenant building) ***PLEASE NOTE IF PROJECT IS INSIDE OR OUTSIDE LIMITS OF CITY NOTED BELOW***
PROJECT LOCATION: 110 Transcript Ave. Lexington KY 40508
NUMBER/STREET, HWY OR ROAD (Please do not indicate P.O. Box or Postal Routes) | CITY | STATE | ZIP CODE

IF PROJECT IS EXISTING, PLEASE NOTE PREVIOUS NAME:

PROJECT LOCATED WITHIN CITY LIMITS? ☒ **Yes** ☐ **No** COUNTY Fayette

OWNER (INDIVIDUAL & COMPANY) University of Kentucky CPMD PHONE (859)257 - 5911 Ext
MAILING ADDRESS: 411 South Limestone Street, Suite 222 Lexington KY 40508
NUMBER / STREET, HWY, ROAD or P. O. BOX | CITY | STATE | ZIP CODE

FAX: **EMAIL:**

ARCHITECT (NAME & FIRM) JRA Architects PHONE (859)257 - 5911 Ext
AS THE ARCHITECT LISTED ABOVE, I AM RESPONSIBLE FOR CONSTRUCTION CONTRACT ADMINISTRATION ☐ **Yes** ☒ **No**
MAILING ADDRESS: 3225 Summit Square Pl # 200 Lexington KY 40509
NUMBER / STREET, HWY, ROAD or P. O. BOX | CITY | STATE | ZIP CODE

FAX: **EMAIL:** mdeluca@jrarchitects.com

NOTE: DESIGN CERTIFICATION REQUIRED. All buildings or structures requiring professional design (Architect or Engineer) by Section 122 of the 2013 KBC shall include a statement from the design professional in responsible charge indicating the Seismic Design Category for this specific site and the applicability of seismic bracing requirements for architectural, mechanical and electrical components and a statement to that effect shall be included with the initial construction documents submitted to the building code official having jurisdiction. This does not apply for Plumbing submission only.

ENGINEER (NAME & FIRM) Walker Consultants, Inc. PHONE (317) 842-6890 Ext
MAILING ADDRESS: 6602 E 75th St., Suite 210 Indianapolis Indiana 46250
NUMBER / STREET, HWY, ROAD or P. O. BOX | CITY | STATE | ZIP CODE

FAX: **EMAIL:** TALDRIDGE@WALKERCONSULTANTS.COM

PROJECT CONTRACTOR Messer Construction Co. PHONE (859)621 - 5181 Ext
MAILING ADDRESS: 854 West Main Street Lexington KY 40508
NUMBER / STREET, HWY, ROAD or P. O. BOX | CITY | STATE | ZIP CODE

FAX: **EMAIL:** sfryman@messer.com

BUILDING INFORMATION

NUMBER OF BUILDINGS IN THIS SUBMITTAL:	2	**USE OF BUILDING(S) ie...restaurant, office, classroom, storage or other (please specify)**	Storage and Office
BUILDING(S) IN THIS PROJECT IS / ARE:	☒ NEW FREESTANDING BUILDING	☒ NEW ADDITION TO EXISTING STRUCTURE	☐ RENOVATION ONLY / ☐ RENOVATION & ADDITION
TOTAL AREA IN NEW BLDG. OR ADDITION:	304,621 FT²	**NUMBER OF LEVELS (INCLUDING BASEMENT):** 7	**BASEMENT** ☐ Yes ☒ No
TOTAL AREA IN EXISTING BLDG.:	606,296 FT²	**DATE CONSTRUCTION TO BEGIN:** 6/2023	**ESTIMATED COMPLETION DATE:** 4/2025

TYPE OF PLAN SUBMITTALS

BUILDING PLAN SUBMITTALS (Check the type of evaluations requested at this time)

BUILDING PLAN REVIEW (BCE)
- Full Building Review ☒
- Expedited Site & Foundation Review ☐
- Other

PLUMBING PLAN REVIEW
- Plumbing Review ***ONLY*** ☐
- Water Supply Review ☐
- Waste Water Review ☐
- Other (please specify) ☐

SUBMIT ONLY ONE SET FOR BCE | SUBMIT 3 SETS OF PLANS FOR PLB

SHOP DRAWING PLAN SUBMITTALS (Check the type of evaluations requested at this time)

Suppression System (Sprinkler, CO^2, Etc.)	☒	Range Hood System	☐
Alarm Systems	☐	Fuel Tank	☐
Boiler System	☐	Elevator	☒
Bleacher Seating	☐	Swimming Pool	☐
		Prefabricated Truss	☐

SUBMIT ONLY ONE SET OF PLANS FOR THE ABOVE

THE INFORMATION IN THIS SECTION IS FOR THE DIVISION OF PLUMBING (TO BE COMPLETED BY PERSON SUBMITTING PLANS)

DESIGN CAPACITY OF BUILDING: NO. OF MALES NO. OF FEMALES
ARE RESTROOMS ACCESSIBLE TO PUBLIC? ☐ Yes ☐ No
SEWAGE DISPOSAL: **TYPE:** ☐ **Municipal** ☐ **Private**
ARE RESTROOMS ACCESSIBLE TO DISABLED? ☐ Yes ☐ No

WATER SUPPLY:
☐ **PUBLIC** ☐ **DRILLED WELL** ☐ **CISTERN** ☐ **HAULED WATER** ☐ **ROOF WATER** ☐ **SPRING** ☐ **STREAM**

IF PRIVATE, INDICATE THE TYPE AND THE DESIGN:

BY WHOM:
NAME | TITLE | REGISTRATION NUMBER

THIS SECTION TO BE COMPLETED BY THE LOCAL HEALTH DEPARTMENT OFFICIAL (Must be completed prior to sending **Plumbing Plans** to Frankfort)

REVIEWED BY:

NAME

TITLE DATE

*APPROVED BY (*COUNTY OR DISTRICT HEALTH DEPARTMENT)

THIS AREA FOR OFFICE USE ONLY

Andy Beshear
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
300 Sower Boulevard
Frankfort, Kentucky 40601
Phone: (502) 564-2150
Fax: 502-564-4245

Rebecca W. Goodman
SECRETARY

Anthony R. Hatton
COMMISSIONER

May 4, 2023

Shelby Fryman
Messer Construction Co
854 W Main St
Lexington, KY 40508

Re: KYR10 Coverage Acknowledgment
KPDES No.: KYR10R387
UK Parking Structure 8 Expansion
Permit Type: Construction Stormwater
AI ID: 1104
Fayette County, Kentucky

Dear Shelby Fryman:

The discharges associated with the Notice of Intent you submitted have been approved for coverage under the "Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Storm Water Discharges Associated with Construction Activities (KYR100000)" master general permit. Your coverage becomes effective on the date of this letter. This coverage automatically terminates two years from the effective date of your coverage unless an extension is requested prior to the termination date, until the KYR100000 master general permit expires on November 30, 2024, or the Division of Water revokes coverage, whichever comes first. During this period of coverage all discharges shall comply with the conditions of the KYR100000 master general permit. This permit and links to the eNOI (and permit coverage extension) and eNOT forms can be found on our website: https://eec.ky.gov/Environmental-Protection/Water/PermitCert/KPDES/Documents/KYR10PermitPage.pdf.

Any person aggrieved by the issuance of a permit final decision may demand a hearing pursuant to KRS 224.10-420(2) within thirty (30) days from the date of the issuance of this letter. Any demand for a hearing on the permit shall be filed in accordance with the procedures specified in KRS 224.10-420, 224.10-440, 224.10-470, and the regulations promulgated thereto. The request for hearing should be submitted in writing to the Energy and Environment Cabinet, Office of Administrative Hearings, 211 Sower Boulevard, Frankfort, Kentucky 40601 and the Commonwealth of Kentucky, Energy and Environment Cabinet, Division of Water, 300 Sower Boulevard, Frankfort, Kentucky 40601. For your record keeping purposes, it is recommended that these requests be sent by certified mail. The written request must conform to the appropriate statutes referenced above.

Any questions concerning the general permit and its requirements should be directed to me at 502-782-6944 or email me at Barry.Elmore@ky.gov

Construction Site GPS Coordinates: 38.031694, -84.511683
Receiving Water: University of KY MS4

Sincerely,

Barry Elmore

Barry Elmore
Surface Water Permits Branch
Division of Water

cc: Robert Daniel, Frankfort Regional Office
Kevin Lucas, University of Kentucky MS4 Coordinator

FORM S-1

Commonwealth of Kentucky
Energy and Environment Cabinet
Division of Water

CONSTRUCTION PERMIT APPLICATION for CLEAN WATER COLLECTION SYSTEM

See the INSTRUCTIONS for more information about selected portions of this application.
Questions on completing this application? Contact the Water Infrastructure Branch at 502/564-3410 or visit our website at http://water.ky.gov for more information.

I. CONSTRUCTION PROJECT INFORMATION

Project Name: University of Kentucky Parking Structure 8, LFUCG Sanitary Sewer Relocation

Name of WWTP which will treat sewage from this project: Town Branch Wastewater Treatment Plant

KPDES Number of the WWTP: KY 0021491 WWTP County: Fayette

Name of Receiving Collection System (if different than WWTP):

KPDES Number of Receiving Collection System (if applicable): KY _____ Project County: _____

Project Latitude/Longitude (DMS): 38º 01' 52.31"N 84º 30' 43.2396" W Estimated Construction Cost: $ 500,000

Identify the funding sources for the project:

☐ CWSRF ☐ SPAP ☐ Other: University of Kentucky

If the project is SRF, is the SRF Plans and Specs Checklist included? _____

II. APPLICANT MAILING ADDRESS

Applicant (Entity paying for construction): Scotty Bowles, University of Kentucky

Street Address: Capitol Project Management, 222 Peterson Services Building,

City, State, Zip: Lexington KY 40506-0005

Phone: 859-963-8230 Fax: _____ E-mail: scott.bowles@uky.edu

Will ownership be transferred? ❑ Yes, future owner will be: _____ ☑ No

III. DESIGN CONSIDERATIONS

A. PLANS AND SPECIFICATIONS COMPLIANCE REQUIREMENTS:

Design plans and specifications shall comply with **401 KAR 5:005** and **"Recommended Standards for Wastewater Facilities" ("Ten States' Standards")**, 2014 edition. If engineering practices, other than those contained in "Ten States' Standards", were used in the design, indicate the source and the corresponding portion of the design. **[See 401 KAR 5:005, Section 7]**

Plans and specification submittals shall meet one of the following options:

☐ Submit at least one paper printed set of detailed plans (no larger than 24" x 36") and a PDF copy of the plans and specifications on a data storage device such as a USB flash drive. Both copies shall be dated with a stamp, signature of a licensed professional engineer in Kentucky which complies with the requirements of 201 KAR 18:104. The plans digital plans shall consist of a single pdf file and be in a folder called "Engineering Plans" and the specifications manual shall be in a folder called "Specifications".

☑ Submit a PDF copy of the plans and specifications digitally via the electronic form on the KY One Stop Business Portal website. The PDF copy shall be dated with stamp and signature of a licensed engineer in Kentucky which complies with the requirements of 201 KAR 18:104 Section 3. The plans shall be submitted as a single pdf file.

B. **DESIGN ENGINEER,** if the project will become part of a sewer system served by a regional facility. **[Section 6]**

P.E.'s Name: R. Derek Motsch Firm: Element Design

Street Address: 366 South Broadway

City, State, Zip: Lexington KY 40515

Phone: 859-389-6533 Fax: _____ E-mail: derek@element-site.com

C. **CONFORMITY TO PLANS AND SPECIFICATIONS.** Provide name of person who will inspect and certify that the constructed facility conforms to the approved plans and specifications. If the sewer lines will become part of a sewer system served by a regional facility, this person must be a professional engineer (P.E.). **[Section 3]**

Name: R. Derek Motsch Firm: Element Design

Street Address: 366 South Broadway

City, State, Zip: Lexington KY 40515

Phone: 859-389-6533 Fax: _____ E-mail: derek@element-site.com

D. **DESIGN CAPACITIES.** The amount of average daily flow added by the sewer line extension is 0 gpd. The basis for the amount of additional flow is project is a relocation project. The line is being moved so a parking garage can be expanded.

E. **OTHER INFORMATION TO BE SUBMITTED WITH APPLICATION.** Place a **check (✓)** by the items that are included in this application or an **N/A** if the item is not applicable to the project.

X 1. A copy of a USGS 7½ minute topographic map with the locations of the proposed sewer lines shown. **[Section 3]**

NA 2. If modifying, replacing or abandoning an existing facility, a closure plan indicating how the new facility will be constructed without a by-pass to a stream and the procedures that will be used for abandoning the existing facility. **[Section 3]**

NA 3. If the project includes a pump station, provide the pump performance curve, design calculations, and detailed wet well drawing with elevations. **[Section 8]**

X 4. If the project includes gravity sewer lines or force mains, a plan view and a profile view of each. **[Section 6]**

NA 5. A model of the hydraulic analysis if the project consists of, or is connected to a network of pumps. **[Section 8]**

X 6. A brief description of the project, including what is being constructed, who will be served by this project, the flow rate, and the flow rate calculations. **[Section 8]**

X 7. A signed letter from the owner of the proposed sewer line stating that the owner will accept responsibility for

the operation and maintenance of the sewer line when it is constructed. **[Section 8]**

X 8. Letters from both the owner of the sewer system and the WWTP stating that they approve the connection and accept responsibility for the additional flow. **[Section 8]**

X 9. A written statement that the portion of the sewer system used by the connection has adequate capacity to transport the current and anticipated peak flow to the WWTP and that the portion of the sewer system used by the connection is not subject to excessive infiltration or excessive inflow. **[Section 8]**

X 10. A written statement that the WWTP has adequate capacity to treat the current and anticipated flow and is not subject to excessive infiltration or excessive inflow. **[Section 8]**

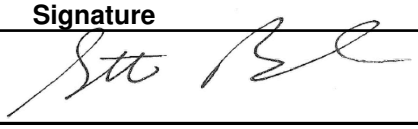
IV. Fees

Fees. Check or money order must be made payable to "**Kentucky State Treasurer**" for the total amount. **Fees do not apply** for a municipality, sanitation district, or other publicly owned facility. **[Section 5]** If claiming Non-Profit status, provide proof.

Sewer Collection Project Category: public owned facility **Total Amount:** $ 0.00

VI. CERTIFICATION

I, the applicant, certify under penalty of law that this document and all attachments were prepared under my direction or supervision. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment or both for known violations. **[Section 2]**

Applicant's Name and Official Title (Type or Print)	**Phone Number (Include area code)**
Scotty Bowles	859-963-8320
Signature 	**Date** 3/20/2023

MAYOR LINDA GORTON

LEXINGTON

CHARLES H. MARTIN, P.E.
DIRECTOR
WATER QUALITY

March 7, 2023

Derek Motsch
366 S. Broadway
Lexington, KY 40515

Re: Sanitary Sewer Capacity - Determination Letter
110 Transcript Avenue (Parking Structure No. 8)

Dear Derek Motsch:

The capacity request for the referenced development meets the technical requirements to be approved for a permanent allocation of 1,718.64 gallons per day (gpd) of sewer capacity credits.

In order for the Division of Water Quality to reserve the Sanitary Sewer Capacity for your request, you are required to pay your non-refundable CAP Administration Fee within 30 days and your Permanent Allocation Fee within 90 days.

$450.00 CAP Administration Fee **DUE**

$46,082.75 TOTAL TAP ON FEE DUE

The Permanent Allocation Fee is equal to 25 percent of the estimated tap-on fee (or exaction fee) and will be credited toward the full tap-on/exaction fee. Tap-on fees are subject to annual increase as outlined in Chapter 16 (Article VI, Section 16-57.1) of the LFUCG Code of Ordinances. The Permanent Allocation Fee will be assessed based on tap-on fee rate in effect on the date of this letter. The full tap-on fee will be assessed based on the tap-on fee rate effective at the time of issuance of the tap permit.

Any failure to pay these fees within the specified schedule above shall result in forfeiture of your Sanitary Sewer Capacity. This letter is not approval of Sanitary Sewer Capacity, it is simply a statement of what must be done in order to reserve/allocate capacity for the referenced property/development.

If you have any questions regarding the content of this letter, please contact me at (859) 425-2506 or by email at rhighland@lexingtonky.gov.

Sincerely,

Rebecca Highland, Project Manager
LFUCG Division of Water Quality

cc: Tap Desk - Division of Water Quality

Reference: REQ0001472

SEWER CAPACITY APPLICATION

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT

Department of Environmental Quality & Public Works

Division of Water Quality

Notice to Applicants:

This application form and supporting documentation must be completed in its entirety and submitted to the Lexington-Fayette Urban County Government's Sanitary Sewer Tap-On Desk per Article XIII of Chapter 16 of the Code of Ordinances and Sections 16-301 through 16-306; and Section 5-30 of the Code of Ordinances. The Sanitary Sewer Tap-On Desk is located at **125 Lisle Industrial Ave., Suite 180** and may be reached at **(859) 258-3433**.

Applicants will receive written notification that sewer capacity has been allocated or waitlisted within 10 calendar days of submitting the Sewer Capacity Application. **Capacity requests may be delayed if the application form is unsigned or contains incomplete or missing information.**

Payment of an Administrative Fee of **$450.00** and a Capacity Reservation Deposit is required prior to approval of the capacity request. The Capacity Reservation Deposit is equal to **25% of the estimated tap permit fee**. The Capacity Reservation Deposit will be credited toward the applicant's sewer tap permit fee. Checks shall be made payable to the Lexington-Fayette Urban County Government.

By signing this document, the applicant hereby certifies that all the information provided in this application submittal is true and accurate to the best of their knowledge.

Applicant's Printed Name: Scotty Bowles, University of Kentucky Date: 2-24-2023

Applicant's Signature: 

Owner's Printed Name (Required only if Different from Applicant)*: Scotty Bowles Date: 3/3/2023

Owner's Signature (Required Only if Different from Applicant)*:

**Owner's signature may be substituted in lieu of authorized documentation.*

For Official Use Only:

Application Submittal Date:

Application Submittal Time:

Application Payment Amount:

Method of Payment/Check #:

Admin Fee Waived? ☐ YES ☐ NO

- ☐ Expansion Area 2
- ☐ Residential Remodel (no increase in dwelling units)
- ☐ Flow increase less than 45 gpd
- ☐ Residential development with plat of record
- ☐ Grandfather
- ☐ Illicit connection removal / Septic Conversion

SEWER CAPACITY APPLICATION

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT

Department of Environmental Quality & Public Works

Division of Water Quality

PLAN INFORMATION

Box 1:	**Has the Planning Commission approved your Preliminary Subdivision Plan (PSP) or Final Development Plan (FDP) for this project?**	Y / (N)

*If **Box 1** is "**Yes**" you must indicate the Plan Identification Number in **Box 13** and Plan Approval Date in **Box 14.***

Box 2:	**If "No" in Box 1: Has a Preliminary Development Plan (PDP) been submitted for this project?**	Y / N

*If **Box 2** is "**Yes**" you must indicate the Plan Identification Number in **Box 13** and Plan Approval Date in **Box 14**.*

Box 3:	**Does the Plan on file with the Planning Commission (and identified in Box 13) accurately reflect the currently proposed development associated with this sewer capacity request? (Yes/No)**	Y / (N)

*If **Box 3** is "**No**", then applicant must attach a copy of an updated development or subdivision plan.*

APPLICANT INFORMATION

Note: Information listed as the Contact is identified as the Owner's Representative. Submit documentation as Owner's representative (e.g. signed letter from Owner)

Box 5: Contact Name: R. Derek Motsch

Box 6: Contact Phone: 859-389-6533

Box 7: Contact E-mail: derek@element-site.com

Box 8: Contact Address (w/ City, State, Zip): 366 South Broadway, Lexington, KY 40515

Box 9: Owner Name: Scotty Bowles, UK

Box 10: Owner Phone: 859-963-8230

Box 11: Owner E-mail: scott.bowles@uky.edu

Box 12: Owner Address (w/ City, State, Zip): Capitol Project Management, 222 Peterson Services Building, Lexington KY 40506-0005

PROPERTY/DEVELOPMENT INFORMATION

Box 13: Plan ID No. (e.g. 2000-100):

Box 14: Plan Approval Date:

Box 15: Plan Type (e.g. PSP, FDP, or PDP):

Box 16: Subdivision Name & Lot Number (if address unknown):

Box 17: Developer Entity/Name:

Box 16A: Property Address: 110 Transcript Ave, Parking Structure #8

Box 18: Total Area of Project Site (Acres): 1.66

Box 19: Current Zoning Designation: R2, R3

Box 20: Is this development an expansion of an existing commerical structure? (Y/N) (Y) / N

If **Box 20** is "***Yes***", please briefly describe: Expansion of existing parking garage with attached office

Box 21: Is this request located within the LFUCG Urban Service Boundary? (Y/N) (Y) / N

Box 22: Is there existing water service on-site? (Y/N) (Y) / N

Box 23: Is there an existing sanitary sewer connection on-site? (Y/N) (Y) / N

Box 24: What is the ***Estimated Capacity Total*** from **Line 41** on **Page 3** of this application? 1,718

Additional Comments:

Return completed Application to:	**Sanitary Sewer Tap-on Desk (Tate Building)** **125 Lisle Industrial Ave., Ste. 180, Lexington, KY 40511**	(859) 258-3433 8:00 - 5:00 (M-F)

SEWER CAPACITY APPLICATION

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT

Department of Environmental Quality & Public Works

Division of Water Quality

FLOW CALCULATION WORKSHEET

Line	Type of Facility	Total Post-Developed Number of Units		Total Existing Units		Unit		Unit Rate in Gallons Per Day (GPD)		Requested Capacity Subtotal (GPD)
1	Single Family Residence		-		)	Units	x	192	=	
2	Townhome		-		)	Units	x	192	=	
3	Efficiency Apartment		-		)	Units	x	100	=	
4	1-bedroom Apartment		-		)	Units	x	138	=	
5	2-bedroom Apartment		-		)	Units	x	175	=	
6	3- or 4-Bedroom Apartment		-		)	Units	x	192	=	
7	Duplex		-		)	Buildings	x	384	=	
8	3-Plex		-		)	Buildings	x	576	=	
9	4-Plex		-		)	Buildings	x	768	=	
10	Hotel/Motel		-		)	Units	x	138	=	
11	Hospital		-		)	Beds	x	300	=	
12	Nursing Home		-		)	Beds	x	150	=	
13	University Dorm (Water Efficient)		-		)	Capita	x	25	=	
14	University Dorm (Traditional)		-		)	Capita	x	75	=	
15	Cafeteria		-		)	Capita	x	2.5	=	
16	Catering hall		-		)	Capita	x	7.5	=	
17	Schools		-		)	Students	x	20	=	
18	Non-Medical Office	28.644	-		)	Sq. Feet	x	0.06	=	1718.64
19	General Industrial		-		)	Sq. Feet	x	0.04	=	
20	Medical Arts (e.g. Doctor's Office)		-		)	Sq. Feet	x	0.10	=	
21	Theatre		-		)	Seats	x	5	=	
22	Bowling Alley		-		)	Lanes	x	100	=	
23	Church		-		)	Capitas	x	1.5	=	
24	Bar/Lounge/Disco		-		)	Seats	x	15	=	
25	Restaurant (With Dishwasher)		-		)	Seats	x	30	=	
26	Restaurant (Fast Food)		-		)	Seats	x	20	=	
27	Convenient Store (Food Processing)		-		)	Sq. Feet	x	0.15	=	
28	Dry Store		-		)	Sq. Feet	x	0.03	=	
29	Market		-		)	Sq. Feet	x	0.05	=	
30	Service Station		-		)	Pumps	x	300	=	
31	Shopping Center (With Food)		-		)	Sq. Feet	x	0.13	=	
32	Shopping Center (Without Food)		-		)	Sq. Feet	x	0.10	=	
33	Warehouse		-		)	Sq. Feet	x	0.02	=	
34	Barber Shop/Beauty Salon		-		)	Chair/Station	x	200	=	
35	Country Club		-		)	Sq. Feet	x	0.30	=	
36	Swimming Pool		-		)	Capita	x	20	=	
37	Laundry		-		)	Washers	x	425	=	
38	Car Wash		-		)	Bays	x	6840	=	
39	Fitness Center		-		)	Sq. Feet	x	0.50		
40	*Other/Manual Entry* *		-		)	GPD	x	1	=	
41	***Sum of Lines 1 through 40 is the Estimated Capacity Total***								=	

* *If Other/Manual Entry utilized, applicant must provide the source/basis for the Unit Rate assumed.*

University of Kentucky
Environmental Health
and Safety Division
Environmental Management Department

Mr. Bowles,

4/252023

Per your request, a visual inspection of Parking Structure 8 was conducted in February in 2023 by Tommy Taylor, Environmental Quality Management Asbestos Building Inspector. The visual inspection was conducted to identify and record the location and condition of the materials to be sampled. Due to the age of the building, no bulk samples were collected since no suspect materials were identified to be suspect asbestos-containing building materials. The building materials observed during the inspection where made of concrete and metal materials hence no suspect materials. However during the course of the project should any materials be discovered that are considered to be suspect to contain asbestos please contact me by cell phone 859-229-3045 or by email twtayl0@uky.edu and I will be glad to come and collect samples for analysis.

Tommy Taylor

Environmental Quality Management

Asbestos Building Inspector.

Andy Beshear
GOVERNOR

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
300 Sower Boulevard
Frankfort, Kentucky 40601
Phone: (502) 564-2150
Fax: 502-564-4245

Rebecca W. Goodman
SECRETARY

Anthony R. Hatton
COMMISSIONER

May 10, 2023

Scott Bowles
University of Kentucky
222 Peterson Service Bldg
Lexington, KY 40506-0005

Re: University of Kentucky Parking Structure 8 SL Relocation
Fayette County, Kentucky
Lexington Town Branch WWTP
Activity ID #: 1073, APE20230006
Receiving Treatment Plant KPDES #: KY0021491

Dear Mr. Bowles:

We have reviewed the plans and specifications for the above referenced project. The plans include the construction of approximately 474 linear feet of 18 inch DI and 13 linear feet of 12 inch DI sanitary sewer. This is to advise that plans and specifications for the above referenced project are APPROVED with respect to sanitary features of design, as of this date with the requirements contained in the attached construction permit.

If we can be of any further assistance or should you wish to discuss this correspondence, please do not hesitate to contact Daniel Kulik at 502-782-6998.

Sincerely,

For Terry Humphries, P.E.
Supervisor, Engineering Section
Water Infrastructure Branch
Division of Water

TH / DK
Enclosures
c: Fayette County Health Department
Element Design PLLC
Division of Plumbing
LFUCG

Sewer Line Construction
Lexington Town Branch WWTP
Facility Requirements

Activity ID No.:APE20230006

GACT0000000209 (University of Kentucky Parking SLR) 474 linear feet of 18 inch DI and 13 linear feet of 12 inch DI sanitary sewer:

Submittal/Action Requirements:

Condition No.	Condition
S-1	When this project is completed, the applicant shall: submit written certification: Due 30 calendar days after Completion of Construction to the Division of Water that the facilities have been constructed and tested in accordance with the approved plans and specifications and the approval conditions. Such certification shall be signed by a registered professional engineer. Failure to certify may result in penalty assessment and/or future approvals being withheld. [401 KAR 5:005 Section 24(2)]

Narrative Requirements:

Condition No.	Condition
T-1	The plans and specifications submitted for the project are approved by the Department of Environmental Protection as to sanitary features, subject to the requirements contained within the permit. [401 KAR 5:005 Section 24(3)]
T-2	Authority to construct these sewers is hereby granted. This approval is issued under the provisions of KRS Chapter 224.10-100 (19) regulations promulgated pursuant thereto. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any permits or licenses required by this cabinet and other state, federal, and local agencies. [401 KAR 5:005 Section 24(3)(c)2]
T-3	A permit to construct a facility shall be effective and valid for twenty-four (24) months upon issuance unless otherwise conditioned. If construction has not commenced within twenty-four (24) months following a permit's issuance, a new permit shall be obtained before construction may begin. [401 KAR 5:005 Section 24(1)]
T-4	The permit is issued to the applicant, and the permittee shall remain the responsible party for compliance with all applicable statutes and administrative regulations until a notarized applicable change in ownership certification is submitted and the transfer of ownership is acknowledged by the cabinet. [401 KAR 5:005 Section 28(1)]
T-5	The issuance of a permit by the cabinet does not convey any property rights of any kind or any exclusive privilege. [401 KAR 5:005 Section 24(5)]
T-6	There shall be no deviations from the plans and specifications submitted with the application or the conditions specified, unless authorized in writing by the cabinet. [401 KAR 5:005 Section 24(3)(b)1]

GACT0000000209 (University of Kentucky Parking SLR) 474 linear feet of 18 inch DI and 13 linear feet of 12 inch DI sanitary sewer:

Narrative Requirements:

Condition No.	Condition
T-7	For subfluvial pipe crossings, a floodplain construction permit will not be required pursuant to KRS 151.250, if the following requirements of 401 KAR 4:050 Section 2 are met: 1) During the construction of the crossing, no material may be placed in the stream or in the flood plain of the stream to form construction pads, coffer dams, access roads, etc., unless prior approval has been obtained from the cabinet. 2) The trench shall be backfilled as closely as possible to the original contour. All excess material from construction of the trench shall be disposed of outside of the flood plain, unless the applicant has received prior approval from the cabinet to fill within the flood plain. 3) For subfluvial crossings of erodible channels, there shall be at least thirty (30) inches of clear cover above the top of the pipe or conduit at all points. 4) For subfluvial crossings of nonerodible channels, there shall be at least six (6) inches of clear cover above the top of the pipe or conduit at all points, and the pipe or conduit shall be encased on all sides by at least six (6) inches of concrete. 5) The weight of a pipe and its contents during normal operating conditions at all points must exceed that of an equal volume of water, or the applicant must provide the division with sufficient information to show that the pipe and joints have sufficient strength. Contact the Floodplain Management Section of the Surface Water Permits Branch at (502) 564-3410 with any question on these requirements. [KRS 151.250 & 401 KAR 4:060]
T-8	If any portion of the sewer project will be constructed in or along a stream or wetland, contact the Water Quality Certification Section, located within the Water Quality Branch, at 502-564-3410, to determine if a 401 certification will be required. [KRS 224.16-050]
T-9	Facilities shall be designed and constructed in accordance with the "Recommended Standards for Wastewater Facilities" of the Great Lakes-Upper Mississippi River Board of State Public Health and Environmental Managers, commonly referred to as "Ten States' Standards", 2004 edition. [401 KAR 5:005 Section 7(1)(a)]
T-10	Gravity sewer lines and force mains shall be designed and constructed to give mean velocities, when flowing full, of not less than two (2) feet per second. Velocity calculations shall incorporate roughness coefficients pursuant to 401 KAR 5:005 Section 8(8). [401 KAR 5:005 Section 8(8)]
T-11	Sewer line pipe material, joints, fittings, and installation shall conform to the latest ASTM specifications. [Ten States (WW) 33.7-33.9]
T-12	Gravity sewer lines and force mains shall have a minimum of thirty (30) inches of cover or provide comparable protection. [401 KAR 5:005 Section 8(9)]

GACT0000000209 (University of Kentucky Parking SLR) 474 linear feet of 18 inch DI and 13 linear feet of 12 inch DI sanitary sewer:

Narrative Requirements:

Condition No.	Condition
T-13	Sewer lines crossing water mains shall be laid to provide a vertical distance of eighteen (18) inches between the outside of the water main and the outside of the sewer line. This shall be the case where the water main is either above or below the sewer line. The crossing shall be arranged so that the sewer line joints are equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer line to prevent damage to the water main. [Ten States (WW) 38.32]
T-14	Sewer lines shall be laid at least ten (10) feet horizontally from any existing or proposed water main. The distance shall be measured from edge to edge. [Ten States (WW) 38.31]
T-15	If gravity sewer lines and force mains are to be constructed in fill areas, the fill areas shall be compacted to ninety-five (95) percent density as determined by the Standard Proctor Density test or to a minimum of ninety (90) percent density as determined by the Modified Proctor Density test prior to the installation of the sewer lines. [401 KAR 5:005 Section 8(10)]

PORT0000000336 (University of Kentucky Parking SLR) 474 linear feet of 18 inch DI and 13 linear feet of 12 inch DI sanitary sewer:

Narrative Requirements:

Condition No.	Condition
T-1	The integrity of a new gravity sewer line shall be verified by either the infiltration-exfiltration or low pressure air testing method, and a deflection test shall be performed, if using flexible pipe. The deflection test shall be performed after the final backfill has been in place for at least thirty (30) days with no pipe exceeding a deflection of five (5) percent. Additionally, each new manhole shall be tested for water tightness. [401 KAR 5:005 Section 8(6)(a)]
T-2	The entrance of groundwater into or loss of waste from a new gravity sewer line shall be limited to two-hundred (200) gpd per inch of diameter per mile of the gravity sewer line. This limitation includes manholes, gravity sewer lines, and appurtenances. [401 KAR 5:005 Section 8(5)]

017413S01 Progress Cleaning- Mechanical Piping Construction Cleaning

1. This standard applies to all water, steam and condensate systems.

2. Provide flushing and drain connections for complete flushing and drainage of the entire system.

3. Remove strainers, open all valves and continuously flush the system with clean domestic water until all foreign matter is removed.

4. Fill and vent the system, adding one pound trisodium phosphate for each fifty gallons of water. Circulate this solution for four hours, then drain and flush the system with clean domestic water.

5. Replace the strainers and fill the system with clean water, circulate for one hour and test for alkalinity. If the system pH is below 7, add trisodium phosphate until the pH reads 7-8.

6. Fill the system using water or steam from the permanent system.

014500S01 Quality Control: Plumbing Inspection and Water Sample Report

1. PLUMBING INSPECTION

Plumbing inspections will be performed throughout the construction in accordance with the Kentucky State Plumbing Code (815 KAR 20:150 Inspections and Tests or superseding publications).

The cost and scheduling of these inspections is to be the responsibility of the Contractor. The Contractor must submit to the University the Plumbing Certificate from the Department of Housing, Buildings, and Construction.

The Contractor is expected to have the plumbing system installed per the drawings, specifications, and plumbing code prior to any inspection. The Contractor may, at any time, be required to demonstrate compliance to the Owner or Engineer.

2. WATER SAMPLE REPORT

The Contractor is responsible for the disinfection of all new, repaired or extended domestic water systems. This process will be as required by the State Plumbing Code and the Local Health Department.

The Contractor must submit to the local Health Department the required water samples for analysis. The required quantity and sample point(s) will be as determined by the Engineer. The "Water Sample Report" must be submitted to the University.

014500S02 Quality Control: Electrical Inspection

Electrical inspection will be performed throughout of the course of construction by a Certified Electrical Inspector from the Department of Housing, Building and Construction, State Fire Marshal's office.

Upon project completion, and when wiring, equipment and fixtures have been installed, inspected and found to be in compliance with the National Electrical Code, the inspector shall issue a Certificate of Compliance to the owner.

The contractor is expected to have (all electrical systems) installed in code compliance and to provide same at no additional cost to the owner.

It is the contractors responsibility to pay for and schedule all inspections with the State Fire Marshal Electrical Inspector at (1) rough-in, (2) 50% of project, and (3) final completion, as a minimum.

FORM 664 REV 02/20/09

BID BOND

Bond # _____

KNOW ALL MEN BY THESE PRESENTS; that _____
(Name of Subcontractor)
_____ a _____ corporation with principal offices located at

_____ as Principal
(Address)
(hereinafter "Principal") and _____ as
(Name of Surety)
Surety, a _____ corporation with home offices located at _____
(Address)
_____ (hereinafter "Surety"), are held and firmly bound

unto The University of Kentucky and _____
(Name of Construction Manager)
hereinafter "Obligees"), in the sum of _____ Dollars ($)
for the payment whereof the Principal and Surety bind themselves, and their respective heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted to Obligees a certain bid, dated _____, 20____ for the performance of _____
(Description of Work)
(hereinafter "Bid").

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Obligees shall accept the Bid of Principal and the Principal shall in accordance with the terms of such Bid:

1) enter into a contract with the Construction Manager Obligee;

2) furnish a bond for the faithful performance of such contract and for the payment of all persons performing labor or furnishing materials in connection therewith; and

3) shall in all other respects perform the agreement created by the acceptance of such Bid.

Then this obligation shall be null and void; otherwise it shall remain in full force and effect.

IN WITNESS WHEREOF, the Principal and Surety have hereunto caused this Bond to be duly executed and acknowledged as set forth below this _____ day of _____, 20____.

(Impress Corporate Seal) _____, Principal
(Name of Subcontractor/Principal)

ATTEST:

By: _____
(Officer)

Title:_____

(Impress Corporate Seal) _____, Surety
(Name of Surety)

ATTEST:

By: _____
(Attorney-in-Fact)

NOTE: An original Power of Attorney bearing same date as Bond must be attached.

ACKNOWLEDGMENT

State of: _____
County of: _____

On this _____ day of _____, 20___, before me appeared _____ _____, to me known, who being by me duly sworn, did depose and say that he resided in _____; that he is the _____ (Officer) of the corporation described in and which executed the foregoing BID BOND (hereinafter "Instrument") as Subcontractor/Principal; that he knew the seal of said corporation; that the seal affixed to the foregoing instrument is the corporate seal of said corporation; and that the foregoing instrument was signed, sealed and delivered to him on behalf of said corporation by its authority duly given as the voluntary act and deed of said corporation.

IN WITNESS WHEREOF, the said _____ (Name of Officer) has subscribed and sworn to the foregoing oaths before me, and I have hereunto set my hand and affixed my official seal the day and year first above written.

(SEAL)

_____
Notary Public

My Commission Expires: _____

Revised 02/20/09

SECTION 01 21 00 - ALLOWANCES

GENERAL

SUMMARY

Section includes administrative and procedural requirements governing allowances.

Types of allowances include the following:

Lump-sum allowances.
Unit-cost allowances.
Quantity allowances.
Contingency allowances.
Testing and inspecting allowances.

Related Requirements:

Section 01 22 00 – Unit Prices for procedures for using unit prices.

SELECTION AND PURCHASE

At the earliest practical date after award of the Subcontract, advise Contractor of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

Purchase products and systems selected by Architect from the designated supplier.

ACTION SUBMITTALS

Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

INFORMATIONAL SUBMITTALS

Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

COORDINATION

Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

LUMP-SUM ALLOWANCES

Allowance shall include cost to Subcontractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include material, sales and/or use tax, labor (and/or erection), overhead, tools, equipment, delivery to project site, unloading and warehousing if necessary.

This type of allowance shall be adjusted by the difference of the allowed amount vs. actual expenditures performed on a T&M basis, usually with pre-agreed to unit rates.

Example: A bid category for masonry may include a Lump Sum Allowance of $5,000 for temporary heating. The bidder shall include this $5,000 allowance in its Base Bid and document actual expenditures to the Contractor. The bidder's contract amount will then be adjusted based on actual usage.

MATERIAL ALLOWANCES

The allowance itself shall include the cost of purchasing the specified materials only, including sales and use tax if applicable. The cost of labor (and/or erection), overhead, profit, tools, equipment, delivery, unloading, warehousing, etc. shall be included in the Base Bid and shall NOT be included in the stated allowance.

This type of allowance shall be adjusted by the difference of the allowed material purchase price and the actual purchase price, either additive or deductive, with no consideration given for either increased or decreased OH&P.

Example: A bid category for carpet may include a Material Allowance of $15.00/sy to purchase carpet. The cost for installation, tools, equipment, delivery, unloading, warehousing, overhead, profit, etc. shall be included in the Base Bid and are not part of the allowance.

Subcontractor shall submit proposals to Contractor for materials selections by the Architect. After selection, subcontractor shall following normal submittal procedures.

Subcontractor shall note if Contract Time will be affected with any material selection.

Invoices shall be submitted to the Contractor to verify actual purchase amounts and quantities.

QUANTITY ALLOWANCES

The allowance itself is to adjust quantity only. All costs such as material, sales tax, labor (and/or erection), overhead, profit, tools, equipment, delivery, unloading, warehousing, etc. shall be included in the Base Bid.

This type of allowance shall be adjusted by the difference in the allowed quantity vs. the actual quantity times a unit price, which includes all material, labor, equipment, OH&P, etc.

Example: A bid category for steel may include a Quantity Allowance of 5 tons of misc. steel that may not be designed at the time of bidding. The bidder shall include the cost of furnishing, fabricating and installing (erecting) this 5 tons of misc. steel in the Base Bid and a unit price to adjust the bidder's contract amount if the actual quantity is different from the allowed amount.

Sufficient documentation to substantiate the quantity difference shall be submitted to the Contractor.

UNUSED MATERIALS

Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

SCHEDULE OF ALLOWANCES

- Dumpster Allowance Base Bid - $85,000
- Construction, Safety Signage - $10,000
- Additional Fencing, Site Logistics Allowance - $25,000
- Tower Crane Operator OT Allowance - $20,000
- Temp Construction Barriers / ICRA - $15,00
- Winter Protection Tent & Heating Allowance - $75,000
- Doors, Frames & HW Repairs - $5,000
- Storefront & Curtain Wall Repair - $5,000

END OF SECTION 01 21 00

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Division 01, Section "Allowances" for procedures for using unit prices to adjust quantity allowances.
2. Division 01, Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
3. Division 01, Section "Quality Control" for field testing by an independent testing agency.

1.3 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (NOT APPLICABLE).

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Removal of unsatisfactory soil and replacement with satisfactory soil material.

1. Description: Unsatisfactory soil excavation and disposal off-site and replacement with satisfactory fill material or engineered fill from off-site, as required, according to Division 31 Section "Earth Moving."
2. Unit of Measurement: Cubic yard (Cubic meter) of soil excavated, based on in-place surveys of volume before and after removal.

B. Unit Price No. 2: Rock excavation and replacement with satisfactory soil material.

1. Description: Classified rock excavation and disposal off-site and replacement with satisfactory fill material or engineered fill from off-site, as required, according to Division 31 Section "Earth Moving."
2. Unit of Measurement: Cubic yard (Cubic meter) of rock excavated, based on survey of in-place surveys volume of before and after removal.

C. Unit Price No. 3 - Change in drilled pier length in rock:

1. Description: Adjustments to base bid net volume of drilled piers according to Section 316329 "Drilled Concrete Piers and Shafts." for each pier diameter.
2. Unit of Measurement: Cubic Yard and should include labor, materials, tools, equipment, incidentals, etc for complete drilled pier installation.

END OF SECTION 01 22 00

SECTION 01 23 00 – ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by Bidders and stated on the Bid Form for certain work defined in Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept corresponding change either in the amount of construction to be completed, or in products, materials, equipment, systems or installation methods described in Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted alternate is complete and fully integrated into project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of Contract, prepare and distribute to each party involved notification of status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at later date. Include complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: Schedule of alternates is included at end of this Section. Specification Sections referenced in Schedule contain requirements for materials and methods necessary to achieve Work described under each alternate.

PART 2 - PRODUCTS (NOT APPLICABLE).

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: West End Office

1. Base Bid: Base bid includes all scope required for a fully functioning garage expansion as indicated in the bid documents.
2. Alternate: Alternate includes construction of approximately 37,000 gross square feet of office space at west end of garage. Alternate includes all scope as indicated on documents as Bid Alternate No. 1 or Alternate No. 1, or similar.

a. Specifications exclusive to Alternate No 1 include:

1)	05 12 00	STRUCTURAL STEEL FRAMING
2)	05 31 00	STEEL DECKING
3)	05 51 13	METAL PAN STAIRS
4)	05 73 13	GLAZED DECORATIVE METAL RAILINGS
5)	06 16 00	SHEATHING
6)	06 40 23	INTERIOR ARCHITECTURAL WOODWORK
7)	06 41 16	PLASTIC-LAMINAE-CLAD ARCHITECTURAL CABINETRY
8)	07 21 19	FOAMED IN PLACE INSULATION
9)	07 42 13.26	NATURAL STONE REINFORCED PANELS
10)	07 84 13	PENETRATION FIRESTOPPING
11)	07 84 43	JOINT FIRESTOPPING
12)	07 95 13.26	EXPANSION JOINT COVER ASSEMBLIES
13)	081 1 16	GLAZED INTERIOR WALL ASSEMBLIES
14)	08 14 16	FLUSH WOOD DOORS
15)	08 31 13	ACCESS DOORS AND FRAMES
16)	09 21 16.23	GYPSUM BOARD SHAFT ASSEMBLIES
17)	09 22 16	NON-STRUCTURAL METAL FRAMING
18)	09 22 26	SUSPENSION GRID SYSTEM
19)	09 24 00	CEMENT PLASTERING
20)	09 29 00	GYPSUM BOARD
21)	09 30 13	CERAMIC TILING
22)	09 51 13	ACOUSTIC PANEL CEILINGS
23)	09 54 26	SUSPENDED WOOD CEILINGS
24)	09 65 13	RESILIENT BASE AND ACCESSORIES
25)	09 66 23	RESINOUS MATRIX TERRAZZO FLOORING
26)	09 68 13	TILE CARPETING
27)	09 72 00	WALL COVERINGS
28)	09 84 33	SOUND ABSORBING WALL UNITS

29)	09 84 53	MULLION TRIM COVERS
30)	09 91 23	INTERIOR PAINTING
31)	10 14 23.13	ROOM IDENTIFICATION SIGNAGE
32)	10 21 13.15	STAINLESS-STEEL TOILET COMPARTMENTS
33)	10 28 00	TOILET, BATH, AND LAUNDRY ACCESSORIES
34)	12 24 13	ROLLER WINDOW SHADES
35)	12 36 61.16	SOLID SURFACE COUNTERTOPS
36)	12 36 61.19	QUARTZ AGGLOMERATE COUNTERTOPS
37)	21 10 00	FIRE-SUPPRESSION
38)	22 05 13	COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT
39)	22 05 19	METERS AND GAGES FOR PLUMBING PIPING
40)	22 07 00	PLUMBING INSULATION
41)	22 11 19	DOMESTIC WATER PIPING SPECIALTIES
42)	22 11 23	DOMESTIC WATER PUMPS
43)	22 13 16	SANITARY WASTE AND VENT PIPING
44)	22 13 19	SANITARY WASTE PIPING SPECIALTIES
45)	22 14 29	SUMP PUMPS
46)	22 16 23	FACILITY NATURAL GAS PIPING
47)	22 33 00	ELECTRIC, DOMESTIC-WATER HEATERS
48)	22 40 00	PLUMBING FIXTURES
49)	23 05 19	METERS AND GAUGES FOR HVAC PIPING
50)	23 05 23	GENERAL-DUTY VALVES FOR HVAC PIPING
51)	23 05 53	IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
52)	23 05 93	TESTING, ADJUSTING, AND BALANCING FOR HVAC
53)	23 07 13	DUCT INSULATION
54)	23 07 19A	HVAC PIPING INSULATION
55)	23 21 13	HYDRONIC PIPING
56)	23 21 23	HYDRONIC PUMPS
57)	23 23 00	REFRIGERANT PIPING
58)	23 25 00	HVAC WATER TREATMENT
59)	23 31 13	METAL DUCTS
60)	23 33 00	AIR DUCT ACCESSORIES
61)	23 34 16	CENTRIFUGAL HVAC FANS
62)	23 37 13	DIFFUSERS, REGISTERS, AND GRILLES
63)	23 52 16	CONDENSING HYDRONIC BOILERS
64)	23 64 23	SCROLL WATER CHILLERS
65)	23 73 13	MODULAR INDOOR CENTRAL STATION AIR HANDLING UNITS
66)	23 82 16	AIR COILS

b. Specifications modified by Alternate No 1 include:

1)	07 42 13.23	METAL COMPOSITE MATERIAL WALL PANELS
2)	08 11 13	HOLLOW METAL DOORS AND FRAMES
3)	08 43 13	ALUMINUM-FRAMED STOREFRONTS
4)	08 44 13	GLAZED ALUMINUM CURTAIN WALLS
5)	08 71 00	DOOR HARDWARE
6)	08 80 00	GLAZING

B. Alternate No. 2: Lighting Replacement
   1. Base Bid: Base bid includes all lighting within the newly constructed expansion defined in the documents.
   2. Alternate: Alternate includes all removal of existing lighting in PS8 and replacement with new LED lighting as indicated on the documents for levels 3 through 7.

END OF SECTION 01 23 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Contractor's Construction Schedule.
   2. Construction schedule updating reports.
   3. Material location reports.
   4. Field condition reports.
   5. Unusual event reports.
   6. Construction photographs.

B. Related Sections include the following:

   1. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
   2. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
   3. Division 01 Section "Photographic Documentation" for submitting construction photographs.
   4. Division 01 Section "Quality Control" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

   1. Critical activities are activities on the critical path that must start and finish on the planned early start and finish times.
   2. Predecessor activity is an activity that precedes another activity in the network.
   3. Successor activity is an activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Engineer.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

H. Major Area: A story of construction, a separate building, or a similar significant construction element.

I. Milestone: A key or critical point in time for reference or measurement.

J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF file.

B. Startup Construction Schedule.

C. Contractor's Construction Schedule: Initial schedule of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.

D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description,

cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.

E. Construction Schedule Updating Reports: Submit with Application for Payment

F. Daily Construction Reports: Submit at monthly intervals.

G. Material Location Reports: Submit at monthly intervals.

H. Site Condition Reports: Submit at time of discovery of differing conditions.

I. Unusual Event Reports: Submit at time of unusual event.

J. Qualification Data: For scheduling consultant.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, submittals schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

B. Time Frame: Extend schedule from date established the Notice of Award to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Engineer.
2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
3. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
4. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use of premises restrictions.
    f. Provisions for future construction.
    g. Seasonal variations.
    h. Environmental control.

5. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

    a. Structural completion.
    b. Temporary enclosure and space conditioning.
    c. Permanent space enclosure.
    d. Completion of mechanical installation.

e. Completion of electrical installation.
f. Substantial Completion.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:

1. Date of opening of revised entry and exit lanes in existing garage.

F. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Distribution: Distribute copies of approved schedule to Engineer, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.7 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within **30** days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.8 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events.
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Construction Change Directives received and implemented.
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 32 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and

effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.abma.com.
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.

24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.

66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; www.eciaonline.org.
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; www.eima.com.
76. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. EVO - Efficiency Valuation Organization; www.evo-world.org.
80. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
81. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
82. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
83. FM Approvals - FM Approvals LLC; www.fmglobal.com.
84. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
85. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
86. FSA - Fluid Sealing Association; www.fluidsealing.com.
87. FSC - Forest Stewardship Council U.S.; www.fscus.org.
88. GA - Gypsum Association; www.gypsum.org.
89. GANA - Glass Association of North America; www.glasswebsite.com.
90. GS - Green Seal; www.greenseal.org.
91. HI - Hydraulic Institute; www.pumps.org.
92. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
93. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
94. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
95. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
96. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
97. IAS - International Accreditation Service; www.iasonline.org.
98. IAS - International Approval Services; (See CSA).
99. ICBO - International Conference of Building Officials; (See ICC).
100. ICC - International Code Council; www.iccsafe.org.
101. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
102. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
103. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
104. IEC - International Electrotechnical Commission; http://www.iec.ch.
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
107. IESNA - Illuminating Engineering Society of North America; (See IES).

108. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
109. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
110. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
111. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
116. ISO - International Organization for Standardization; www.iso.org.
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; www.itu.int/home.
119. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
120. LMA - Laminating Materials Association; (See CPA).
121. LPI - Lightning Protection Institute; www.lightning.org.
122. MBMA - Metal Building Manufacturers Association; www.mbma.com.
123. MCA - Metal Construction Association; www.metalconstruction.org.
124. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
125. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
126. MHIA - Material Handling Industry of America; www.mhia.org.
127. MIA - Marble Institute of America; www.marble-institute.com.
128. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
129. MPI - Master Painters Institute; www.paintinfo.com.
130. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
131. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
132. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
133. NADCA - National Air Duct Cleaners Association; www.nadca.com.
134. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
135. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
136. NBI - New Buildings Institute; www.newbuildings.org.
137. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
138. NCMA - National Concrete Masonry Association; www.ncma.org.
139. NEBB - National Environmental Balancing Bureau; www.nebb.org.
140. NECA - National Electrical Contractors Association; www.necanet.org.
141. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
142. NEMA - National Electrical Manufacturers Association; www.nema.org.
143. NETA - InterNational Electrical Testing Association; www.netaworld.org.
144. NFHS - National Federation of State High School Associations; www.nfhs.org.
145. NFPA - National Fire Protection Association; www.nfpa.org.
146. NFPA - NFPA International; (See NFPA).
147. NFRC - National Fenestration Rating Council; www.nfrc.org.
148. NHLA - National Hardwood Lumber Association; www.nhla.com.
149. NLGA - National Lumber Grades Authority; www.nlga.org.
150. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).

151. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
152. NRCA - National Roofing Contractors Association; www.nrca.net.
153. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
154. NSF - NSF International; www.nsf.org.
155. NSPE - National Society of Professional Engineers; www.nspe.org.
156. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
157. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
158. NWFA - National Wood Flooring Association; www.nwfa.org.
159. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
160. PDI - Plumbing & Drainage Institute; www.pdionline.org.
161. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
162. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
163. RFCI - Resilient Floor Covering Institute; www.rfci.com.
164. RIS - Redwood Inspection Service; www.redwoodinspection.com.
165. SAE - SAE International; www.sae.org.
166. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
167. SDI - Steel Deck Institute; www.sdi.org.
168. SDI - Steel Door Institute; www.steeldoor.org.
169. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
170. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
171. SIA - Security Industry Association; www.siaonline.org.
172. SJI - Steel Joist Institute; www.steeljoist.org.
173. SMA - Screen Manufacturers Association; www.smainfo.org.
174. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
175. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
176. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
177. SPIB - Southern Pine Inspection Bureau; www.spib.org.
178. SPRI - Single Ply Roofing Industry; www.spri.org.
179. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
180. SSINA - Specialty Steel Industry of North America; www.ssina.com.
181. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
182. STI - Steel Tank Institute; www.steeltank.com.
183. SWI - Steel Window Institute; www.steelwindows.com.
184. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
185. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
186. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
187. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
188. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
189. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
190. TMS - The Masonry Society; www.masonrysociety.org.
191. TPI - Truss Plate Institute; www.tpinst.org.
192. TPI - Turfgrass Producers International; www.turfgrasssod.org.
193. TRI - Tile Roofing Institute; www.tileroofing.org.

194. UL - Underwriters Laboratories Inc.; www.ul.com.
195. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
196. USAV - USA Volleyball; www.usavolleyball.org.
197. USGBC - U.S. Green Building Council; www.usgbc.org.
198. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
199. WASTEC - Waste Equipment Technology Association; www.wastec.org.
200. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
201. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
202. WDMA - Window & Door Manufacturers Association; www.wdma.com.
203. WI - Woodwork Institute; www.wicnet.org.
204. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
205. WWPA - Western Wood Products Association; www.wwpa.org.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.

18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 42 00

SECTION 01 42 10 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic contract definitions are included in the Conditions of the Contract.

B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.

C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Design Professional, requested by the Design Professional, and similar phrases.

D. "Approved": The term "approved," when used in conjunction with the Design Professional's action on the Contractor's submittals, applications, and requests, is limited to the Design Professional's duties and responsibilities as stated in the Conditions of the Contract.

E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations.

Installers are required to be experienced in the operations they are engaged to perform.

1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
2. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.

    a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.

J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the CSI/CSC's "MasterFormat" numbering system.

B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be

performed by the Contractor. At certain locations in the Section Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the Design Professional for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Design Professional for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

1.5 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01 42 10

SECTION 01 45 16 – GROUND PENETRATION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. The purpose of this procedure is to define minimum utility avoidance requirements for all Contractors, Subcontractors, and other companies engaged in ground penetration activities.

B. This procedure applies to all personnel associated with excavation, trenching, demolition and other ground penetrating activities including dee stakes, sign posts, fence posts, ground rods, etc. on Contractor projects. The result of this procedure is to:
   1. Ensure that all excavation, trenching, and demolition activities and work within excavations / trenches are adequately planned and performed safely.
   2. Define the standard work process to avoid any utility strikes during all excavation, trenching and demolition activities.

C. Excavation means the use of hand tools, powered equipment, or explosives to move earth, rock, or other materials in order to penetrate, bore or drill into the earth, or to demolish any structure whether or not it is intended that the demolition will disturb the earth.

1.2 PROJECT DESCRIPTION AND REQUIREMENTS

A. Pre-Planning:

   1. Subcontractor(s) shall conduct thorough planning prior to the execution of any Excavation/Trenching or Penetration activities. This requires the Subcontractor complete the Ground Penetration / Dig Permit DAILY prior to starting work.

B. Utility Avoidance:

   1. All underground and overhead utilities within the Excavation / Trenching or Penetration work area shall be surveyed and positively identified before excavation work commences. It is the responsibility of every Subcontractor performing an excavation to call the 811 Utility Protection Service in their state to obtain an individual reference / dig number. No Subcontractor shall work under another Subcontractor's ticket number, including the Contractor's.

      Since 811 will only mark utilities in the Right-of-Way, a private locating service must also be used to locate any utilities not located by 811 inside the project / excavation area. Obtain as built drawings showing the location of all known / found utilities with in the excavation site and reference the Contract Documents to verify there are no utilities that were not marked by the Locating Service.

   2. <u>811 Procedures:</u>
      a. Assess the area to be excavated, gather all the information that will needed to complete the locate work order form.
      b. Premark the location where the excavations will occur in white paint, flags or both.

c. Contact 811 and provide details of the excavation.
d. Obtain reference / ticket number, record the number on the Ground Penetration / Dig Permit and keep it for the duration of the excavation or longer is necessary.
e. Utility owners will mark any existing utilities around the excavation site.
f. Wait the required amount of time before commencing excavation.
    1) Advance notice needed to inform 811 of excavation.
        a) KY – 2 working days
g. Protect and preserve the markings of tolerance zones of underground utility facilities until those markings are no longer required for proper and safe excavations. If markings are destroyed or lost do not repaint the markings, contact 811 to remark the found/known utilities. Markings are only valid for the following amount of time before 811 has to be notified again of the excavation.
    1) KY – 21 days

3. Private Property Locating:
    a. ALL excavations/borings/mass excavations/ground penetrating activities must be coordinated with the Contractor and the Owner to have a 3rd Party Locating Service survey the areas of excavation that are not in the right-of-way.
    b. Subcontractor must coordinate with the Contractor and contact the designated 3rd Party Locating Service prior to any ground penetrating activities to have the service locate the area where the activities occur. Prior to arrival of the 3rd Party Locating Service, the area that needs surveyed should be painted or marked with flags.
    c. The 3rd Party Locating Service shall mark all found utilities with paint or flags.
    d. All markings must be protected and preserved so the location of the utility is known at all times.
    e. Take pictures and keep records of the survey to include with the Excavation Permit.

4. Ground & Concrete Penetrations:
    a. Prior to any excavation, drilling, cutting, etc. beginning, the scope of work must be reviewed with the Contractor to discuss the process and hazards related to task.
    b. Subcontractors must complete the Ground Penetration / Dig Permit daily and have it signed by the Contractor's project representative.
    c. Protect and preserve the markings of utilities and/or concrete reinforcement until those markings are no longer required for proper and safe work.
    d. The exact location and depth of any known / found utilities within 24" of the excavation must be identified by one of the following means:
        1) Hand digging
        2) Pot holing
        3) Hydro / Vacuum excavation
    e. Maintain a minimum of 24" (tolerance zone) between the utility and the cutting edge or point of powered equipment.
    f. When approaching and excavating within the tolerance zone of underground utility facilities with powered equipment, the Subcontractor must provide a spotter to visually monitor the excavation activity for any indication of the underground utility.
    g. Conduct the excavation within the tolerance zone of the utility in a careful, prudent and non-destructive manner such as hand digging, hydro/vacuum excavation. Do not excavate within the tolerance zone with any powered equipment.

h. Review area(s) of work to verify there are no power lines/overhead cables in the work area. If there are, a plan must be approved by the Contractor prior to proceeding.

5. Demolition (sub-surface):
   a. When demoing existing utilities, the same procedures listed in section 1.2-B.4 must be followed.
   b. When demoing existing structures, the Contractor's demolition checklist must be completed prior to commencement.

1.3 ASSIGNMENT OF RESPONSIBILITY

1. Contractor shall provide all record documents for the Subcontractor to use to locate new / existing utilities.
2. Subcontractor shall include all costs to achieve the requirements listed in this specification section.

END OF SECTION 01 45 16

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing Contractor's selection of products for use in Project.

B. Related Requirements:

1. Division 01 Section “Allowances” for products selected under an allowance.
2. Division 01 Section “Alternates” for products selected under an alternate.
3. Division 01 Section "References" for applicable industry standards for products specified.
4. Division 01 Section "Submittal Procedures" specifies requirements for submittal of the Contractor's Construction Schedule and the Submittal Schedule.
5. Division 01 Section "Product Substitution Procedures" specifies administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

B. Definitions used in this Article are not intended to change meaning of other terms used in Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms such are self-explanatory and have well recognized meanings in construction industry.

a. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
b. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
c. Comparable Product: Product that is demonstrated and approved by Engineer through submittal process to have the indicated qualities related

to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

2. **"Materials"** are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form part of Work.
3. **"Equipment"** is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

C. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

D. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Engineer will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Engineer's Approval of Submittal: As specified in Division 01, Section "Submittal Procedures."
    b. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01, Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

    a. Name of product and manufacturer.
    b. Model and serial number.
    c. Capacity.
    d. Speed.
    e. Ratings.

3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Engineer will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

    a. Submit additional documentation required by Engineer in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Engineer, whose determination is final.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: …"

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: …"

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

    a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"

4. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

    a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

    a. For approval of products by unnamed manufacturers, comply with requirements in Section "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match Engineer's sample," provide a product that complies with requirements and matches Engineer's sample. Engineer's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners, if requested.
4. Samples, if requested.

B. Submittal Requirements: Approval by the Engineer of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS:

A. Comply with manufacturer's instructions and recommendations for installation of products in applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01 60 00

SECTION 01 60 10 - PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of Contract.

B. Requests for substitution shall not be submitted by the contractor for products, materials, equipment or methods of construction when substitutions are not allowed by the technical specification sections.

C. Related Requirements:

1. Division 01 Section "Allowances" for products selected under an allowance.
2. Division 01 Section "Alternates" for products selected under an alternate.
3. Division 01 Section "Reference Standards and Definitions" for applicability of industry standards to products specified
4. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

D. Engineer's policy is to reject requests for substitution unless paragraph "Substitutions" under Article "Definitions" applies. Vendors wishing inclusion in Engineer's master specification: contact Engineer for procedure.

1.3 DEFINITIONS

A. Definitions used in this Article are not intended to change or modify meaning of other terms used in Contract Documents.

B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by Contractor after award of Contract are considered requests for "substitutions." Following are not considered substitutions:

1. Revisions to Contract Documents requested by Owner or Engineer.
2. Specified options of products and construction methods included in Contract Documents.
3. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Substitution Request Submittal: Requests for substitution will be considered if received within 15 days after commencement of Work. Requests received more than 15 days after commencement of Work may be considered or rejected at discretion of Engineer.

1. Submit 3 copies of each request for substitution for consideration. Submit requests on forms included at end of this Section and in accordance with procedures required for Change Order proposals.
2. Identify product, or fabrication or installation method to be replaced in each request. Include Specification Section number and title and Drawing numbers and titles. Provide complete documentation showing compliance with requirements for substitutions, and the following information, as appropriate:

    a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
    b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    e. Samples, where applicable or requested.
    f. Certificates and qualification data, where applicable or requested.
    g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
    h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
    i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
    j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
    k. Cost information, including a proposal of change, if any, in the Contract Sum.
    l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
    m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
    b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:

    a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    b. Substitution request is fully documented and properly submitted.
    c. Requested substitution will not adversely affect Contractor's construction schedule.
    d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    e. Requested substitution is compatible with other portions of the Work.
    f. Requested substitution has been coordinated with other portions of the Work.
    g. Requested substitution provides specified warranty.
    h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform

and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

C. Contractor's submittal and Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 2 - PRODUCTS (NOT APPLICABLE0

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01 60 10

REQUEST FOR SUBSTITUTION

To:

Attention:

From: _____
Name of Company

_____
Address

_____
City, State, Zip Code

_____
Phone

Fully answer all information requested below. Failure to answer any item may cause rejection of request for substitution. If requested by Engineer, submit information about manufacturer and vendor history, financial stability, distribution and support systems. Use one form for each product requested. Only first product listed will be considered on forms with more than one product listed.

Specification Section Number: _____ Drawing Number: _____

Para Number: _____ Detail Number: _____

Specified Product: _____

Proposed Substitution: _____

Answer the following questions. Attach an explanation sheet on your company's letterhead when required.

Does the proposed substitution affect dimensions indicated on Drawings?

No _____ Yes _____ (If yes, explain below).

_____

_____

_____

Does the proposed substitution require changes in Drawings and/or design or installation changes?

No _____ Yes _____

If yes, is the cost of these changes included in the proposed amount? No ____ Yes _____

Does the proposed substitution affect other trades? No _____ Yes _____

(If yes, explain who and how)

_____

_____

_____

If the proposed product does affect the work of other trades, has the cost impact on their work been included in the price of the proposed substitution?

No _____ Yes _____

Does the proposed product's guarantee differ from that of the specified product's?

No _____ Yes _____ (If yes, explain below).

_____

_____

_____

Why is this proposal for substitution being submitted? List reasons below.

_____

_____

_____

Attach a listing of 3 projects using proposed substitution completed within the past 5 yrs in geographic and climatic region of Project. One of applications shall have been in service for at least 3 yrs.

Attach product data/brochures and Vendor Qualification Form for the specified and substitute product.

Undersigned has examined Construction Documents, is familiar with specified product, understands indicated application of product, and understands design intent of Engineer. Undersigned states that proposed substitution complies with Construction Documents and will perform at least equally to specified product within limitations stated above. Undersigned accepts responsibility for coordinating application and installation of proposed substitution and waives all claims for additional costs resulting from incorporation of proposed substitution into Project or its subsequent failure to perform according to specified requirements.

Submitted By: _____ _____
Typed Signature

Date: _____

Vendor Qualification Form
Walker Consultants

1. **Statement of Confidentiality:**

Walker Consultants (Walker) will treat any information as confidential which is clearly labeled so. A "clear label" is defined as the word "Confidential" marked in red ink on each and every page desired confidential in letters no less than one half inch high. At most, only two Walker staff will have access to vendor information marked "Confidential", Brian Preston and his designate.

2. **Statement of Walker's Commitment to Quality:**

WALKER is committed to providing quality service to its clients. As part of this commitment, WALKER never makes a promise it cannot keep. WALKER requires the same commitment from its vendors, whether direct or indirect.

3. **Statement of WALKER's Relationship to its Vendors:**

Mutual trust is the relationship WALKER desires with all its vendors. Both WALKER and its vendors must realize that trust must be earned over time. Trust is easily damaged and sometimes impossible to recover.

4. **Vendor's Organization:**

For the product being considered, list the number of employees in:

_____ Product manufacture

_____ Product sales

_____ Product marketing

_____ Product R & D

_____ Product technical service

_____ TOTAL

5. **Financial Stability:**

Provide past 5 yrs sales history and current audited financial statement or equivalent documentation of financial stability.

6. **Safety and Environment:**

Define vendor policies.

7. **Sales/Service Offices:**

List all locations.

8. **Geographic Markets:**

   List all areas served.

9. **Products:**

   On (a) separate sheet(s) for each product, list product name, uses, length of time in service, test data. Provide Material Safety Data Sheet(s). Provide case history data of product use in 5 major projects within the last 2 yrs.

10. **Quality Assurance:**

    Define manufacturing program. Define installation program.

11. **Installation:**

    By manufacturer? _____ Y _____ N

    By certified applicators? _____ Y _____ N

    By approved applicators? _____ Y _____ N

    By any applicator? _____ Y _____ N

12. **Comments:**

13. **Standard Warranty:**

    Provide copy of terms.

14. **References:**
    Provide three. _____

    _____

    _____

Signature: _____

Printed name: _____

Title: _____

Date: _____

Have this statement notarized.

Decision of Engineer regarding acceptance or rejection of proposed substitution will be based, at least in part, on information supplied above and in attached explanations and product data.

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.

B. Related Requirements:

1. Division 01 “Summary of Work” for limits on use of Project site.
2. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
3. Division 01 Section "Submittal Procedures" for submitting surveys.
4. Division 01 Section "Execution" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
5. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
6. Section 02 "Selective Structure Demolition" for demolition and removal of selected portions of the building.
7. Section 07 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor and professional engineer to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified.

B. Certificates: Submit certificate signed by land surveyor and professional engineer certifying that location and elevation of improvements comply with requirements.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Certified Surveys: Submit two copies signed by land surveyor.

E. Final Property Survey: Submit 4 copies showing the Work performed and record survey data.

1.5 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

    a. Primary operational systems and equipment.
    b. Fire separation assemblies.
    c. Air or smoke barriers.
    d. Fire-suppression systems.
    e. Plumbing piping systems.
    f. Mechanical systems piping and ducts.
    g. Control systems.
    h. Communication systems.
    i. Fire-detection and -alarm systems.

j. Conveying systems.
k. Electrical wiring systems.
l. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

a. Water, moisture, or vapor barriers.
b. Membranes and flashings.
c. Exterior curtain-wall construction.
d. Sprayed fire-resistive material.
e. Equipment supports.
f. Piping, ductwork, vessels, and equipment.
g. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework,

investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions

outside the control of Contractor, submit a request for information to Engineer according to requirements in Division 01, Section "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer and Construction Manager promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Engineer and Construction Manager when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer and Construction Manager.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer and Construction Manager before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

E. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor , that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels

F. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

H. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01, Section "Summary of Work."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01, Section "Temporary Facilities and Controls**."**

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Control."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

B. Related Requirements:
1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 01 Section "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.
3. Divisions 02 through 14, 21-27, and 31-33 Sections for specific operation and maintenance manual requirements for products in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Engineer will comment on whether content of operation and maintenance submittals is acceptable.

2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit by uploading to web-based project software site. Enable reviewer comments on draft submittals.
2. Submit three paper copies. Engineer, through Construction Manager, will return two copies.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Engineer will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Engineer will return copy with comments.

1. Correct or revise each manual to comply with Engineer's comments. Submit copies of each corrected manual within 15 days of receipt of Engineer's comments and prior to commencing demonstration and training.

E. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Engineer.
8. Name and contact information for Commissioning Authority.

9. Names and contact information for major consultants to the Engineer that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:

1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.8 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.9 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.

8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.10 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.11 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Related Requirements:
1. Division 01, Section "Execution" for final property survey.
2. Division 01, Section "Closeout Procedures" for general closeout procedures and maintenance manual requirements.
3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
4. Divisions 02 through 14, 21-27, and 31-33 Sections for specific requirements for Project Record Documents of products in those Sections.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of marked-up Record Prints.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an acceptable drawing technique.
    c. Record data as soon as possible after obtaining it.
    d. Record and check the markup before enclosing concealed installations.
    e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Construction Change Directive.
    k. Changes made following Engineer/Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Engineer/Architect and Construction

Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Engineer/Architect through Construction Manager for resolution.
4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.

    a. See Division 01, Section "Project Management and Coordination" for requirements related to use of Engineer/Architect's digital data files.

5. Engineer/Architect will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Engineer/Architect and Construction Manager.
    e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Drawings, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

1.6 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders**,** record Specifications, record Drawings, and Product Data where applicable.

C. Format: Submit record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Engineer/Architect's and Construction Manager's reference during normal working hours.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.

B. Related requirements:

1. Division 01 Section "Allowances" for administrative and procedural requirements for demonstration and training allowances.
2. Division 01 Section "Project Management and Coordination" for requirements for pre-instruction conferences.
3. Division 01 Section "Photographic Documentation" for preparing and submitting demonstration and training videotapes.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Attendance Record: For each training module, submit list of participants and length of instruction time.

C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Engineer.
d. Name of Construction Manager.
e. Name of Contractor.
f. Date of video recording.

2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
3. At completion of training, submit complete training manual(s) for Owner's use prepared in same PDF file format required for operation and maintenance manuals specified in Division 01, Section "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Engineer.

1.7 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.

k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning.
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.8 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   1. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

   1. Schedule training with Owner, through Construction Manager, with at least 14 days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

F. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01 79 00

017900S01 Demonstration and Training

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1. Demonstration of operation of systems, subsystems, and equipment.
   2. Training in operation and maintenance of systems, subsystems, and equipment.
   3. Demonstration and training video.

B. Related Sections include the following:

   1. Division 01 Section "Project Management and Coordination" for requirements for pre-instruction conferences.

   2. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module. This information is to be provided to PPDMC for review at least 30 days prior to the proposed training dates.

   1. See UK Special Conditions for ‘Submissions – Operation and Maintenance Manuals’ for the minimum number of manuals to be submitted and when in the schedule.

B. Qualification Data: For facilitator, instructor and photographer.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

E. Demonstration and Training DVDs: Submit two copies within seven days of end of each training module. Identification: On each copy, provide an applied label with the following information:

   a. Name of Project.

   b. Name and address of photographer.

   c. Name of Architect and Construction Manager.

   d. Name of Contractor.

   e. Date video was recorded.

f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

1. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video. Include name of Project and date of video on each page.

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.

D. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.

2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.

3. Review required content of instruction.

4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

1.6 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows but not limited to:

1. Motorized doors, including overhead coiling grilles, fire and smoke shutters, and automatic entrance doors.
2. Equipment, including projection screens, loading dock equipment, vacuum waste systems, food-service equipment and laboratory fume hoods.
3. Fire-protection systems, including fire alarm, fire pumps and fire-extinguishing systems.
4. Intrusion detection systems.
5. Conveying systems, including elevators.
6. Laboratory equipment, including laboratory water and vacuum equipment and piping.
7. Heat generation, including boilers, feedwater equipment, pumps, steam distribution piping and water distribution piping.
8. Refrigeration systems, including chillers, cooling towers, condensers, pumps and distribution piping.
9. HVAC systems, including air-handling equipment, air distribution systems and terminal equipment and devices.
10. HVAC instrumentation and controls.
11. Electrical service and distribution, including transformers, switchboards, panelboards, uninterruptible power supplies and motor controls.
12. Packaged engine generators, including transfer switches.
13. Lighting equipment and controls.
14. Communication systems, including intercommunication, surveillance, clocks and programming, voice and data and television equipment.
15. Other Contractor furnished and installed systems and equipment.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.

d. Regulatory requirements.

e. Equipment function.

f. Operating characteristics.

g. Limiting conditions.

h. Performance curves.

2. Documentation: Review the following items in detail:

a. Emergency manuals.

b. Operations manuals.

c. Maintenance manuals.

d. Project Record Documents.

e. Identification systems.

f. Warranties and bonds.

g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

a. Instructions on meaning of warnings, trouble indications, and error messages.

b. Instructions on stopping.

c. Shutdown instructions for each type of emergency.

d. Operating instructions for conditions outside of normal operating limits.

e. Sequences for electric or electronic systems.

f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.

b. Equipment or system break-in procedures.

c. Routine and normal operating instructions.

d. Regulation and control procedures.

e. Control sequences.

f. Safety procedures.

g. Instructions on stopping.

h. Normal shutdown instructions.

i. Operating procedures for emergencies.

j. Operating procedures for system, subsystem, or equipment failure.

k. Seasonal and weekend operating instructions.

l. Required sequences for electric or electronic systems.

m. Special operating instructions and procedures.

5. Adjustments: Include the following:

   a. Alignments.

   b. Checking adjustments.

   c. Noise and vibration adjustments.

   d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

   a. Diagnostic instructions.

   b. Test and inspection procedures.

7. Maintenance: Include the following:

   a. Inspection procedures.

   b. Types of cleaning agents to be used and methods of cleaning.

   c. List of cleaning agents and methods of cleaning detrimental to product.

   d. Procedures for routine cleaning

   e. Procedures for preventive maintenance.

   f. Procedures for routine maintenance.

   g. Instruction on use of special tools.

8. Repairs: Include the following:

   a. Diagnosis instructions.

   b. Repair instructions.

   c. Disassembly; component removal, repair, and replacement; and re-assembly instructions.

   d. Instructions for identifying parts and components.

   e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual. Provide handouts of pertinent training information for each class attendee.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season. At least two sessions of the same information for each training module for accommodation of the maintenance staff are required. More sessions may be required for specific modules which will be noted in project specifications when warranted by equipment type.

1. Schedule training with Owner with at least 30 days' advance notice. The PPDMC training coordinator will enter the class into the University SAP personnel module to allow staff to enroll into the training sessions.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO

A. General: Engage a qualified commercial photographer to record demonstration and training video. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video Format: Provide high-quality DVD disk in mp4 format.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

D. Narration: Describe scenes on videotape by audio narration by microphone while videotape is recorded or by dubbing off-site. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

E. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from video opposite the corresponding narration segment.

Attachment C

UNIVERSITY OF KENTUCKY

SPECIAL CONDITIONS OF THE CONTRACT

FOR CONSTRUCTION BY A CONSTRUCTION MANAGER AT RISK

ARTICLE 30 OWNER SUPPLIED MATERIALS

30.1 Owner, in an effort to expedite this Project, has pre-ordered certain long lead time items:

- 550 KW DIESEL GENERATOR AND ATS-EQ (RFP – UK-2335-23)
- Fire Alarm System (NewTech)
- Underground detention chamber (StormTrap)
- Sanitary Piping (partial) – (Core & Main)
- Sanitary Manholes (partial) – (Oldcastle)
- Temp Parking directional signage – (Goble Signs)
- Parking Equipment for temp parking – (Evan Time)