EXHIBIT A

HamiltonAnderson addendum

ADDENDUM NUMBER

01 WSU School of Social Work Phase 2

DATEJuly 1, 2019

OWNERPROJECT LOCATIONWayne State University FP & MDetroit, Michigan

OWNER'S REPRESENTATIVEDISCIPLINEKidest AlbaariSite

This Addendum is issued before award of Contract to inform bidders of revisions to the Bidding Documents.

PROJECT NAME

PROJECT NUMBER

2013088.22

All requirements contained in the Bidding Documents shall apply to this Addendum, and the general character of the Work called for in this Addendum shall be the same as originally set forth in the applicable portions of the Bidding Documents for similar Work, unless otherwise specified under this Addendum, and all work necessitated by the Addendum as required to complete the Work shall be included in the bids, even though not specifically mentioned in the Addendum.

This Addendum is hereby made a portion of the Bidding Documents and shall be included in the Contract.

DRAWINGS REVISED AND REISSUED

DI.1

DRAWINGS REVISED AND NOT REISSUED

NEW DRAWINGS / SKETCHES

1, L000, L200, L300, L400, L800

PROJECT MANUAL SECTIONS REVISED AND REISSUED

000110

PROJECT MANUAL SECTIONS REVISED AND NOT REISSUED

NEW PROJECT MANUAL SECTIONS ISSUED

040140.62, 311000, 321313, 321373, 329113, 329300

DRAWING REVISIONS

hamilton anderson addendum

Changes to Bid Documents dated <u>June</u> 20, 2019 include the following:

DRAWING REVISIONS

SHEET	CHANGE
DI.1	Added site sheets and addendum 01 column to drawing index.
1	Added sheet in its entirety to set
L000	Added sheet in its entirety to set
L200	Added sheet in its entirety to set
L300	Added sheet in its entirety to set
L400	Added sheet in its entirety to set
L800	Added sheet in its entirety to set

PROJECT MANUAL REVISIONS

CHANGE
CHANGE
Added news specification sections to table of contents.
Added section in its entirety to project manual.
Added section in its entirety to project manual.
Added section in its entirety to project manual.
Added section in its entirety to project manual.
Added section in its entirety to project manual.
Added section in its entirety to project manual.

					EW	ADDENDUM 01
				S	AN REVIEW	NDQ.
				JUN 2019 FOR BIDS	AN F	
				FOR	- ₽	
				019	2019	2019
				N 20	JUNE	
SHEET NO.	SHEET NAME	Project Phase	SHEET ISSUE DATE	20 JL	~ (01 JULY
	3.1221 .W2	1 11000		KN	- }	5
COVER CS.1	COVER SHEET	FOR BIDS	20 JUN 2019	X	X	
DI.1	DRAWING INDEX	FOR BIDS	20 JUN 2019	X	X	
2 GENERAL						
AG0.1	GENERAL NOTES AND DETAILS	FOR BIDS	20 JUN 2019	X	Х	
AG0.2	GENERAL SYMBOLS AND ABBREVIATIONS	FOR BIDS	20 JUN 2019	X	Х	
AG1.0.1 AG1.1	CODE SUMMARY - PHASE 2 LOWER LEVEL LIFE SAFETY PLAN	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
AG1.2	FIRST LEVEL LIFE SAFETY PLAN	FOR BIDS	20 JUN 2019	X	X	
AG1.3	SECOND LEVEL LIFE SAFETY PLAN	FOR BIDS	20 JUN 2019	X	X	
SITE		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
1	EXISTING CONDITION PLAN	FOR BIDS	07/01/19			X
L000 L200	GENERAL NOTES ALTERNATE - SITE DEMOLITION PLAN	FOR BIDS	07/01/19 07/01/19			X
L300	ALTERNATE - SITE MATERIALS & LAYOUT PLAN	FOR BIDS	07/01/19			X
L400	ALTERNATE - GRADING PLAN	FOR BIDS	07/01/19			X
L800 6, , , , , , , , , ,	SITE DETAILS	FOR BIDS	07/01/19			X
DEMOLITION		FOD 5:55	20 1111 22 (2			
AD1.0.1 AD1.1.1	LOWER LEVEL DEMOLITION PLAN FIRST LEVEL DEMOLITION PLAN	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
AD1.2.1	SECOND LEVEL DEMOLITION PLAN	FOR BIDS	20 JUN 2019	X	Χ	
AD3.0.1	DEMOLITION ELEVATIONS	FOR BIDS	20 JUN 2019	X	X	
ARCHITECTU	JRE .					
A0.0	ALTERNATE KEY PLANS	FOR BIDS	20 JUN 2019	X	V	
A1.0.1 A1.1.1	LOWER LEVEL FLOOR PLAN FIRST LEVEL FLOOR PLAN	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
A1.2.1	SECOND LEVEL FLOOR PLAN	FOR BIDS	20 JUN 2019	X	Х	
A1.3 A1.10	ROOF DEMOLITION AND NEW WORK PLAN & DETAILS ALTERNATE 2 - PLANS	FOR BIDS	20 JUN 2019 20 JUN 2019	X	Х	
A1.10	ALTERNATE 3 - PLANS	FOR BIDS	20 JUN 2019	X		
A2.0.1	LOWER LEVEL REFLECTED CEILING PLAN	FOR BIDS	20 JUN 2019	X	Χ	
A2.1.1 A2.2.1	FIRST LEVEL REFLECTED CEILING PLAN SECOND LEVEL REFLECTED CEILING PLAN	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
A3.0.1	EXTERIOR ELEVATIONS	FOR BIDS	20 JUN 2019	X	X	
A3.1.1	EXTERIOR STOREFRONT SCHEDULE	FOR BIDS	20 JUN 2019	X	X	
A4.1.1 A4.2.1	STRUCTURAL DETAILS SECTION DETAILS	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
A4.2.2	PLAN DETAILS	FOR BIDS	20 JUN 2019	X	Χ	
A6.1 A7.1.1	ENLARGED TOILET ROOM PLANS & ELEVATIONS DOOR SCHEDULE	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
A7.1.1	ROOM FINISH SCHEDULE	FOR BIDS	20 JUN 2019	X	X	
A7.2.2	MATERIAL INDEX	FOR BIDS	20 JUN 2019	X	X	
A7.4.1 A7.4.2	PARTITION TYPES FRAMING DETAILS	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
A7.5.1	MILLWORK DETAILS	FOR BIDS	20 JUN 2019	X	X	
A7.5.2	MILLWORK DETAILS	FOR BIDS	20 JUN 2019	X	X	
A7.5.3 A7.5.4	MILLWORK DETAILS CEILING DETAILS	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
A7.6.1	CASEWORK DETAILS	FOR BIDS	20 JUN 2019	X	Х	
A7.7.0 A7.7.1	LOWER LEVEL FINISH/SIGNAGE PLAN FIRST LEVEL FINISH/SIGNAGE PLAN	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
A7.7.2	SECOND LEVEL FINISH/SIGNAGE PLAN	FOR BIDS	20 JUN 2019	X	X	
A7.8.1	SIGNAGE SCHEDULE	FOR BIDS	20 JUN 2019	X	Х	
30 MECHANICAI	_					
M0.1	MECHANICAL STANDARDS AND DRAWING INDEX	FOR BIDS	20 JUN 2019	X	X	
MD1.00 MD2.0	UNDERGROUND PLUMBING DEMOLITION PLAN LOWER LEVEL PLUMBING DEMOLITION PLAN	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
MD2.1	FIRST FLOOR PLUMBING DEMOLITION PLAN	FOR BIDS	20 JUN 2019	X	X	
MD2.2	SECOND FLOORPLUMBING DEMOLITION PLAN	FOR BIDS	20 JUN 2019	X	X	
MD3.1 MD3.2	FIRST FLOOR HVAC PIPING DEMOLITION PLAN SECOND FLOOR HVAC PIPING DEMOLITION PLAN	FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
MD4.0	LOWER LEVEL SHEET METAL DEMOLITION PLAN	FOR BIDS	20 JUN 2019	X	Х	
MD4.1 MD4.2	FIRST FLOOR SHEET METAL DEMOLITION PLAN SECOND FLOOR SHEET METAL DEMOLITION PLAN	FOR BIDS		X	X	
MD4.3	ROOF MECHANICAL DEMOLITION PLAN	FOR BIDS		X	X	
M2.00	UNDERGROUND PLUMBING PLAN	FOR BIDS		X	X	
M2.0 M2.0-ALT	LOWER LEVEL PLUMBING PLAN LOWER LEVEL PLUMBING PLAN - ALTERNATE	FOR BIDS		X	X	
M2.1	FIRST FLOOR PLUMBING PLAN	FOR BIDS	20 JUN 2019	X	Х	
M2.1-ALT M2.2	FIRST FLOOR PLUMBING PLAN - ALTERNATE SECOND FLOOR PLUMBING PLAN	FOR BIDS		X	Х	
M3.0	LOWER LEVEL HVAC PIPING PLAN	FOR BIDS		X	X	
M3.1	FIRST FLOOR HVAC PIPING PLAN	FOR BIDS		X	X	-
M3.2 M4.0	SECOND FLOOR HVAC PIPING PLAN LOWER LEVEL SHEET METAL PLAN	FOR BIDS		X	X	
M4.1	FIRST FLOOR SHEET METAL PLAN	FOR BIDS	20 JUN 2019	X	Х	
M4.2	SECOND FLOOR SHEET METAL PLAN	FOR BIDS		X	X	
M4.3	ROOF MECHANICAL PLAN	FOR BIDS	20 JUN 2019	X	X	

				N 2019 FOR BIDS	JUNE 2019 PLAN REVIEW	LY 2019 - ADDENDUM 01
		Project	SHEET ISSUE	N D S		JULY
SHEET NO.	SHEET NAME	Phase	DATE	20	17	6
NAE 4	DI LIMBING ENILADOED DI ANIC	EOD DIDE	20 11 11 2040	V		
M5.1	PLUMBING ENLARGED PLANS MECHANICAL DEMOLITION AND NEW WORK PLANS - ALTERNATE	FOR BIDS	20 JUN 2019	X	X	
M5.2			20 JUN 2019	X	V	
M6.1	MECHANICAL DETAILS	FOR BIDS	20 JUN 2019	X	X	
M6.2	MECHANICAL DETAILS	FOR BIDS	20 JUN 2019	X	X	
M6.3	MECHANICAL DETAILS	FOR BIDS	20 JUN 2019	X	X	
M6.4	MECHANICAL DETAILS	FOR BIDS	20 JUN 2019	X	X	
M7.1	MECHANICAL SCHEDULES	FOR BIDS	20 JUN 2019	X	X	
M7.2	MECHANICAL SCHEDULES	FOR BIDS	20 JUN 2019	X	X	
M7.3	MECHANICAL SCHEDULES	FOR BIDS	20 JUN 2019	X	X	
M7.4	MECHANICAL SCHEDULES	FOR BIDS	20 JUN 2019	X	X	
M8.1	TEMPERATURE CONTROLS STANDARDS AND GENERAL NOTES	FOR BIDS	20 JUN 2019	X	X	
M8.2	TEMPERATURE CONTROLS	FOR BIDS	20 JUN 2019	X	X	
M8.3	TEMPERATURE CONTROLS	FOR BIDS	20 JUN 2019	X	Х	
E0.1 E0.2	ELECTRICAL STANDARDS AND DRAWING INDEX ELECTRICAL STANDARD SCHEDULES LOWER LEVEL LIGHTING DEMOLITION PLAN	FOR BIDS FOR BIDS	20 JUN 2019 20 JUN 2019	X	X	
ED2.0	LOWER LEVEL LIGHTING DEMOLITION PLAN	FOR BIDS	20 JUN 2019	X	X	
ED2.1	FIRST FLOOR LIGHTING DEMOLITION PLAN	FOR BIDS	20 JUN 2019	X	X	
ED2.2	SECOND FLOOR LIGHTING DEMOLITION PLAN	FOR BIDS	20 JUN 2019	X	X	
ED3.0	LOWER LEVEL POWER DEMOLITION PLAN	FOR BIDS	20 JUN 2019	X	X	
ED3.1	FIRST FLOOR POWER DEMOLITION PLAN	FOR BIDS	20 JUN 2019	X	X	
ED3.2	SECOND FLOOR POWER DEMOLITION PLAN	FOR BIDS	20 JUN 2019	Χ	X	
ED3.3	ROOF ELECTRICAL DEMOLITION PLAN	FOR BIDS	20 JUN 2019	X	X	
E2.0	LOWER LEVEL LIGHTING PLAN	FOR BIDS	20 JUN 2019	X	X	
E2.1	FIRST FLOOR LIGHTING PLAN	FOR BIDS	20 JUN 2019	X	X	
E2.2	SECOND FLOOR LIGHTING PLAN	FOR BIDS	20 JUN 2019	X	X	
E3.0	LOWER LEVEL POWER AND AUXILIARY SYSTEMS PLAN	FOR BIDS	20 JUN 2019	X	X	
E3.1	FIRST FLOOR POWER AND AUXILIARY SYSTEMS PLAN	FOR BIDS	20 JUN 2019	X	X	
E3.2	SECOND FLOOR POWER AND AUXILIARY SYSTEMS PLAN	FOR BIDS	20 JUN 2019	X	X	
E3.2 E3.3	ROOF POWER AND AUXILIARY SYSTEMS PLAN	FOR BIDS	20 JUN 2019	X	X	
					^	
E4.1	ELECTRICAL DEMOLITION AND NEW WORK PLANS - ALTERNATE	FOR BIDS	20 JUN 2019	X	V	
E5.1	ONE LINE DIAGRAM NEW WORK	FOR BIDS	20 JUN 2019	X	X	
E5.2	ONE LINE DIAGRAM - NEW WORK	FOR BIDS	20 JUN 2019	X	X	
E5.3	PANEL SCHEDULES	FOR BIDS	20 JUN 2019	X	X	
E7.1	ELECTRICAL DETAILS AND DIAGRAMS	FOR BIDS	20 JUN 2019	X	X	
21 25 (15) (15)						
SECURITY	T. 600 E. S. E. C. G. G. C.					
SC-FPL	LOWER LEVEL SECURITY FLOOR PLAN	FOR BIDS	20 JUN 2019	X		
SC-FP1	FIRST FLOOR SECURITY FLOOR PLAN	FOR BIDS	20 JUN 2019	X		
SC-FP1A	FIRST LEVEL ALTERNATE SECURITY PLAN		20 JUN 2019			
SC-FP2	SECOND LEVEL SECURITY PLAN		20 JUN 2019	X		
SC-R1	SECURITY RISER DIAGRAM	FOR BIDS	20 JUN 2019	X		
				X		

HamiltonAnderson

architecture landscape architecture urban design

Hamilton Anderson Associates, Inc 1435 Randolph Suite 200 Detroit, Michigan 48226 p 313 964 0270 f 313 964 0170 www.hamilton-anderson.com

MEP Engineer

Peter Basso Associates 5145 Livernois Troy, MI 48098 248.879.5666

Structural Engineer Desai/Nasr Consulting Engineer 6765 Daly Rd
West Bloomfield, MI 48322 248.932.2010



WAYNE STATE UNIVERSITY FP&M

5454 Cass Avenue Detroit, Michigan

Key Plan:

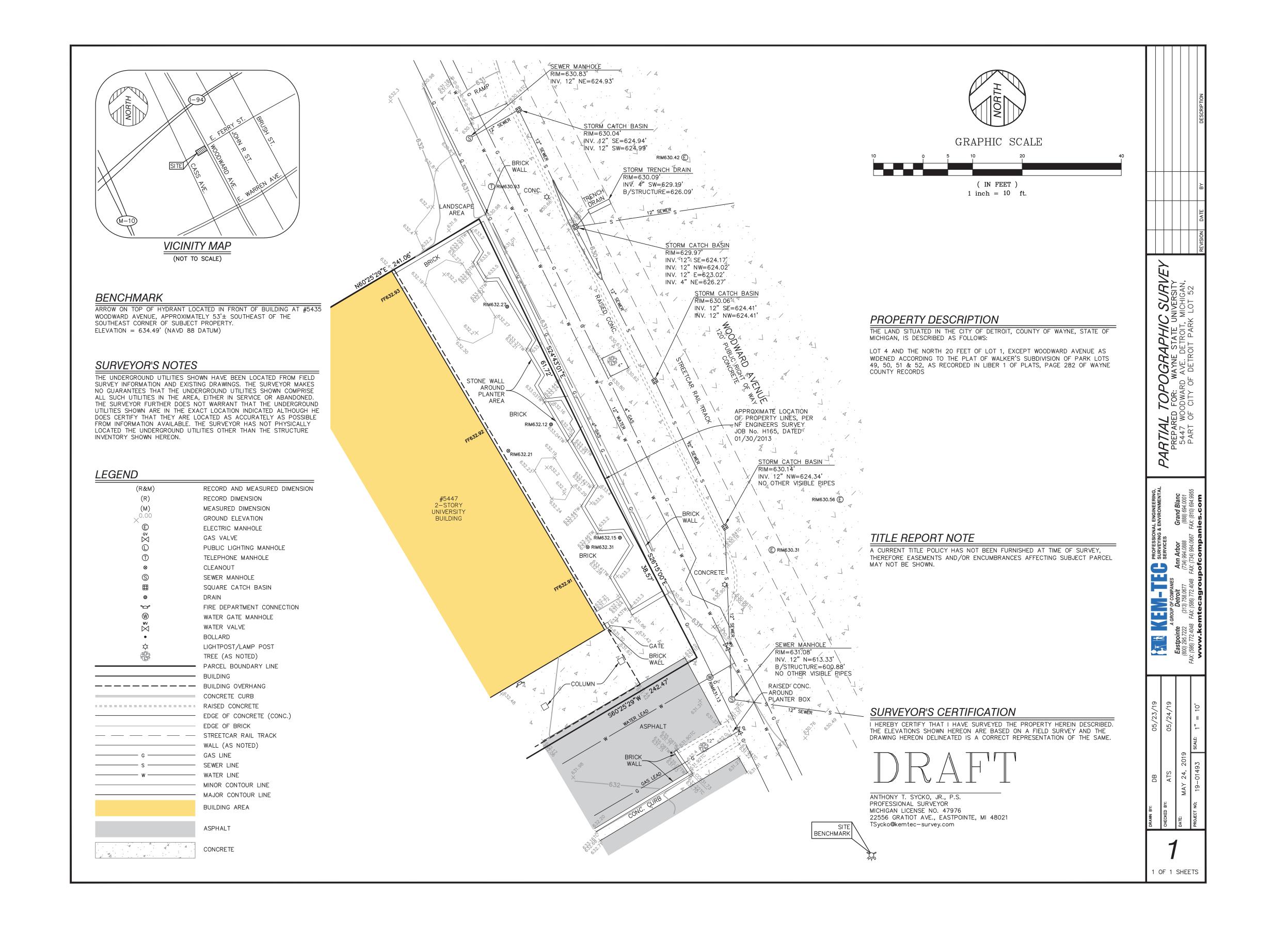
		-	
		-	
	NDUM 01		01 JULY 2019
FOR			20 JUN 2019
PLAN	REVIEW		17 JUN 2019

SCHOOL OF SOCIAL WORK - PHASE 2 5447 Woodward, Detroit, MI

DRAWING INDEX

Project Number: 2013088.22 WSU Project No: 063-301464 Approved By: RH Drawn By: HM/JAM Scale: Seal:

Drawing No:



SYMBOLS LEGEND

DETAIL IDENTIFICATION NUMBER (SAME NUMBER ON SHEET WHERE DRAWN OR REFERENCED)

DRAWING TITLE

SCALE: 1 1/2"=1'-0"

SHEET IDENTIFICATION NUMBER (INDICATES SHEET

NUMBER WHERE DETAIL CALLOUT IS DRAWN)

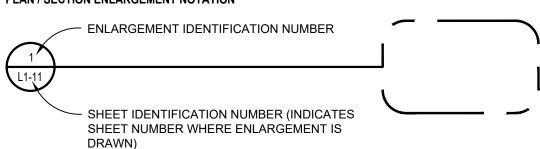
SECTION CUT NOTATION

SECTION IDENTIFICATION NUMBER

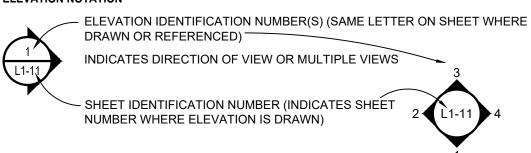
SECTION CUT LINE

SHEET IDENTIFICATION NUMBER (INDICATES SHEET NUMBER WHERE SECTION IS DRAWN)

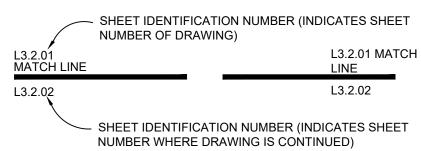
PLAN / SECTION ENLARGEMENT NOTATION



ELEVATION NOTATION



MATCH LINE NOTATION



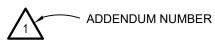
PRODUCT IDENTIFICATION TAG



NORTH INDICATION



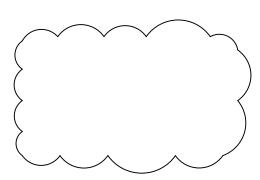
ADDENDUM NOTATION



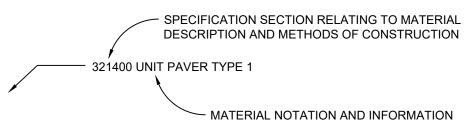
BULLETIN NOTATION



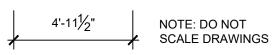
REVISION NOTATION



DRAWING NOTATION



DIMENSION LINE NOTATION



NOTE: THIS LIST DEFINES THE TYPICAL NOTATION FORMAT, THOUGH NOTATIONS WITHIN DRAWINGS MAY DIFFER FROM NOTATIONS INCLUDED ABOVE. CONTRACTOR TO CLARIFY ANYTHING UNCLEAR WITH OWNER REPRESENTATIVE. ANY NOTATION THAT IS UNCLEAR AND NOT INCLUDED WITHIN THIS LIST SHOULD BE BROUGHT TO THE ATTENTION OF THE OWNERS REPRESENTATIVE.

GENERAL NOTES

- 1. THE DRAWINGS AND SPECIFICATIONS DESCRIBE IN GENERAL THE QUALITY AND CHARACTER OF THE MATERIALS, SHAPE AND CONFIGURATION OF IMPROVEMENTS AND THE DESIGN INTENT OF THE COMPLETED, INSTALLED WORK OF THIS SPECIFIC PROJECT AND ONLY THIS PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION COORDINATION, EQUIPMENT, METHODS AND MATERIALS REQUIRED FOR SUCCESSFUL COMPLETION OF THE PROJECT, WHETHER OR NOT MENTIONED IN THE SPECIFICATIONS OR SHOWN IN THE DRAWINGS. THIS INCLUDES BUT IS NOT LIMITED TO THE QUALITY OF WORKMANSHIP AND MATERIALS REQUIRED FOR EXECUTION OF THESE DOCUMENTS AND ALL WORK OR MATERIALS SUPPLIED BY ANY SUBCONTRACTORS.
- 2. CONTRACTOR IS RESPONSIBLE FOR REVIEWING AND UNDERSTANDING CONTRACT DOCUMENTS FOR THE PROJECT, INCLUDING BUT NOT LIMITED TO THE PROJECT MANUAL AND PROJECT DRAWINGS. PROJECT MANUAL CONTAINS MATERIAL DESCRIPTIONS AND DETAILED INSTRUCTION NOT INCLUDED IN THE DRAWINGS. CONTRACTOR TO NOTIFY THE LANDSCAPE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES BETWEEN DRAWINGS AND SPECIFICATIONS.
- 3. SPECIFIC NOTES AND DETAILS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.
- 4. CONTRACTOR SHALL PROTECT EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED IN KIND AT NO ADDITIONAL COST TO THE OWNER. BARRICADES, SIGNS, LIGHTS, ETC., REQUIRED FOR THE PROTECTION OF PUBLIC, PERSONNEL, PROPERTY AND MATERIAL SHALL BE PROVIDED FOR AND MAINTAINED DURING CONSTRUCTION BY THE CONTRACTOR AND SHALL CONFORM TO ALL GOVERNING CODES, ORDINANCES AND REGULATIONS.
- 5. CONTRACTOR SHALL PROVIDE ALL TOOLS, TRANSPORTATION, UTILITIES, TEMPORARY FACILITIES, AND OTHER SERVICES AS NECESSARY FOR PROPER EXECUTION OF THE WORK, AND SHALL ASSUME FULL RESPONSIBILITY FOR PROTECTION AND SAFEKEEPING OF THESE ELEMENTS DURING CONSTRUCTION, UNLESS NOTED OTHERWISE. THE CONTRACTOR SHALL CONTACT THE OWNER'S REPRESENTATIVE IN ADVANCE FOR APPROVAL OF THE MATERIAL STORAGE AREA AT THE JOB SITE.
- 6. CONTRACTOR IS RESPONSIBLE FOR MATCHING EXISTING STREETS, SURROUNDING LANDSCAPE, AND OTHER IMPROVEMENT WITH A SMOOTH TRANSITION IN PAVING, CURBS, GUTTERS, SIDEWALKS, GRADING, ETC. AND TO AVOID ANY ABRUPT OR APPARENT CHANGES IN GRADES OR CROSS SLOPE, LOW SPOTS, OR HAZARDOUS CONDITIONS.
- 7. ALL EXISTING UTILITIES AND UTILITY COVERS SHALL BE PROTECTED UNLESS NOTED OTHERWISE ON THE DRAWINGS. PROVIDE ADEQUATE COVER FOR THE PROTECTION OF ALL PROPOSED AND EXISTING UTILITIES DURING THE CONSTRUCTION OF THIS PROJECT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNER'S REPRESENTATIVE OF ANY DIFFERENCES IN LOCATIONS OF EXISTING UTILITIES FROM THAT SHOWN, OR ANY CONFLICTS WITH THE DESIGN BEFORE CONTINUING WORK IN THAT AREA
- 8. ANY REVISIONS OR ADDITIONAL WORK REQUIRED AS A RESULT OF FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE. WORK PERFORMED BY THE CONTRACTOR WITHOUT WRITTEN AUTHORIZATION SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR WHO SHALL BEAR ALL COSTS ATTRIBUTABLE THERETO. ANY AND ALL REVISIONS SHALL BE IN WRITTEN CHANGE ORDER FORM AND APPROVED AND ALTHORIZED BY THE OWNER BEFORE REGINNING WORK

TABLE OF ABBREVIATIONS

MINIMUM

NORTH

MISC

MISCELLANEOUS

APPROX	APPROXIMATE	NIC	NOT IN CONTRACT
ARCH	ARCHITECT	NO	NUMBER
AVG		NOM	
-	AVERAGE		NOMINAL
B&B	BALLED AND BURLAPPED	NTS	NOT TO SCALE
BC	BOTTOM OF CURB	OC	ON CENTER
BLDG	BUILDING	OD	OUTSIDE DIAMETER
BM	BENCHMARK	PAV	PAVING
BOC	BACK OF CURB	PC	POINT OF CURVATURE
		PE	
BR	BOTTOM OF RAMP		POLYURETHANE
BS	BOTTOM OF STAIR	PI	POINT OF INTERSECTION
BW	BOTTOM OF WALL	PL	PROPERTY LINE
BYD	BEYOND	PT	POINT OF TANGENCY
CAL	CALIPER	PVC	POLYVINYL CHLORIDE
СВ	CATCH BASIN	QTY	QUANTITY
CF	CUBIC FEET	R	RADIUS
CIP	CAST IN PLACE	REF	REFERENCE
CL	CENTERLINE	REINF	REINFORCED(D)
CLR	CLEARANCE	REQ'D	REQUIRED
CM	CENTIMETER	REV	REVISION, REVISED
CO	CLEAN OUT	ROW	RIGHT OF WAY
CONC	CONCRETE	S	SOUTH
CONT	CONTINUOUS	SAN	SANITARY
CY	CUBIC YARD	SD	STORM DRAIN
DEG	DEGREE	SF	SQUARE FOOT (FEET)
DEMO	DEMOLISH, DEMOLITION	SHT	SHEET
DIA	DIAMETER	SIM	SIMILAR
DIM	DIMENSION	SPECS	SPECIFICATIONS
DTL	DETAIL	ST	STORM SEWER
DWG	DRAWING	SY	SQUARE YARDS
E	EAST	STA	STATION
EA 	EACH	STD	STANDARD
EL	ELEVATION	SYM	SYMMETRICAL
ENG	ENGINEER	T&B	TOP AND BOTTOM
EQ	EQUAL, EQUIDISTANT	TC	TOP OF CURB
EST	ESTIMATE	TF	TOP OF FOOTING
E.W.	EACH WAY	TH	THICK
EXIST	EXISTING	TOPO	TOPOGRAPHY
EXP	EXPANSION, EXPOSED	TR	TOP OF RAMP
FFE	FINISHED FLOOR ELEVATION	TS	TOP OF STEP
	FINISHED FROOK ELEVATION FINISHED GRADE		
FG 		TW	TOP OF WALL
FL	FLOW LINE	TYP	TYPICAL
FOC	FACE OF CURB	VAR	VARIES
FT	FOOT, FEET	VOL	VOLUME
FTG	FOOTING	W/	WITH
GA	GAUGE	W/O	WITHOUT
GEN	GENERAL	WT	WEIGHT
GR	GRADE ELEVATION	WL	WATER LEVEL
HORIZ	HORIZONTAL	WWF	WELDED WIRE FABRIC
	HIGH POINT		
HP		YD	YARD
HT	HEIGHT	@	AT
ID	INSIDE DIAMETER		
INV	INVERT ELEVATION		
IN	INCHES		
INCL	INCLUDE(D)		
JT	JOINT		
LF	LINEAR FEET		
LP	LOW POINT		
MAX	MAXIMUM		
MH	MANHOLE		

NOTE: LIST IS NON-EXHAUSTIVE. ANY NOTATION THAT IS UNCLEAR AND NOT INCLUDED WITHIN THIS LIST SHOULD BE BROUGHT TO THE ATTENTION OF THE OWNERS REPRESENTATIVE.

HamiltonAnderson

Hamilton Anderson Associates, Inc 1435 Randolph Suite 200 Detroit, Michigan 48226 p 313 964 0270 f 313 964 0170 www.hamilton-anderson.com

MEP Engineer Pe

Peter Basso Associates 5145 Livernois Troy, MI 48098 248.879.5666

Structural Engineer

Desai/Nasr Consulting Engineer 6765 Daly Rd West Bloomfield, MI 48322 248.932.2010

WAYNE STATE UNIVERSITY

WAYNE STATE UNIVERSITY
FP&M

5454 Cass Avenue Detroit, Michigan

Key Plan

DDENIDUM 4	4 11 11 14 00 40
DDENDUM 1	1 JULY 2019
ESIGN DEVELOPMENT	3 APR 2019

Project

Drawing Title

SCHOOL OF SOCIAL WORK - PHASE 2 5447 Woodward, Detroit, MI

GENERAL NOTES

Project Number: 2013088.22 WSU Project No: 063-301464

Drawn By: JS Approved By: GCR

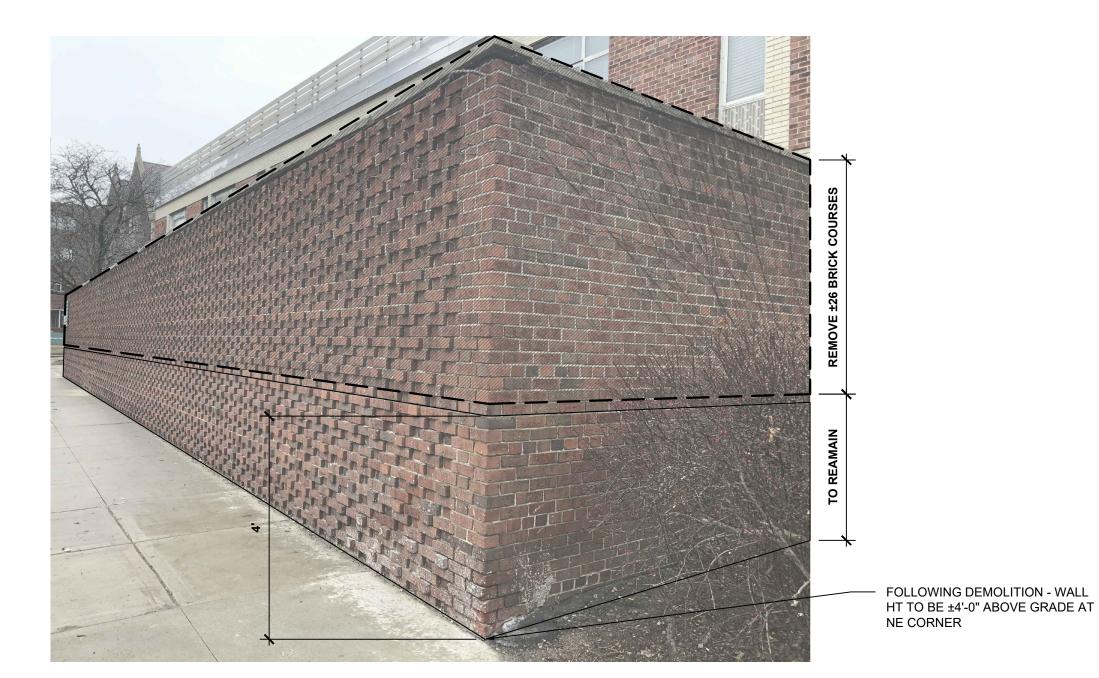
Scale: AS SHOWN



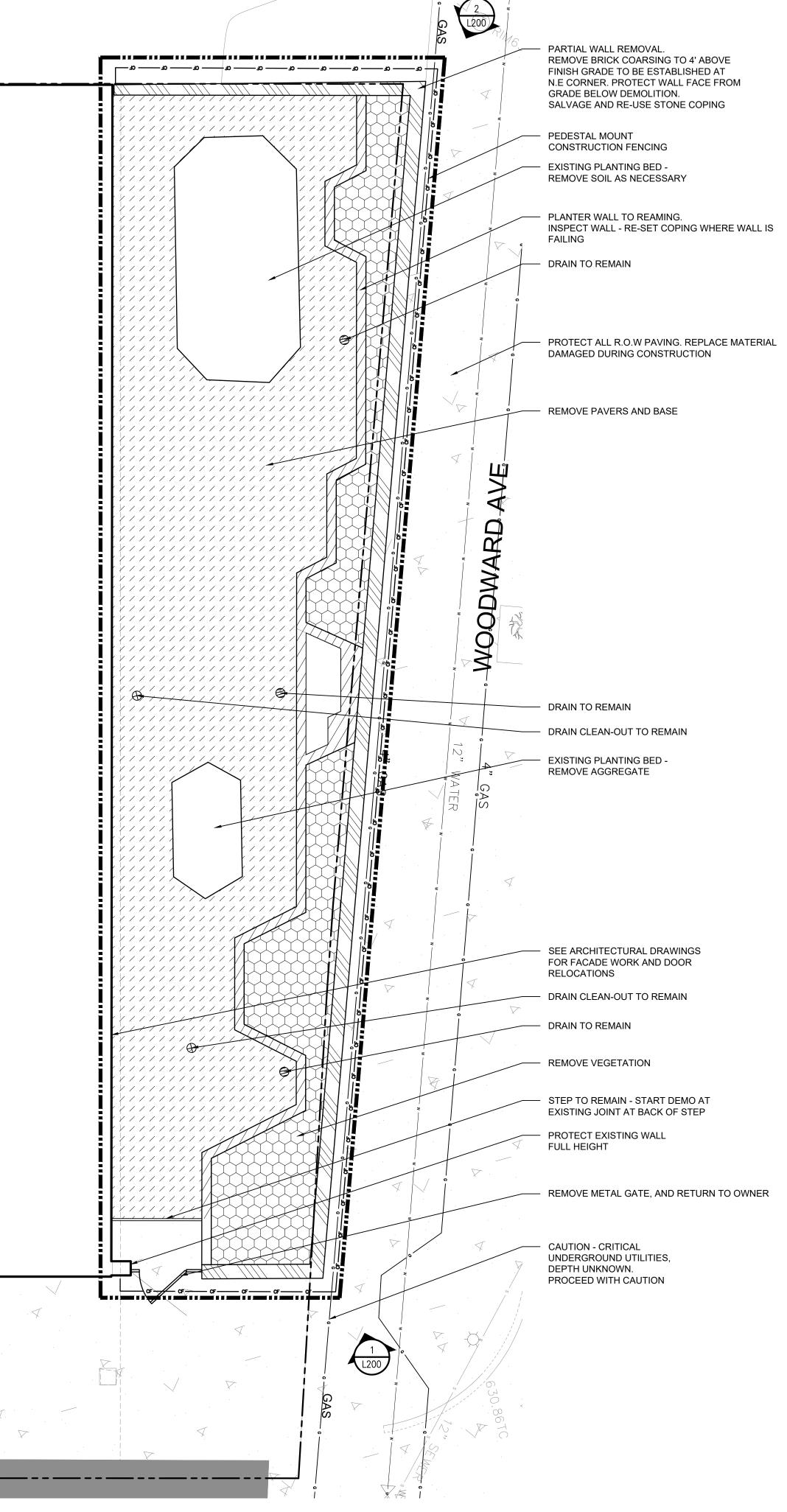
Signature:

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EXTERIOR WALL LOOKING NORTH



EXTERIOR WALL LOOKING SOUTH



LEGEND

PROJECT LIMITS PROPERTY LINE

PLANTER WALL TO REMAIN

PARTIAL WALL REMOVAL ///////// REMOVE PAVERS & BASE

—— от—— от—— CONSTRUCTION FENCE

REMOVE PLANT MATERIAL

NOTES

- 1. PROTECT ALL R.O.W PAVING. REPLACE MATERIAL DAMAGED DURING CONSTRUCTION.
- 2. MOVE CONSTRUCTION FENCE AS REQUIRED TO COMPLETE THE WORK. REPLACE FENCE WHEN SUPERVISION IS NOT PRESENT.
- 3. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING BUILDINGS, PAVING, LANDSCAPE, AND OTHER EXISTING CONDITIONS THROUGH ALL PHASES OF CONSTRUCTION.
- 4. ALL REMOVALS AND SPOILS SHALL BE HAULED FROM THE SITE BY THE CONTRACTOR. CONTRACTOR SHALL MAINTAIN SOIL VOLUME REQUIRED TO BACKFILL PLANTING EXCAVATIONS AND LANDSCAPE AREAS.
- 5. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND/ OR REPLACEMENT OF ALL EXISTING MATERIAL DAMAGED DURING CONSTRUCTION OPERATIONS, INCLUDING BUT NOT LIMITED TO TURF, PAVING, BUILDING APPURTENANCES, FENCING AND SIGNAGE.

HamiltonAnderson

Hamilton Anderson Associates, Inc 1435 Randolph Suite 200 Detroit, Michigan 48226 p 313 964 0270 f 313 964 0170

www.hamilton-anderson.com

MEP Engineer

Peter Basso Associates 5145 Livernois

Troy, MI 48098 248.879.5666

Desai/Nasr Consulting Engineer 6765 Daly Rd West Bloomfield, MI 48322 248.932.2010

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5454 Cass Avenue Detroit, Michigan

Key Plan

1 JULY 2019 DESIGN DEVELOPMENT 3 APR 2019

Drawing Title

SCHOOL OF SOCIAL WORK - PHASE 2 5447 Woodward, Detroit, MI

ALTERNATE - SITE DEMOLITION PLAN

WSU Project No: 063-301464 Project Number: 2013088.22 Approved By: GCR Scale: AS SHOWN



PLAN

PERENNIALS

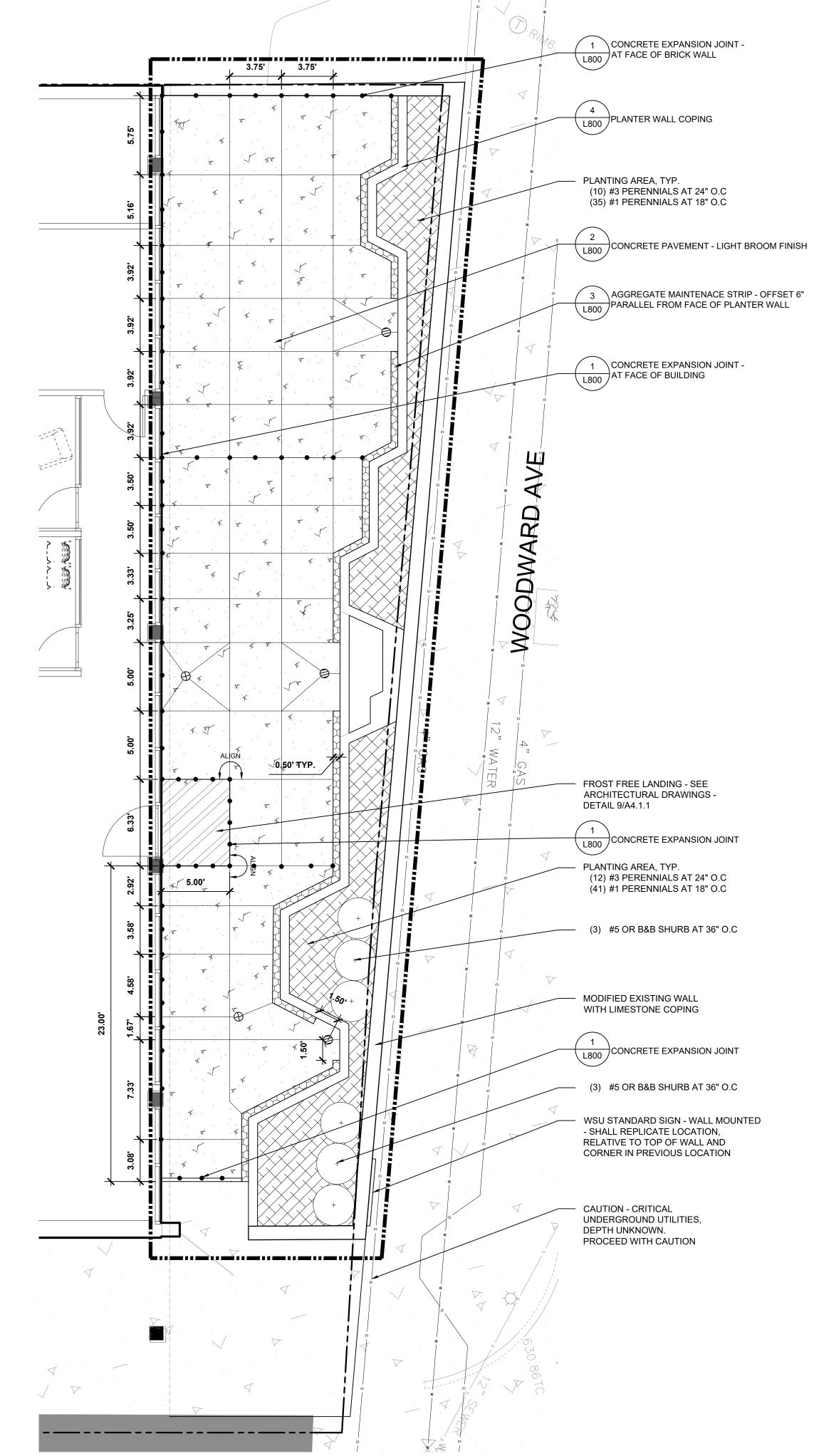
АММ	ACHILLEA MILLEFOLIUM 'MOONSHINE' MOONSHINE YARROW	1 GAL.	18" O.C
SSM	SALVIA X SYLVESTRIS 'MAY NIGHT' MAY NIGHT SAGE	1 GAL.	18" O.C

GRASSES

PVS	PANICUM VIRGATUM 'SHENANDOAH' SHENANDOAH SWITCH GRASS	3 GAL.	24" O.C
SS	SCHIZACHYRIUM SCOPARIUM LITTLE BLUESTEM	3 GAL.	24" O.C

SHRUBS

RAM	RIBES ALPINUM ALPINE CURRANT	5 GAL OR B&B	36" O.C



LEGEND

PROJECT LIMITS PROPERTY LINE CONCRETE PAVEMENT AGGREGATE STONE PLANTING AREA FROST FREE FOOTING • • • **EXPANSION JOINT**

NOTES

- 1. CONTRACTOR SHALL CONFIRM LAYOUT WITH LANDSCAPE ARCHITECT PRIOR TO FINAL INSTALLATION
- 2. CONTRACTOR SHALL INSTALL PAVING TO ALLOW POSITIVE DRAINAGE AT A MINIMUM OF .5% SLOPE AND MAXIMUM OF 2% SLOPE IN ANY DIRECTION AWAY FROM BUILDINGS UNLESS NOTED OTHERWISE.
- 3. LANDSCAPE ARCHITECT WILL REVIEW PLANT MATERIAL PRIOR TO PLANTING AND RESERVES THE RIGHT TO REJECT ANY MATERIAL WHICH DOES NOT MEET THE SPECIFICATIONS OR LANDSCAPE ARCHITECT'S SATISFACTION.
- 4. ALL PLANTS OF THE SAME SPECIES SHALL MATCH IN SIZE, SHAPE AND FORM. ALL PLANT MATERIALS SHALL BE SPECIMEN QUALITY.
- 5. LANDSCAPE ARCHITECT SHALL REVIEW PLACEMENT OF PLANT MATERIAL PRIOR TO AND AFTER INSTALLATION. ALL PLANTINGS SHALL BE INSTALLED IN A LOGICAL SEQUENCE IN THE SAME PLANTING TIME FRAME.
- 6. ALL NEW AND EXISTING PLANT MATERIAL WITHIN THE PROJECT AREA SHALL RECEIVE 3" DEPTH OF DOUBLE SHREDDED HARDWOOD MULCH.
- 7. APPLY PRE-EMERGENCE HERBICIDE TO ALL LANDSCAPE BEDS PER MANUFACTURER'S RECOMMENDATION.
- 8. CONTRACTOR IS RESPONSIBLE FOR REPAIR AND RESODDING ALL LAWN AREAS DAMAGED BY CONSTRUCTION.
- 9. LANDSCAPE ARCHITECT RESERVES THE RIGHT TO MAKE ADJUSTMENT TO PLANT LOCATIONS.
- 10. ALL EVERGREENS SHALL BE SPRAYED WITH
- ANTIDESSICANT SPRAY DURING THE FIRST WINTER 11. ALL PLANT MATERIAL SHALL BE GUARANTEED FOR ONE YEAR FROM FINAL ACCEPTANCE. CONTRACTOR SHALL REPLENISH MULCH AND PRUNE OUT ANY DIE BACK ON PLANT MATERIAL AFTER FIRST WINTER.
- 12. CONTRACTOR SHALL SUPPLY OWNER WITH RECOMMENDED ANNUAL MAINTENANCE SCHEDULE INCLUDING GUIDELINES FOR SPRAYING FERTILIZING
- AND PRUNING 13. CONCRETE EXPANSION JOINTS TO BE HELD AROUND ALL DRAINS AND DRAIN CLEAN OUTS.

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MEP Engineer

Structural Engineer

Peter Basso Associates 5145 Livernois

Troy, MI 48098 248.879.5666

Desai/Nasr Consulting Engineer

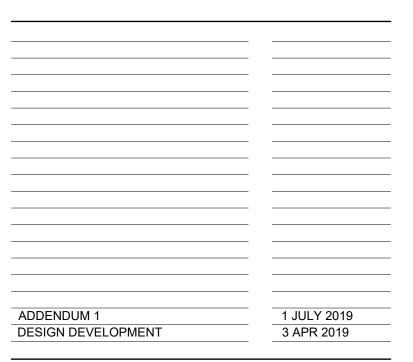
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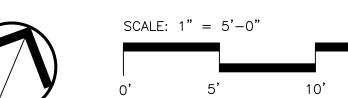
Key Plan



SCHOOL OF SOCIAL WORK - PHASE 2 5447 Woodward, Detroit, MI Drawing Title

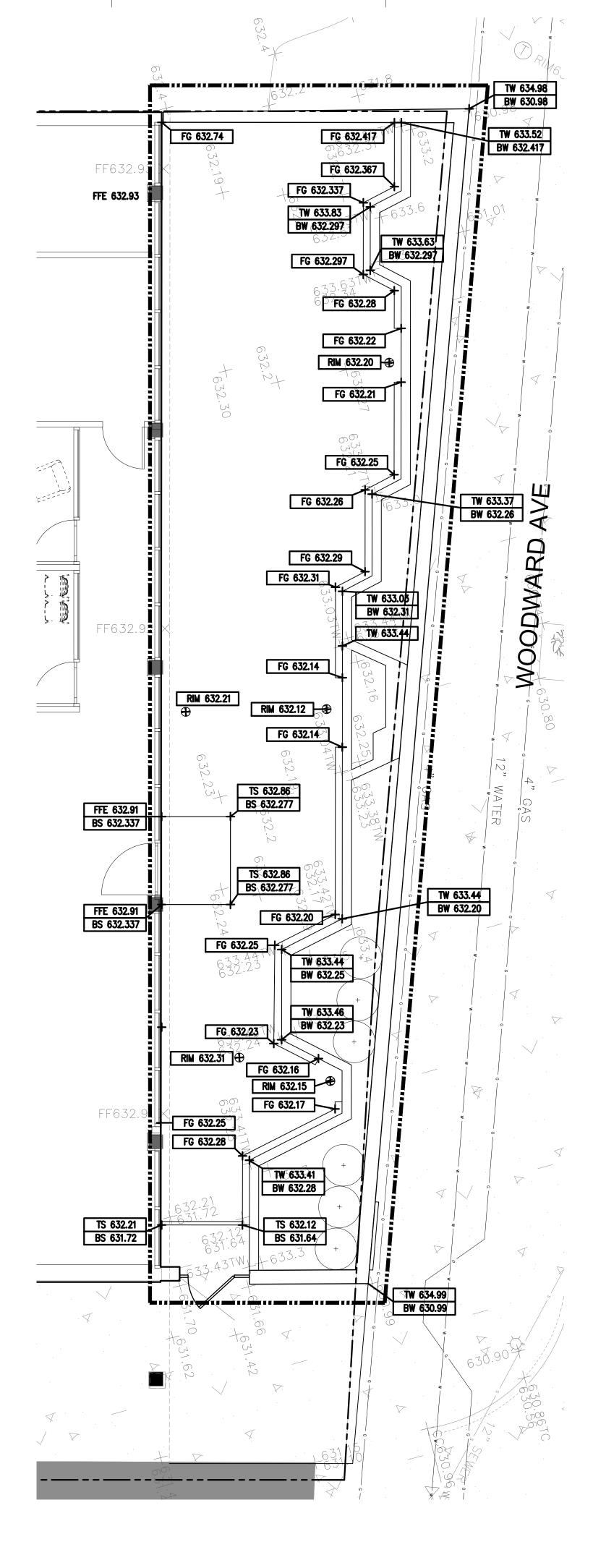
ALTERNATE - SITE MATERIALS & LAYOUT PLAN

Project Number: 2013088.22 WSU Project No: 063-301464 Approved By: GCR Drawn By: JS Scale: AS SHOWN





Signature: Drawing No:



LEGEND

PROPOSED CONTOUR PROPOSED SPOT ELEVATION + FFE 100.00 FINISH FLOOR ELEVATION + FG 100.00 FINISHED GRADE ELEVATION + TW 100.00 TOP OF WALL ELEVATION + BW 100.00 BOTTOM OF WALL + TS 100.00 TOP OF STEP ELEVATION + BS 100.00 BOTTOM OF STEP ELEVATION TOP OF RIM ELEVATION FOR CATCH BASIN + RIM 100.00 + MATCH EX MATCH EXISTING GRADE

DRAIN

EX. CONTOUR

EX. SPOT ELEVATION

NOTES

- TOP OF NEW PAVEMENT AND NEW STEPS SHALL MEET FLUSH WHERE THEY ABUT EXISTING PAVEMENTS AND STEPS.
- 2. ALL PROPOSED ELEVATIONS REPRESENT FINISHED GRADES
- 3. CONTRACTOR SHALL INSTALL PAVING TO ALLOW POSITIVE DRAINAGE AT A MINIMUM OF .5% SLOPE AND MAXIMUM OF 2% SLOPE IN ANY DIRECTION AWAY FROM BUILDINGS UNLESS NOTED OTHERWISE.

 4. CONTRACTOR TO ESTABLISH TOP OF WALL
- ELEVATION WITH EXISTING CONDITIONS.
 TOP OF WALL TO BE CONSISTENT ACROSS THE SITE -TO BE FIELD VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO RE-SETTING COPING.

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MEP Engineer

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5145 Livernois Troy, MI 48098 248.879.5666

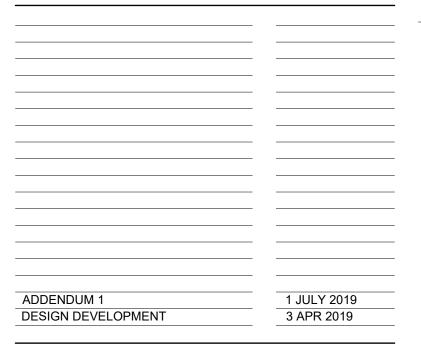
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Project

SCHOOL OF SOCIAL WORK - PHASE 2 5447 Woodward, Detroit, MI Drawing Title

ALTERNATE - GRADING PLAN

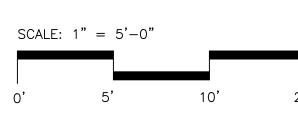
Project Number: 2013088.22 WSU Project No: 063-301464

Drawn By: JS Approved By: GCR

Scale: AS SHOWN

Seal:



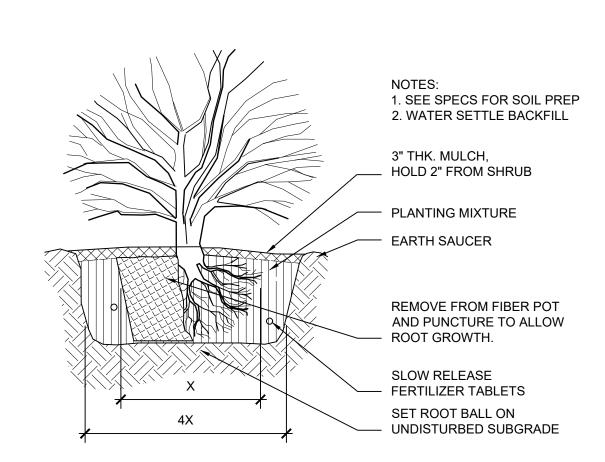




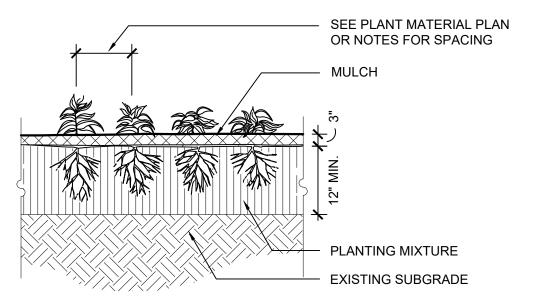
Signature:

Drawing No:

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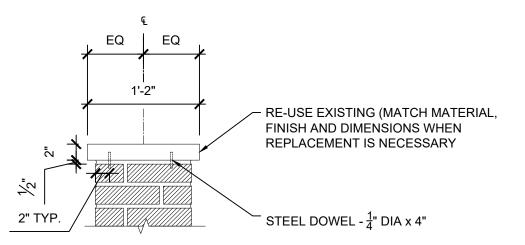


7 **SHRUB DETAIL**SCALE: 1/4" = 1'-0"



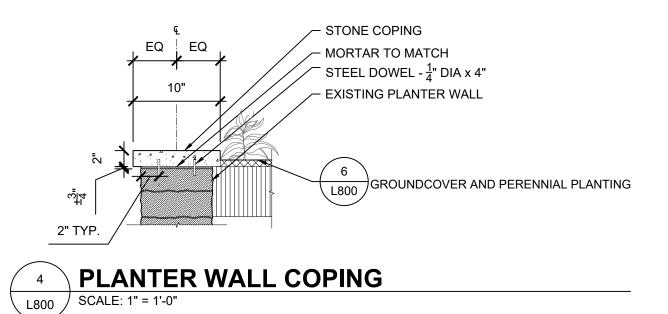
NOTES:
PLANTS TO BE SET WITH BOTTOM LEAVES
PARALLEL WITH GRADE AFTER MULCH.

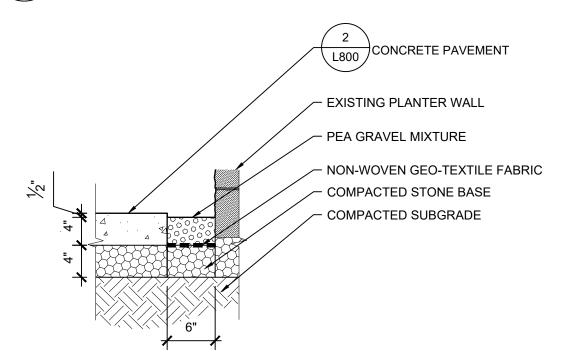
6 GROUNDCOVER AND PERENNIAL PLANTING
SCALE: 1/2" = 1'-0"



5 BRICK WALL COPING

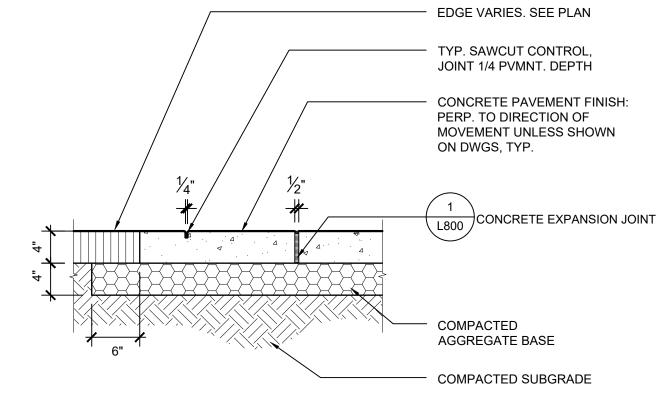
SCALE: 1" = 1'-0"





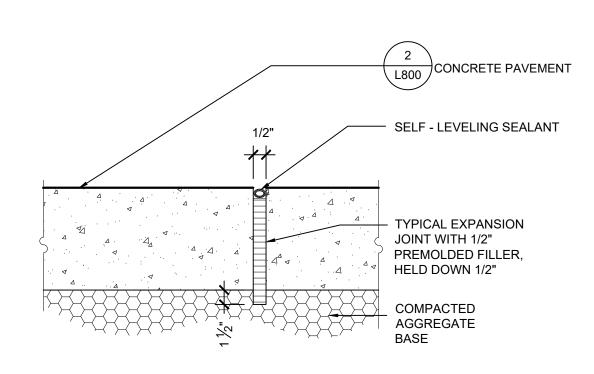
3 AGGREGATE MAINTENACE STRIP

SCALE: 1" = 1'-0"



2 CONCRETE PAVEMENT

SCALE: 1" = 1'-0"



1 CONCRETE EXPANSION JOINT SCALE: 1" = 1'-0"

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248.879.5666

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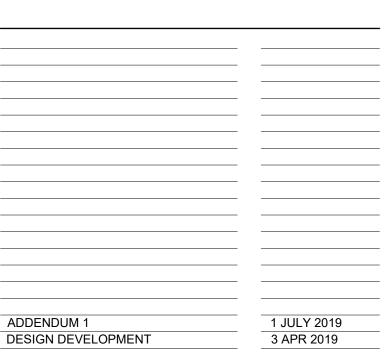
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Project

Drawing Title

SCHOOL OF SOCIAL WORK - PHASE 2 5447 Woodward, Detroit, MI

ALTERNATE - SITE DETAILS

Project Number: 2013088.22 WSU Project No: 063-301464

Drawn By: JS Approved By: GCR

Scale: AS SHOWN

Seal:



Signature:

Drawing No:

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SECTION 040140.62 - STONE REPOINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Repointing joints with mortar.

1.3 DEFINITIONS

- A. Low-Pressure Spray: 100 to 400 psi (690 to 2750 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).
- B. Rift: The most pronounced direction of splitting or cleavage of a stone.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to repointing stonework including, but not limited to, the following:
 - a. Verify stone repointing specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Materials, material application, sequencing, tolerances, and required clearances.
 - c. Quality-control program.
 - d. Coordination with building occupants.

1.5 SEQUENCING AND SCHEDULING

- A. Order sand and gray portland cement for pointing mortar immediately after approval of Samples. Take delivery of and store at Project site enough quantity to complete Project.
- B. Work Sequence: Perform stone repointing work in the following sequence, which includes work specified in this and other Sections:
 - 1. Remove plant growth.

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- 2. Inspect masonry for open mortar joints and permanently or temporarily point them before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
- 3. Remove paint.
- 4. Clean stone.
- 5. Rake out mortar from joints surrounding stone to be replaced and from joints adjacent to stone repairs along joints.
- 6. Repair stonework, including replacing existing stone with new stone.
- 7. Rake out mortar from joints to be repointed.
- 8. Point mortar and sealant joints.
- 9. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.
- 10. Where water repellents are to be used on or near stonework, delay application of these chemicals until after pointing and cleaning.
- C. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in stone according to Section 040140.61 "Stone Repair." Patch holes in mortar joints according to "Repointing Stonework" Article.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include recommendations for product application and use.
 - 3. Include test data substantiating that products comply with requirements.
- B. Samples for Initial Selection: For the following:
 - 1. Pointing Mortar: Submit sets of mortar for pointing in the form of sample mortar strips, 6 inches (150 mm) long by 1/2 inch (13 mm) wide, set in aluminum or plastic channels.
 - a. Have each set contain a close color range of at least three Samples of different mixes of colored sands and cements that produce a mortar matching the existing, cleaned mortar when cured and dry.
 - b. Submit with precise measurements on ingredients, proportions, gradations, and source of colored sands from which each Sample was made.
 - 2. Sand Type Used for Pointing Mortar: Minimum 8 oz. (240 mL)of each in plastic screwtop jars.
 - 3. Sealant materials.
 - 4. Include similar Samples of accessories involving color selection.
- C. Samples for Verification: For the following:
 - 1. Each type, color, and texture of pointing mortar in the form of sample mortar strips, 6 inches (150 mm) long by 1/2 inch (13 mm) wide, set in aluminum or plastic channels.

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- a. Include with each Sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.
- 2. Sealant materials.
- 3. Accessories: Each type of anchor, accessory, and miscellaneous support.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For stone repointing specialist.
- B. Preconstruction Test Reports: For existing stone and mortar.
- C. Quality-control program.

1.8 QUALITY ASSURANCE

- A. Stone Repointing Specialist Qualifications: Engage an experienced stone repointing firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing standard unit masonry or new stone masonry is insufficient experience for stone repointing work.
 - 1. Field Supervision: Stone repointing specialist firms shall maintain experienced full-time supervisors on Project site during times that stone repointing work is in progress.
- B. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging stonework. Include provisions for supervising performance and preventing damage.
- C. Mockups: Prepare mockups of stone repointing to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Repointing: Rake out joints in two separate areas, each approximately 36 inches (900 mm) high by 48 inches (1200 mm) wide for each type of repointing required, and repoint one of the areas.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on stone units as follows:

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- 1. Provide test specimens as indicated and representative of proposed materials and existing construction.
- 2. Existing Stone: Test each type of existing stone indicated for repointing according to ASTM C 170/C 170M for compressive strength, wet and dry, perpendicular and parallel to rift; ASTM C 99/C 99M for modulus of rupture, wet and dry, perpendicular and parallel to rift; and ASTM C 97/C 97M for absorption and bulk specific gravity. Carefully remove 1 existing stones from locations designated by Architect. Take testing samples from these stones.
- 3. Existing Mortar: Test according to ASTM C 295/C 295M, modified as agreed by testing service and Architect for Project requirements, to determine proportional composition of original ingredients, sizes and colors of aggregates, and approximate strength.
- 4. Temporary Patch: As directed by Architect, provide temporary materials followed by permanent repairs at locations from which existing samples were taken.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver packaged materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
- D. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.11 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit repointing work to be performed according to product manufacturers' written instructions and specified requirements.
- B. Temperature Limits, General: Repoint mortar joints only when air temperature is between 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least seven days after completion of the Work unless otherwise indicated.
- C. Cold-Weather Requirements: Comply with the following procedures for mortar-joint pointing unless otherwise indicated:
 - 1. When air temperature is below 40 deg F (4 deg C), heat mortar ingredients and existing stone to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
 - 2. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for seven days after pointing.
- D. Hot-Weather Requirements: Protect mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar materials. Provide artificial

shade and wind breaks, and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain each type of material for stone repointing (cement, sand, etc.) from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150/C 150M, Type I or Type II, except Type III may be used for cold-weather construction; white or gray or both where required for color matching of mortar.
 - 1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Masonry Cement: ASTM C 91/C 91M.
- D. Mortar Cement: ASTM C 1329/C 1329M.
- E. Mortar Sand: ASTM C 144.
 - 1. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
 - 2. Color: Natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.
- F. Mortar Pigments: ASTM C 979/C 979M, compounded for use in mortar mixes, and having a record of satisfactory performance in stone mortars.
- G. Water: Potable.

2.3 ACCESSORY MATERIALS

A. Sealant Materials:

1. Sealant manufacturer's standard elastomeric sealant(s) of base polymer and characteristics indicated below and according to applicable requirements in Section 079200 "Joint Sealants."

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2. Colors: Provide colors of exposed sealants to match colors of mortar adjoining installed sealant unless otherwise indicated.

B. Joint-Sealant Backing:

- 1. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- 2. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended in writing by sealant manufacturer for preventing sealant from adhering to rigid, inflexible, joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.
- C. Masking Tape: Nonstaining, nonabsorbent material; compatible with mortar, joint primers, sealants, and surfaces adjacent to joints; and that easily comes off entirely, including adhesive.
- D. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:
 - 1. Previous effectiveness in performing the work involved.
 - 2. Minimal possibility of damaging exposed surfaces.
 - 3. Consistency of each application.
 - 4. Uniformity of the resulting overall appearance.
 - 5. Do not use products or tools that could leave residue on surfaces.

2.4 MORTAR MIXES

- A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
 - 1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again, adding only enough water to produce a damp, unworkable mix that retains its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.
- B. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.
 - 1. Mortar Pigments: Where mortar pigments are indicated, do not add pigment exceeding 10 percent by weight of the cementitious or binder materials, except for carbon black which is limited to 2 percent, unless otherwise demonstrated by a satisfactory history of performance.
- C. Do not use admixtures in mortar unless otherwise indicated.
- D. Mixes: Mix mortar materials in the following proportions:

- 1. Proportion shall be determined by existing mortar analysis.
 - a. Ultimate Compressive Strength: Not to exceed that of existing mortar or stone.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Prevent mortar from staining face of surrounding stone and other surfaces.
 - 1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
 - 2. Keep wall area wet below pointing work to discourage mortar from adhering.
 - 3. Immediately remove mortar splatters in contact with exposed stone and other surfaces.
- B. Remove associated hardware adjacent to stone and store during stone repointing. Reinstall when repointing is complete.
 - 1. Provide temporary rain drainage during work to direct water away from building.

3.2 STONE REPOINTING, GENERAL

A. Appearance Standard: Repointed surfaces are to have a uniform appearance as viewed from 20 feet (6 m) away by Architect.

3.3 REPOINTING STONEWORK

- A. Rake out and repoint joints to the following extent:
 - 1. All joints in areas indicated.
 - 2. Joints indicated as sealant-filled joints.
 - 3. Joints at locations of the following defects:
 - a. Holes and missing mortar.
 - b. Cracks that can be penetrated 1/4 inch (6 mm) or more by a knife blade 0.027 inch (0.7 mm) thick.
 - c. Cracks 1/8 inch (3 mm) or more in width and of any depth.
 - d. Hollow-sounding joints when tapped by metal object.
 - e. Eroded surfaces 1/4 inch (6 mm) or more deep.
 - f. Deterioration to point that mortar can be easily removed by hand, without tools.
 - g. Joints filled with substances other than mortar.
- B. Do not rake out and repoint joints where not required.
- C. Rake out joints as follows, according to procedures demonstrated in approved mockup:
 - 1. Remove mortar from joints to depth of joint width plus 1/8 inch (3 mm) but not less than 1/2 inch (13 mm) or not less than that required to expose sound, unweathered mortar. Do

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- not remove unsound mortar more than 2 inches (50 mm) deep; consult Architect for direction.
- 2. Remove mortar from stone surfaces within raked-out joints to provide reveals with square backs and to expose stone for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
- 3. Do not spall edges of stone units or widen joints. Replace or patch damaged stone units as directed by Architect.
- D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose stone, rotted wood, rusted metal, and other deteriorated items.

E. Pointing with Mortar:

- 1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
- 2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch (9 mm) until a uniform depth is formed. Fully compact each layer, and allow it to become thumbprint hard before applying next layer.
- 3. After deep areas have been filled to same depth as remaining joints, point joints by placing mortar in layers not greater than 3/8 inch (9 mm). Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing stone has worn or rounded edges, slightly recess finished mortar surface below face of stone to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed stone surfaces or to featheredge the mortar.
- 4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
- 5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.
- 6. Hairline cracking within mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

3.4 FINAL CLEANING

- A. After mortar has fully hardened, thoroughly clean exposed stone surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, applied by low-pressure spray.
 - 1. Do not use metal scrapers or brushes.
 - 2. Do not use acidic or alkaline cleaners.
- B. Clean adjacent nonstone surfaces. Use detergent and soft brushes or cloths.
- C. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.
- D. Remove masking materials, leaving no residues that could trap dirt.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage qualified testing agencies to perform tests and inspections. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.
- B. Architect's Project Representatives: Architect will assign Project representatives to help carry out Architect's responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Architect's Project representatives use of lift devices and scaffolding, as needed, to observe progress and quality of portion of the Work completed.
- C. Notify inspectors and Architect's Project representatives in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until inspectors and Architect's Project representatives have had reasonable opportunity to make inspections and observations of work areas at lift device or scaffold location.

END OF SECTION 040140.62

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Removing existing vegetation.
- 2. Clearing and grubbing.
- 3. Stripping and stockpiling topsoil.
- 4. Stripping and stockpiling rock.
- 5. Removing above- and below-grade site improvements.

1.3 DEFINITIONS

- A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing inplace surface soil; the zone where plant roots grow.
- D. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing inplace surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches (50 mm) in diameter; and free of weeds, roots, toxic materials, or other nonsoil materials.
- E. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- F. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction.
- G. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
 - 1. Use sufficiently detailed photographs or video recordings.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

- A. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.
- B. Rock Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

1.7 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.
- C. Utility Locator Service: Notify Miss Utility or Call Before You Dig or One Call for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

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E. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 EXISTING UTILITIES

- A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.
 - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

3.4 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Grind down stumps and remove roots larger than 2 inches (50 mm), obstructions, and debris to a depth of 18 inches (450 mm) below exposed subgrade.
 - 3. Use only hand methods or air spade for grubbing within protection zones.
 - 4. Chip removed tree branches and stockpile in areas approved by Architect.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

- A. Strip topsoil to depth of 6 inches (150 mm) in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches (50 mm) in diameter; trash, debris, weeds, roots, and other waste materials.
- B. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 - 1. Limit height of topsoil stockpiles to 6'
 - 2. Do not stockpile topsoil within protection zones.
 - 3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
 - 4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.6 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

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3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 311000

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes Concrete Paving
- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete" for general building applications of concrete.
 - 2. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and adjacent construction.
 - 3. American Concrete Institute (ACI)
 - a. ACI 304 Guide for Measuring, Mix, Transporting, and Placing Concrete.
 - b. ACI 305R Hot Weather Concreting.
 - c. ACI 306R Cold Weather Concreting.
 - d. ACI 308 Standard Specification for Curing Concrete.
 - 4. ASTM International. For referenced ASTM standards, visit the ASTM website, www.astm.org or contact ASTM customer service at service@astm.org. For Annual book of ASTM standards volume information, refer to the standard's Document Summary page on the ASTM website.
 - a. ASTM C33 Concrete Aggregates.
 - b. ASTM C69 Ready-Mixed Concrete.
 - c. ASTM C150 Portland Concrete
 - d. ASTM C260 Air Entraining Admixtures for Concrete.
 - e. ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - f. ASTM C494 Chemicals Admixtures for Concrete.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.
- B. Material Certificates: For the following, from manufacturer:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Curing compounds.
 - 4. Joint fillers.
- C. Material Test Reports: For each of the following:
 - 1. Aggregates: Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- D. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Stamped Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.
- B. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing readymixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual Section 3, "Plant Certification Checklist").
- C. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing on concrete paving mixtures.

1.8 FIELD CONDITIONS

- A. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- B. Hot-Weather Concrete Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

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B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- B. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 deformed bars.
- C. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 deformed bars.
- D. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60 deformed bars; assembled with clips.
- E. Plain-Steel Wire: ASTM A 1064/A 1064M, galvanized.
- F. Deformed-Steel Wire: ASTM A 1064/A 1064M.
- G. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A; coated, [plain] [deformed].
- H. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars; zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating. Cut bars true to length with ends square and free of burrs.
- I. Epoxy-Coated, Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60 plain-steel bars.
- J. Tie Bars: ASTM A 615/A 615M, Grade 60; deformed.
- K. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
- L. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.
- M. Zinc Repair Material: ASTM A 780/A 780M.

2.4 CONCRETE MATERIALS

- A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150/C 150M, white portland cement Type I/II
 - 2. Fly Ash: ASTM C 618.
 - 3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.

- B. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 4S, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: MDOT 6AA or 17A
 - 2. Fine Aggregate: MDOT 2NS
- C. Air-Entraining Admixture: ASTM C 260/C 260M.
- D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- E. Water: Potable and complying with ASTM C 94/C 94M.

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry or cotton mats.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

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E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork in preformed strips.

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301 for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
 - 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.
- B. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 - 1. Air Content: 6 percent plus or minus 1-1/2 percent for 3/4-inch (19-mm) nominal maximum aggregate size.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- E. Concrete Mixtures: Normal-weight concrete.
 - 1. Compressive Strength (28 Days): 4000 psi (27.6 MPa).
 - 2. Maximum W/C Ratio at Point of Placement: 0.50.
 - 3. Slump Limit: 4 inches (100 mm) plus or minus 1 inch (25 mm).
 - 4. Air Content: Maintain within range permitted by ACI 301 (ACI 301M)

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2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For concrete batches of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For concrete batches larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
 - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

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3.4 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.

E.

F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
 - 1. Locate expansion joints as shown in drawings
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
 - 4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 - 5. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- C. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as shown on drawings.
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete

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when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 (ACI 301M) by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.7 FLOAT AND BROOM FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

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3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing or a combination of these as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 (ACI 117M) and as follows:
 - 1. Elevation: 3/4 inch (19 mm).
 - 2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
 - 3. Surface: Gap below 10-feet- (3-m-) long; unleveled straightedge not to exceed 1/2 inch (13 mm).
 - 4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches (13 mm per 300 mm) of tie bar.
 - 5. Lateral Alignment and Spacing of Dowels: 1 inch (25 mm).
 - 6. Vertical Alignment of Dowels: 1/4 inch (6 mm).

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- 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches (6 mm per 300 mm) of dowel.
- 8. Joint Spacing: 3 inches (75 mm).
- 9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
- 10. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when it is 80 deg F (27 deg C) and above, and one test for each composite sample.
 - 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 - 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days,

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concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Concrete paying will be considered defective if it does not pass tests and inspections.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- I. Prepare test and inspection reports.

3.11 REPAIR AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

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SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Cold-applied joint sealants.
 - 2. Joint-sealant backer materials.
 - 3. Primers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Paving-Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and qualified applicator.
- B. Product Certificates: For each type of joint sealant and accessory.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Product Testing: Test joint sealants using a qualified testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.
- C. Submittals: Provide manufacturers color selection guide for exposed concrete sealants. Color selection by Landscape Architect.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
- B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than that allowed by joint sealant manufacturer for application indicated.
- C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 COLD-APPLIED JOINT SEALANTS

A. Type SL Silicone Sealant for Concrete: Single-component, low-modulus, neutral-curing, nonsag silicone sealant complying with ASTM D 5893 for Type NS.

2.3 JOINT-SEALANT BACKER MATERIALS

- A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.
- B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

2.4 PRIMERS

A. Primers: Product recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint- sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

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- B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.
- C. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of joint-sealant backings.
 - 2. Do not stretch, twist, puncture, or tear joint-sealant backings.
 - 3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:
 - 1. Place joint sealants so they fully contact joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
 - 1. Remove excess joint sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

- A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.
- B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

END OF SECTION 321373

SECTION 329113 - SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes planting soils specified by composition of the mixes.

1.3 DEFINITIONS

- A. AAPFCO: Association of American Plant Food Control Officials.
- B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.
- C. CEC: Cation exchange capacity.
- D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.
- E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- F. Imported Soil: Soil that is transported to Project site for use.
- G. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
- H. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.
- I. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."
- J. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

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- K. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
- L. SSSA: Soil Science Society of America.
- M. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- N. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- O. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- P. USCC: U.S. Composting Council.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.
 - 3. Include sieve analyses for aggregate materials.
 - 4. Material Certificates: For each type of imported soil, soil amendment and fertilizer before delivery to the site, according to the following:
 - a. Manufacturer's qualified testing agency's certified analysis of standard products.
 - b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
 - c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.
- B. Qualification Data: For each testing agency.
- C. Preconstruction Test Reports: For preconstruction soil analysis specified in "Preconstruction Testing" Article.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.
 - 1. Laboratories: Subject to compliance with requirements, provide testing by the following:
 - a. Environmental/Hazardous Metals Testing:

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- 1) University Laboratories, 22530 Heslip Drive, Novi, MI 4837, 248-615-8000 (support@universitylaboratories.com)
- 2) Or Approved Equal.
- b. Soil Physical Testing:
 - 1) Turf and Soil Diagnostics, 35 King Street, Trumansburg, NY 14886, 855-769-4231 (lab@turfdiag.com)
 - 2) Or Approved Equal
- c. Soil Fertility Testing
 - 1) CLC Labs, 325 Venture Drive, Lewis Center, OH 43035, 614-888-1663 (clclabs@aol.com)

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil.
 - 1. Notify Architect seven days in advance of the dates and times when laboratory samples will be taken.
- B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.
 - 1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.7 SOIL-SAMPLING REQUIREMENTS

- A. General: Extract soil samples according to requirements in this article.
- B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Architect under the direction of the testing agency.
 - 1. Number and Location of Samples: Minimum of three representative soil samples from varied locations for each soil to be used or amended for landscaping purposes.
 - 2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils
 - 3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
 - 4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.8 TESTING REQUIREMENTS

A. General: Perform tests on soil samples according to requirements in this article.

B. Physical Testing:

- 1. Soil Texture: Soil-particle, size-distribution analysis by the following methods according to SSSA's "Methods of Soil Analysis Part 1-Physical and Mineralogical Methods":
 - a. Hydrometer Method: Report percentages of sand, silt and clay.
- 2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis Part 1-Physical and Mineralogical Methods."
- 3. Water Retention: According to SSSA's "Methods of Soil Analysis Part 1-Physical and Mineralogical Methods."
- 4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).

C. Chemical Testing:

- 1. Metals Hazardous to the Environment: Test for presence and quantities of RCRA metals including, arsenic, barium, cadmium, chromium, lead, and mercury. If RCRA metals are present, include recommendations for corrective action.
- 2. Metals Hazardous to Human Health: Test for the presence and quantities of the USEPA 503 metals, including arsenic, cadmium, copper, lead, mercury, nickel, selenium and zinc. Reports levels found in comparison to allowable levels according to Table 3 of 503.13.
- D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT NCR-13, including the following:
 - 1. Percentage of organic matter.
 - 2. CEC, calcium percent of CEC, and magnesium percent of CEC.
 - 3. Soil reaction (acidity/alkalinity pH value).
 - 4. Buffered acidity or alkalinity.
 - 5. Nitrogen ppm.
 - 6. Phosphorous ppm.
 - 7. Potassium ppm.
 - 8. Manganese ppm.
 - 9. Manganese-availability ppm.
 - 10. Zinc ppm.
 - 11. Zinc availability ppm.
 - 12. Copper ppm.
 - 13. Sodium ppm.
 - 14. Soluble-salts ppm.
 - 15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.

16. Other deleterious materials, including their characteristics and content of each.

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- E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis Part 3- Chemical Methods."
- F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.
 - 1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. (100 sq. m) for 6-inch (150-mm)depth of soil
 - 2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. (100 sq. m) for 6-inch (150-mm)depth of soil

1.9 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

- 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
- 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
- 3. Do not move or handle materials when they are wet or frozen.
- 4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
- B. Planting-Soil Type: Existing, on-site surface soil, with the duff layer, if any, retained and stockpiled on-site; modified to produce viable planting soil. Blend existing, on-site surface soil with the following soil amendments and fertilizers, and lime quantities as recommended based on Testing reports.
- C. Planting-Soil Type: Imported, naturally formed soil from off-site sources and consisting of sandy loam soil according to USDA textures; and modified to produce viable planting soil.

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- 1. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 4 inches (100 mm) deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass.
- 2. Additional Properties of Imported Soil before Amending: Soil reaction of pH 6 to 7 and minimum of 4 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
- 3. Unacceptable Properties: Clean soil of the following:
 - a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
 - b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil
 - c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 2 inches (50 mm) in any dimension.

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: O, with a minimum of 95 percent passing through a No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through a No. 60 (0.25-mm) sieve.
 - 2. Form: Provide lime in form of ground calcitic limestone.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through a No. 40 (0.425-mm) sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Perlite: Horticultural perlite, soil amendment grade.
- E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 (0.30-mm) sieve.
- F. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C 33/C 33M

2.3 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:

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- 1. Reaction: pH of 5.5 to 8.
- 2. Soluble-Salt Concentration: Less than 4 dS/m.
- 3. Moisture Content: 35 to 55 percent by weight.
- 4. Organic-Matter Content: 30 to 40 percent of dry weight.
- 5. Particle Size: Minimum of 98 percent passing through a 1-inch (25-mm) sieve.

2.4 FERTILIZERS

- A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 33 percent available phosphoric acid.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- D. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

- A. Place planting soil and fertilizers according to requirements in other Specification Sections.
- B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.
- C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

A. Excavation: Excavate soil from designated area(s) to a depth of 6 inches (150 mm) and stockpile until amended.

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- B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- C. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches (150 mm). Remove stones larger than 2 inches (50 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply, add soil amendments, and mix approximately half the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil.
- C. Mixing: Spread unamended soil to total depth of 6 inches (150 mm), but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Amendments: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
 - a. Mix lime and sulfur with dry soil before mixing fertilizer.
 - b. Mix fertilizer with planting soil no more than seven days before planting.
 - 2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches (200 mm) in loose depth for material compacted by compaction equipment, and not more than 6 inches (150 mm) in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 PROTECTION

- A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."
- B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:

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- 1. Storage of construction materials, debris, or excavated material.
- 2. Parking vehicles or equipment.
- 3. Vehicle traffic.
- 4. Foot traffic.
- 5. Erection of sheds or structures.
- 6. Impoundment of water.
- 7. Excavation or other digging unless otherwise indicated.
- C. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Architect and replace contaminated planting soil with new planting soil.

3.5 CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

END OF SECTION 329113

SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Plants.

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- D. Finish Grade: Elevation of finished surface of planting soil.
- E. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
- F. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- G. Planting Area: Areas to be planted.
- H. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" for drawing designations for planting soils.

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- I. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- J. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- K. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- L. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
 - 2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 10 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 - 1. Manufacturer's certified analysis of standard products.
 - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.
- D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

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1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.
 - 1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 - 2. Experience: Three years' experience in landscape installation in addition to requirements in Section 014000 "Quality Requirements."
 - 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 4. Certification program in "Personnel Certifications" Subparagraph below is administered by the Professional Landcare Network. Verify availability of qualified individuals in Project area before retaining. See Evaluations.
 - 5. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
- C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 - 1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches (150 mm) above the root flare for trees up to 4-inch (100-mm) caliper size, and 12 inches (300 mm) above the root flare for larger sizes.
 - 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- D. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
 - 1. Notify Architect of sources of planting materials seven days in advance of delivery to site.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

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- 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
- 3. Accompany each delivery of bulk materials with appropriate certificates.
- C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- D. Handle planting stock by root ball.
- E. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.
- F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

G.

- 1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
- 2. Do not remove container-grown stock from containers before time of planting.
- 3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.9 FIELD CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
- C. Planting Limitations: The spring season for planting shall be from approximately April 1 through June 30; and from August 15 to October 31. Plants shall be installed when the ground is in a workable condition and temperatures are less than 95 degrees Fahrenheit. "Workable" ground condition is defined as ground conditions which are neither frozen nor muddy. Planting shall not commence when ground surface is frozen or during extended drought. Special conditions exist which may warrant a variance in the planting dates. Submit a written request for such variance to Architect.

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1.10 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
 - b. Structural failures including plantings falling or blowing over.
 - 2. Warranty Periods: From date of Substantial Completion.
 - a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
 - b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.
 - 3. Include the following remedial actions as a minimum:
 - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
 - c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
 - d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
 - 1. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including

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genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.2 FERTILIZERS

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
 - 1. Type: Shredded hardwood
 - 2. Size Range: 3 inches (76 mm) maximum, 1/2 inch (13 mm) minimum.
 - 3. Color: Natural.

2.4 WEED-CONTROL BARRIERS

- A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. (101g/sq. m) minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.
- B. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz./sq. yd. (162 g/sq. m).

2.5 PESTICIDES

- A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

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2.6 MISCELLANEOUS PRODUCTS

- A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.
- B. Burlap: Non-synthetic, biodegradable.
- C. Planter Filter Fabric: Nonwoven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.
- D. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb (0.45 kg) of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb (0.45 kg) of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
 - 3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

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- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.
- D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."
- B. Placing Planting Soil: Place and mix planting soil in-place over exposed subgrade.
- C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- D. Application of Mycorrhizal Fungi: At time directed by Architect, broadcast dry product uniformly over prepared soil at application rate according to manufacturer's written recommendations.

3.4 EXCAVATION SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits.
 - 1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 2. Excavate approximately three times as wide as ball diameter for balled and burlapped, balled and potted, container-grown stock.
 - 3. Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
 - 4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 - 5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 - 6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 - 7. Maintain supervision of excavations during working hours.
 - 8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
- B. Backfill Soil: Subsoil and topsoil removed from excavations [may] [may not] be used as backfill soil unless otherwise indicated.

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- C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
- D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

3.5 SHRUB PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare level with adjacent finish grades.
 - 1. Backfill: Planting soil
 - 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root level with adjacent finish grades.
 - 1. Backfill: Planting soil
 - 2. Carefully remove root ball from container without damaging root ball or plant.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Revise first subparagraph below to suit sizes and varieties of plants and planting tablets.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.

3.6 SHRUB PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.

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- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

3.7 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines 18 inches (450 mm) apart for #1 pot, 24 inches (600 mm) apart for #3 pot in even rows with triangular spacing.
- B. Use planting soil for backfill.
- C. Dig holes large enough to allow spreading of roots.
- D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.
- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.8 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Organic Mulch in Planting Areas: Apply 3-inch (75-mm) average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches (75 mm) of trunks or stems.

3.9 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use

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of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.10 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.11 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
 - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

3.12 CLEANING AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.
- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- D. After installation and before substantial completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

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3.13 MAINTENANCE SERVICE

- A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 - 1. Maintenance Period: 12 months from date of substantial completion.
- B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 - 1. Maintenance Period: 12 months from date of Substantial Completion.

END OF SECTION 329300