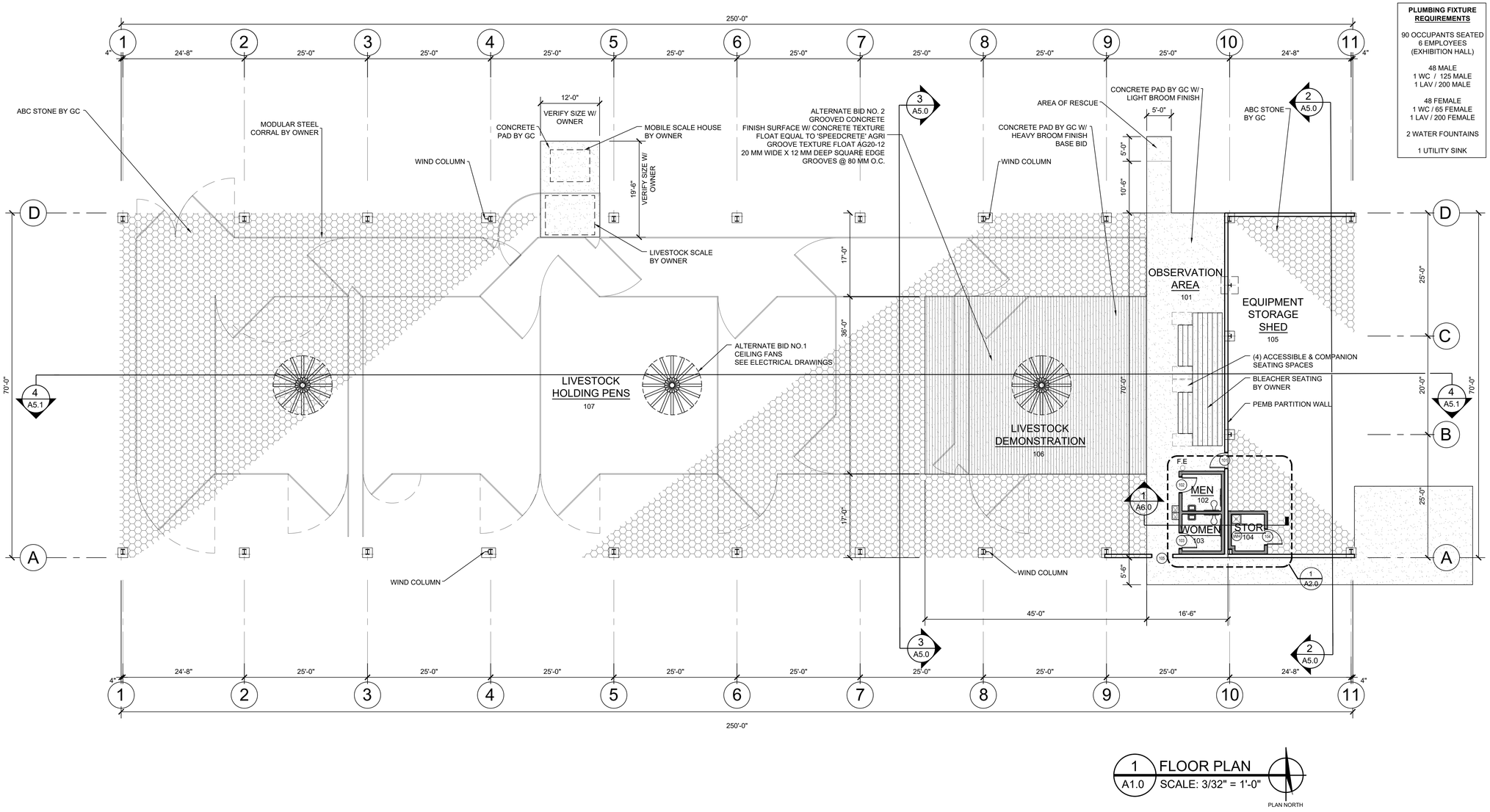

1 A1.0 FLOOR PLAN
SCALE: 3/32" = 1'-0"

PLAN NORTH

PLUMBING FIXTURE REQUIREMENTS

90 OCCUPANTS SEATED
6 EMPLOYEES
(EXHIBITION HALL)

48 MALE
1 WC / 125 MALE
1 LAV / 200 MALE

48 FEMALE
1 WC / 65 FEMALE
1 LAV / 200 FEMALE

2 WATER FOUNTAINS

1 UTILITY SINK

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06/22/2026

PROJECT

CATAWBA COUNTY CATTLEMEN'S ASSOCIATION EDUCATION CENTER

2894 MT. OLIVE CHURCH ROAD
NEWTON, NORTH CAROLINA 28658

DISTRIBUTION

MARK	DATE	DESCRIPTION
SD	10-23-2025	SCHEMATIC DESIGN
DD	11-10-2025	DESIGN DEVELOPMENT
CD	06-22-2026	CONSTRUCTION DOCUMENTS

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SHEET TITLE

FLOOR PLAN

A1.0

FINISH ROOM SCHEDULE

ABBREVIATIONS

ACT 1	2' X 2' ACOUSTICAL TILE	CLR CONC	COLORED CONCRETE	MRGB	MOIST. & MOLD RESIST. GYP. BD.	RUBB	RUBBER - 4" COVED BASE	WD	WOOD		
ACT 2	2' X 2' ACOUSTICAL TILE	EP	EPOXY PAINT	MAT	WALK - OFF MAT	S	SEALED	MWP	METAL WALL PANEL		
BB	BEAD BOARD	EPF	EPOXY FLOOR	MT	MARBLE TILE	ST	CRUSHED STONE				
CPT #1	CARPET - ROLL	EXT	EXISTING	P	PAINT	STL STRUC	STEEL STRUCTURE				
CPT #2	CARPET - MODULAR TILE	EXP	EXPOSED	PL LAM	PLASTIC LAMINATE	TERR	TERRAZZO				
CT	CERAMIC TILE	EXT - BRK	EXISTING BRICK	PLST	PLASTER	TP	TEXTURED PAINT				
CT - S	CERAMIC TILE (SPECIAL SHAPE)	EXT - MAS	EXISTING MASONRY WALLS	POR T	PORCELAIN TILE	VWC	VINYL WALL COVERING				
CONC	CONCRETE - SEALED	GB	GYPSUM BOARD	PLWD	PLYWOOD	VCT	VINYL COMPOSITION TILE				
CMU	CONCRETE MASONRY	LVP	LUXURY VINYL PLANK	RSV	RESILIENT SHEET VINYL	WC - (type)	WALL COVERING				

		FLOORS		WALLS				CEILING		NOTES	
NO.	SPACE	FLOOR	BASE	NORTH	SOUTH	EAST	WEST	MATERIAL	HEIGHT		NO.
	OBSERVATION AREA	CONC	--	EXP-P	EXP-P	MWP	--	EXP-P	--	①	101
	MEN RESTROOM	CONC	RUBB	PLWD-P	PLWD-P	PLWD-P	PLWD-P	PLWD-P	--		102
	WOMEN RESTROOM	CONC	RUBB	PLWD-P	PLWD-P	PLWD-P	PLWD-P	PLWD-P	--		103
	STORAGE	CONC	RUBB	PLWD-P	PLWD-P	PLWD-P	PLWD-P	PLWD-P	--		104
	EQUIPMENT STORAGE SHED	ST	--	EXP-P	EXP-P	--	EXP	EXP-P	--	①	105
	LIVESTOCK DEMONSTRATION	CONC/ST	--	EXP-P	EXP-P	--	--	EXP-P	--	①	106
	LIVESTOCK HOLDING PENS	ST	--	EXP-P	EXP-P	--	--	EXP-P	--	①	107

GENERAL NOTES:

PAINT ALL PRIMED PRE-ENGINEERED METAL BUILDING STRUCTURAL MEMBERS

DOOR, FRAME AND HARDWARE SCHEDULE

DOOR LEGEND:		HARDWARE LEGEND:	
TIG	TEMPERED INSULATED GLASS	ET	ENTRANCE
TG	TEMPERED GLASS	OFF	OFFICE
PR	PAIR	ST	STORAGE
HM	HOLLOW METAL - INSULATED	PV	PRIVACY
SCWD	SOLID CORE WOOD DOOR	CR	CLASSROOM
DE	DOUBLE EGRESS	PA	PASSAGE
CG	CERAMIC FIRE RATED GLASS	ED	RIM TYPE EXIT DEVICE
EX	EXISTING	WD	WOOD DOOR
CO	CASED OPENING		
HCWD	HOLLOW CORE WOOD DOOR		
HCMD	HOLLOW CORE MOLDED DOOR		

DOOR NOTES:

① SEE GENERAL NOTE 1
② --

FRAME NOTES:

① SEE GENERAL NOTE 1
② --

HARDWARE NOTES:

① SEE GENERAL NOTE 1
② KICK PLATE BOTH SIDES

OPENING		DOORS					FRAMES				
NUMBER	LABEL	TYPE	MATERIAL	SIZE	GLASS	NOTES	TYPE	MATERIAL	JAMB	HEAD	NOTES
101	--	D1	HM	3'-0" X 7'-0"	--	①	F1	HM	--	--	①
102	--	D1	HM	3'-0" X 7'-0"	--	①	F1	HM	--	--	①
103	--	D1	HM	3'-0" X 7'-0"	--	①	F1	HM	--	--	①
104	--	D1	HM	3'-0" X 7'-0"	--	①	F1	HM	--	--	①
105	--	--	--	4'-0" X 7'-0" OPENING	--	①	--	--	--	--	①

HARDWARE:

NUMBER	LOCK TYPE: (M = MORTISE, C = CYLINDRICAL, * = CYLINDER BY HARDWARE MFG)	RIM EXIT DEVICE EXTERIOR LEVER LOCKSET	EXIT DEVICE - RIM & EXTERIOR PULL	EXIT DEVICE RIM - EXIT ONLY	LOCK FUNCTION	PUSH / PULL	ELECTRONIC DOOR LOCK EXTERIOR KEY PAD & INTERIOR CONTROL	CLOSE W/ HOLD OPEN	CLOSER	KICKPLATE	FLUSHBOLTS - MANUAL	RECESSED DUST PROOF STRIKE	STOP: (BC = BY CLOSER, W = WALL, OH = OVERHEAD)	ASTRAGAL	WEATHER SEAL - ALL SIDES	THRESHOLD	RAIN DRIP EDGE	SMOKE & DRAFT CONTROL SEAL IN ACCORDANCE W/ NCBC 716.5.3.1	ACCESSIBILITY SIGNAGE	NOTES	NUMBER
101	M				PA				●	●			BC		●	●	--	--	--	①②	101
102	M				PV				●	●			BC		●	●	--	--	●	①②	102
103	M				PV				●	●			BC		●	●	--	--	●	①②	103
104	M				ST				●	●			BC		●	●	--	--	--	①②	104
105	--				--				--	--			--		--	--	--	--	--	①	105

GENERAL NOTES:

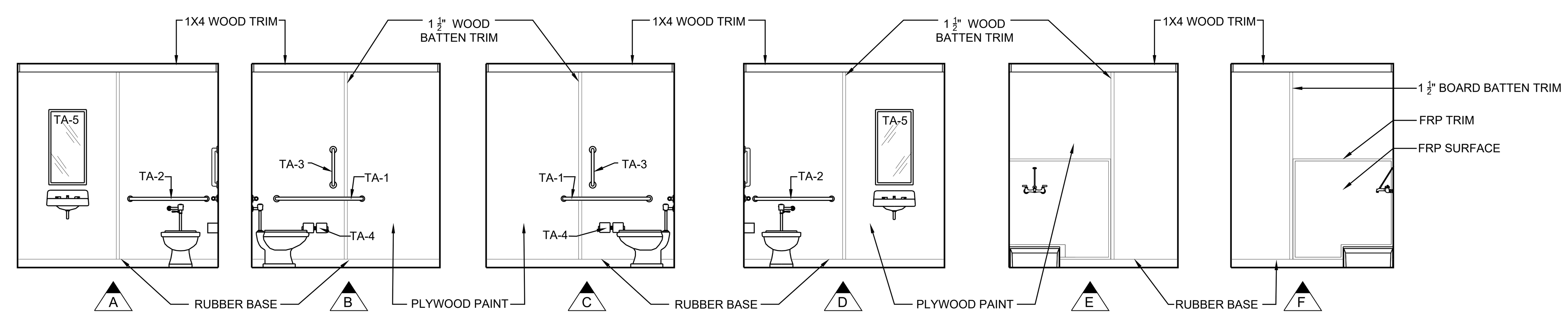
① HOLLOW METAL FRAMES AND DOORS, FINISH HARDWARE, FRAMED OPENINGS, OPENING TRIM, TO BE PROVIDED BY PRE ENGINEERED METAL BUILDING MANUFACTURER.
②
③
④

TOILET ACCESSORY SCHEDULE

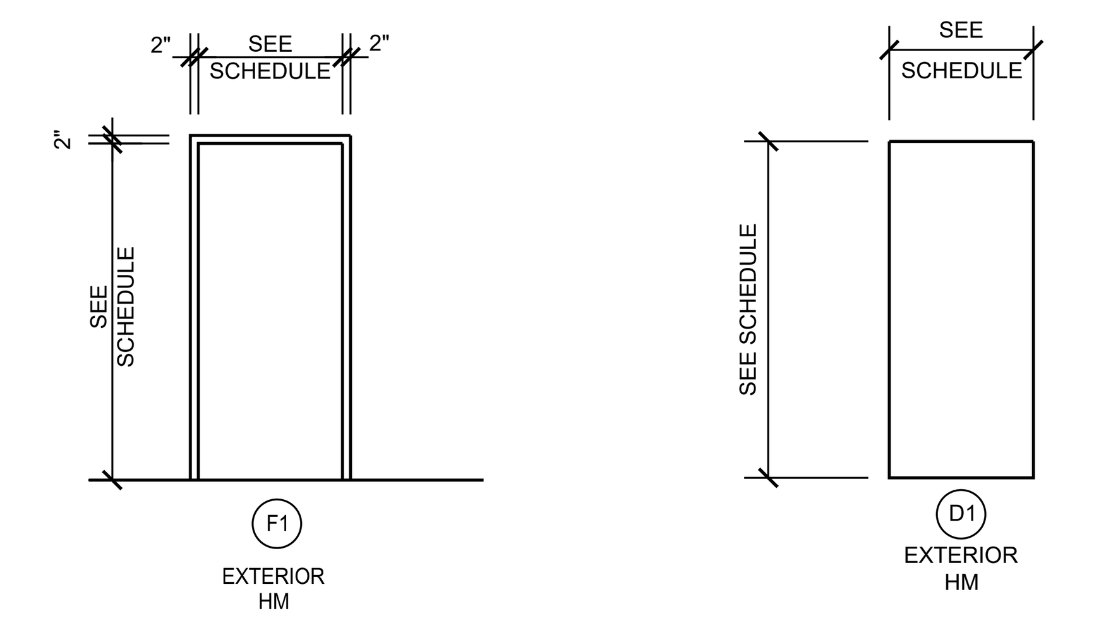
MARK	BOBRICK #	DESCRIPTION
TA-1	B-6806x42	HORIZONTAL GRAB BAR (42")
TA-2	B-6806x36	HORIZONTAL GRAB BAR (36")
TA-3	B-6206 x 18	VERTICAL GRAB BAR (18")
TA-4	B-274	TOILET PAPER DISPENSER
TA-5	B-290 2436	24x36 MIRROR

NOTES: BRAND NAMES OF ACCESSORIES ARE TO SET STANDARD ONLY.

1. SEE PLANS FOR ADDITIONAL ACCESSORIES.
2. SEE ELEVATIONS FOR TYPICAL MOUNTING HEIGHTS.
3. INSTALL BLOCKING AS REQUIRED FOR MOUNTING TOILET PARTITIONS, ACCESSORIES & CABINET INSTALLATION.

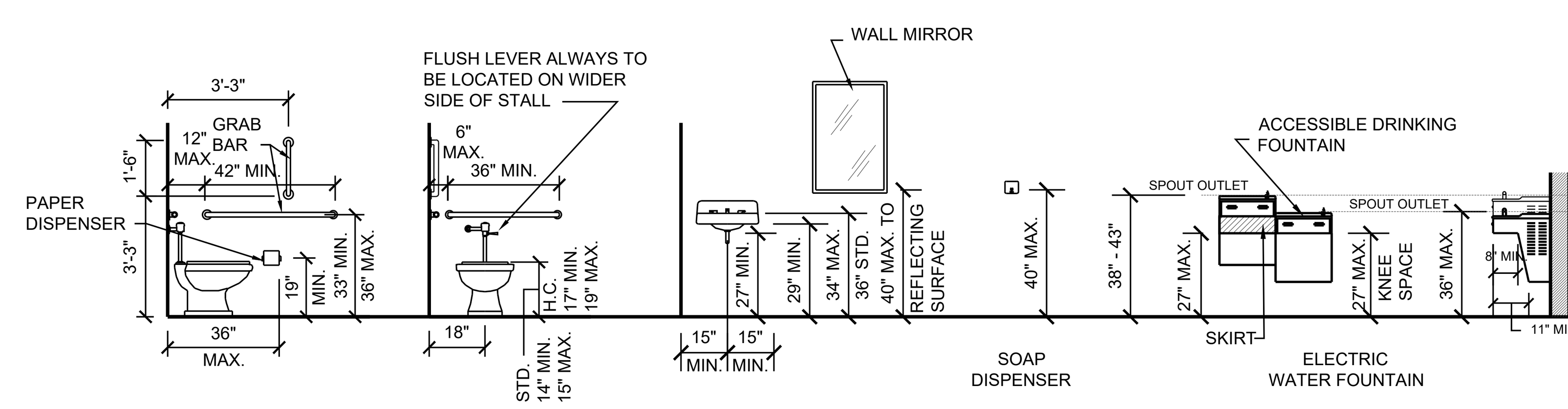


2 INTERIOR ELEVATIONS
A2.0 SCALE: 1/4" = 1'-0"

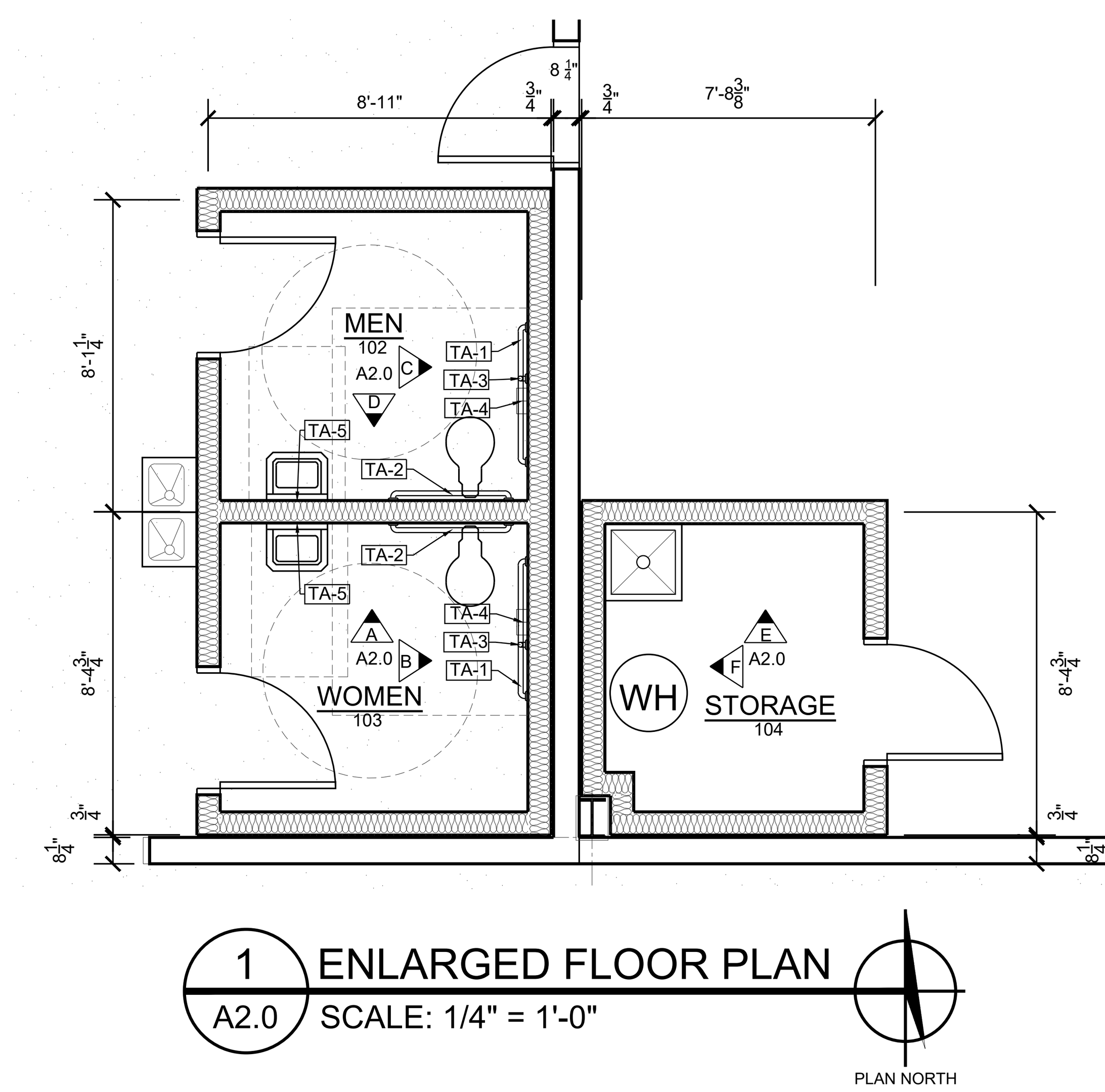


FRAME TYPES
NOT TO SCALE

DOOR TYPES
NOT TO SCALE



ACCESSIBLITY CODE REQUIREMENTS
MOUNTING HEIGHTS FOR NC AND ADA COMPLIANCE NOT TO SCALE
AGES 13 - ADULTS



1 ENLARGED FLOOR PLAN
A2.0 SCALE: 1/4" = 1'-0"

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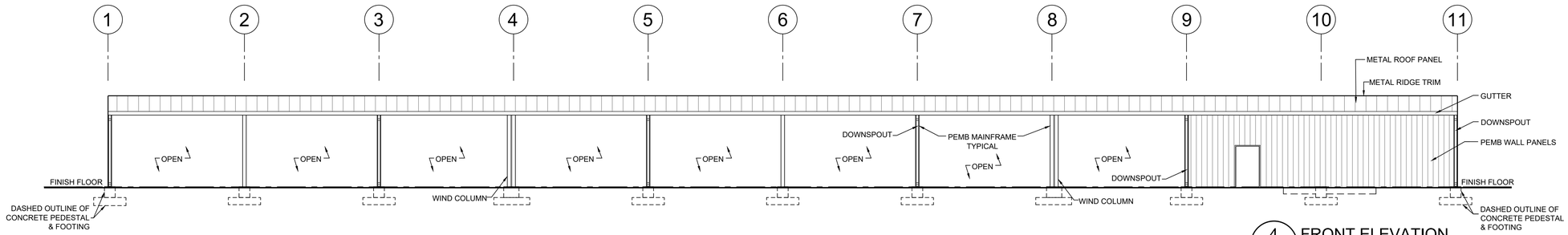
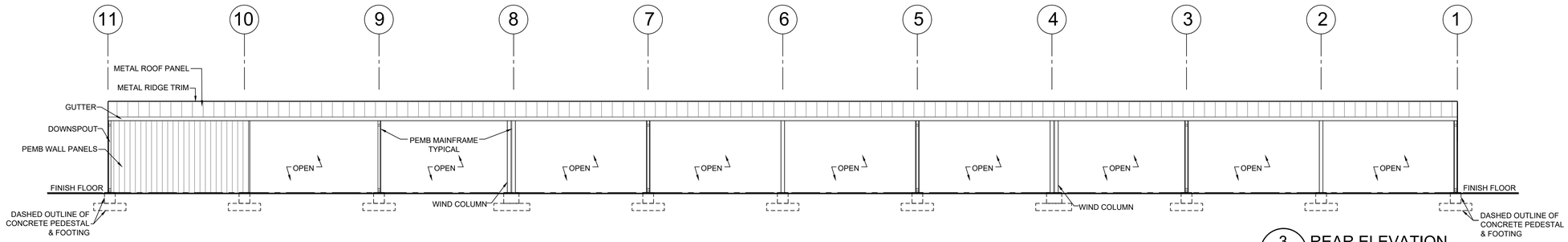
SCHEDULES

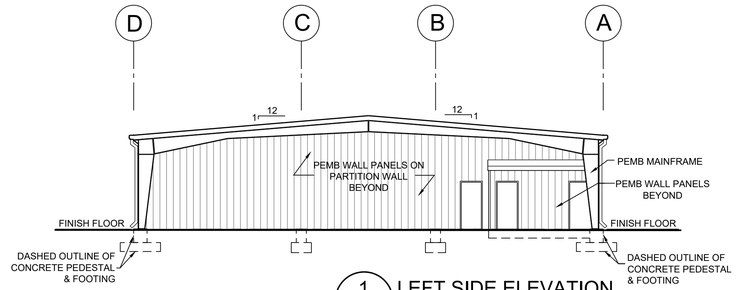
A2.0



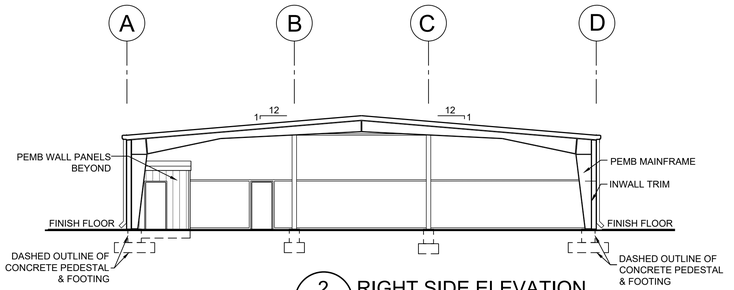
4 FRONT ELEVATION
A3.0 SCALE: 3/32" = 1'-0"



3 REAR ELEVATION
A3.0 SCALE: 3/32" = 1'-0"



1 LEFT SIDE ELEVATION
A3.0 SCALE: 3/32" = 1'-0"



2 RIGHT SIDE ELEVATION
A3.0 SCALE: 3/32" = 1'-0"

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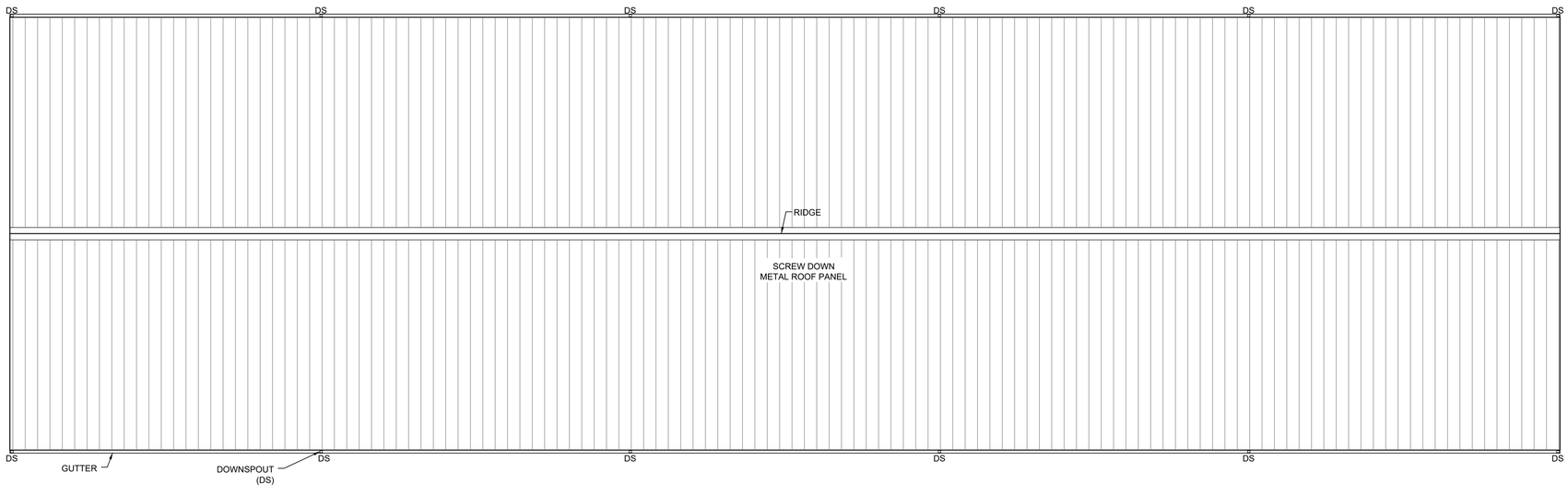
ELEVATIONS

A3.0



1 A4.0 ROOF PLAN
SCALE: 3/32" = 1'-0"

PLAN NORTH

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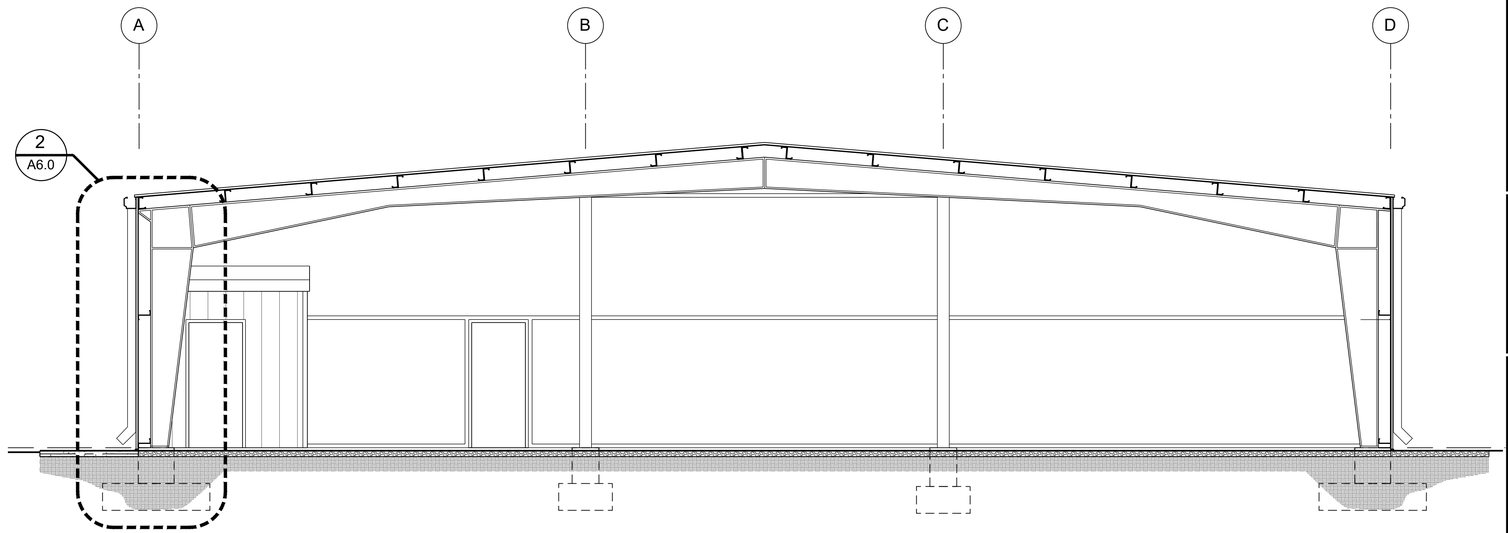
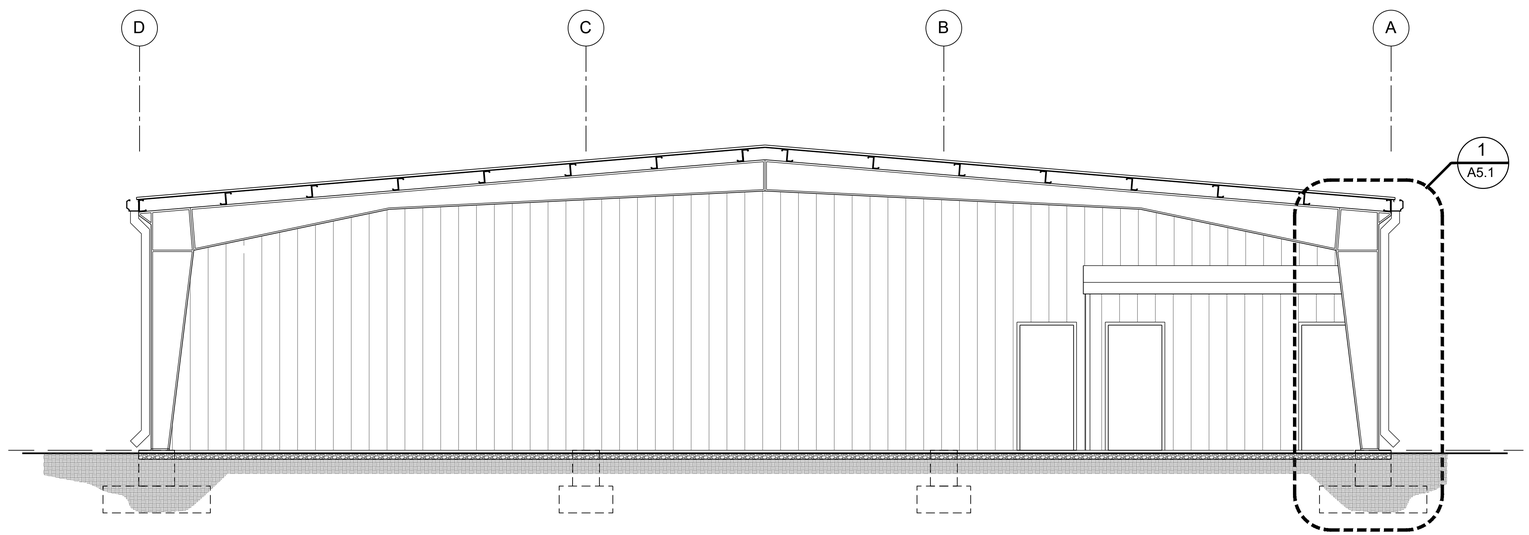
ROOF PLAN

A4.0



2 A5.0 BUILDING CROSS SECTION
SCALE: 1/4" = 1'-0"



3 A5.0 BUILDING CROSS SECTION
SCALE: 1/4" = 1'-0"

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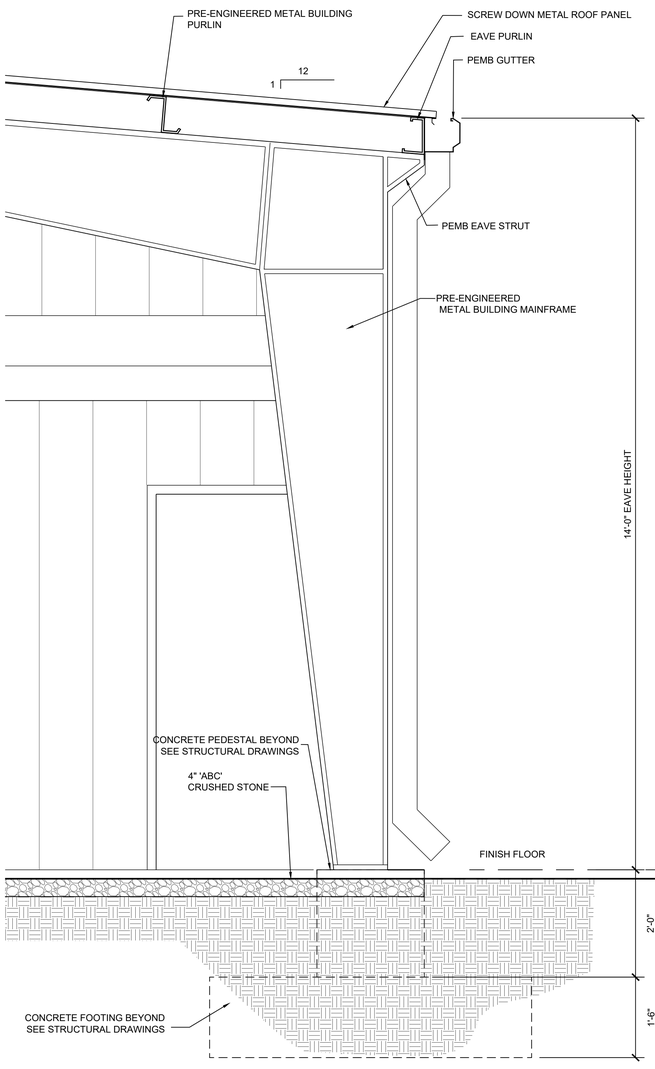
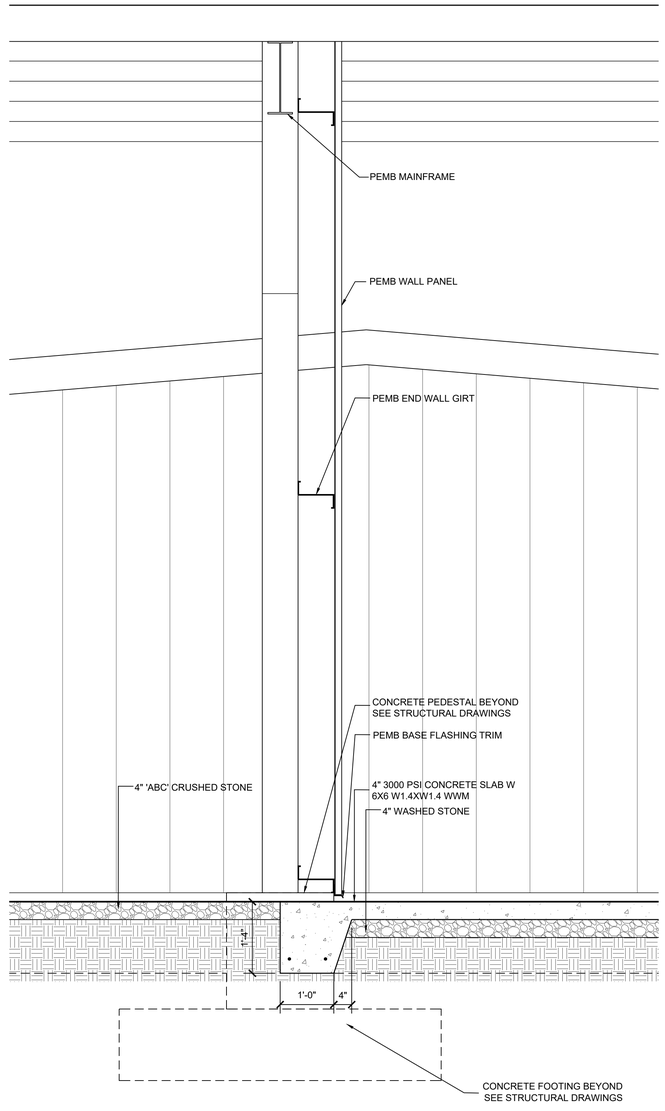
BUILDING CROSS SECTIONS

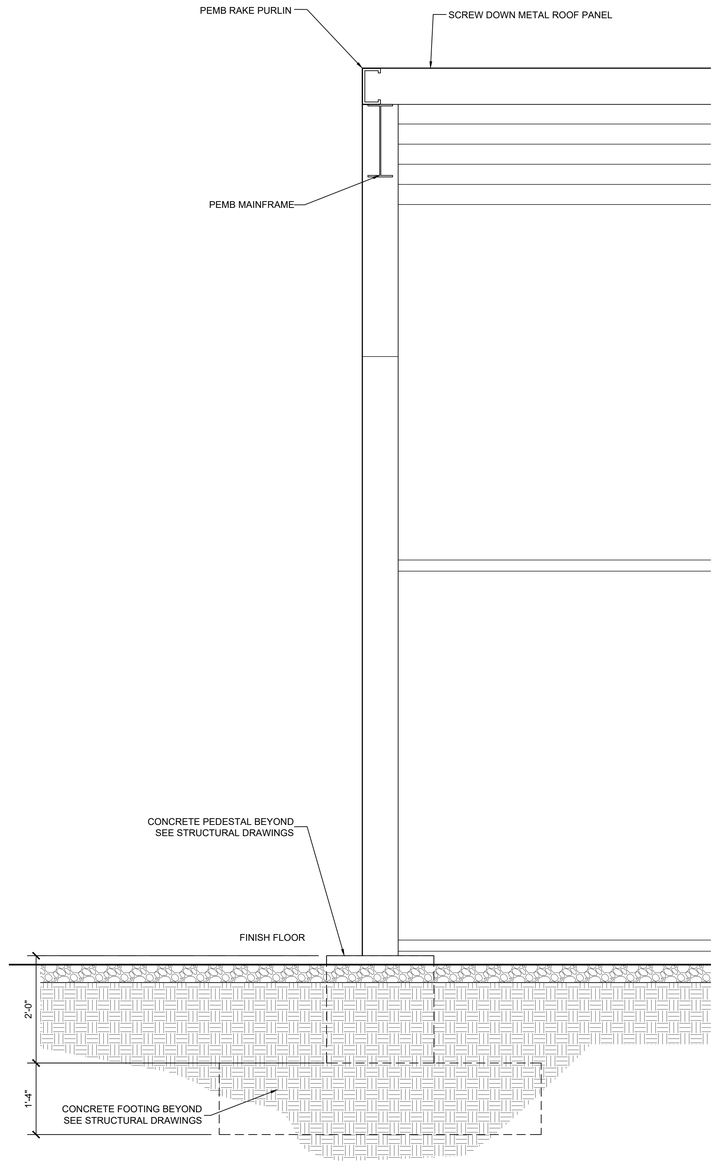
A5.0



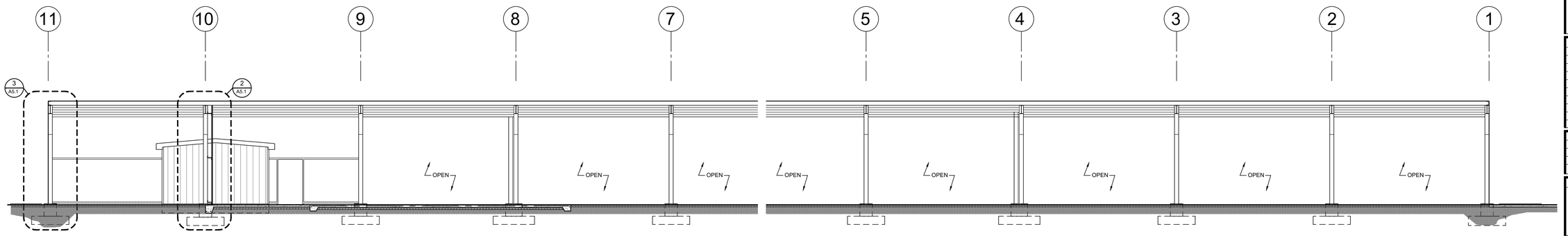
1 A5.1 SIDE WALL DETAIL
SCALE: 3/4" = 1'-0"



2 A5.1 PARTITION WALL DETAIL
SCALE: 3/4" = 1'-0"



3 A5.1 END WALL DETAIL
SCALE: 3/4" = 1'-0"



4 A5.1 BUILDING CROSS SECTION
SCALE: 1/8" = 1'-0"

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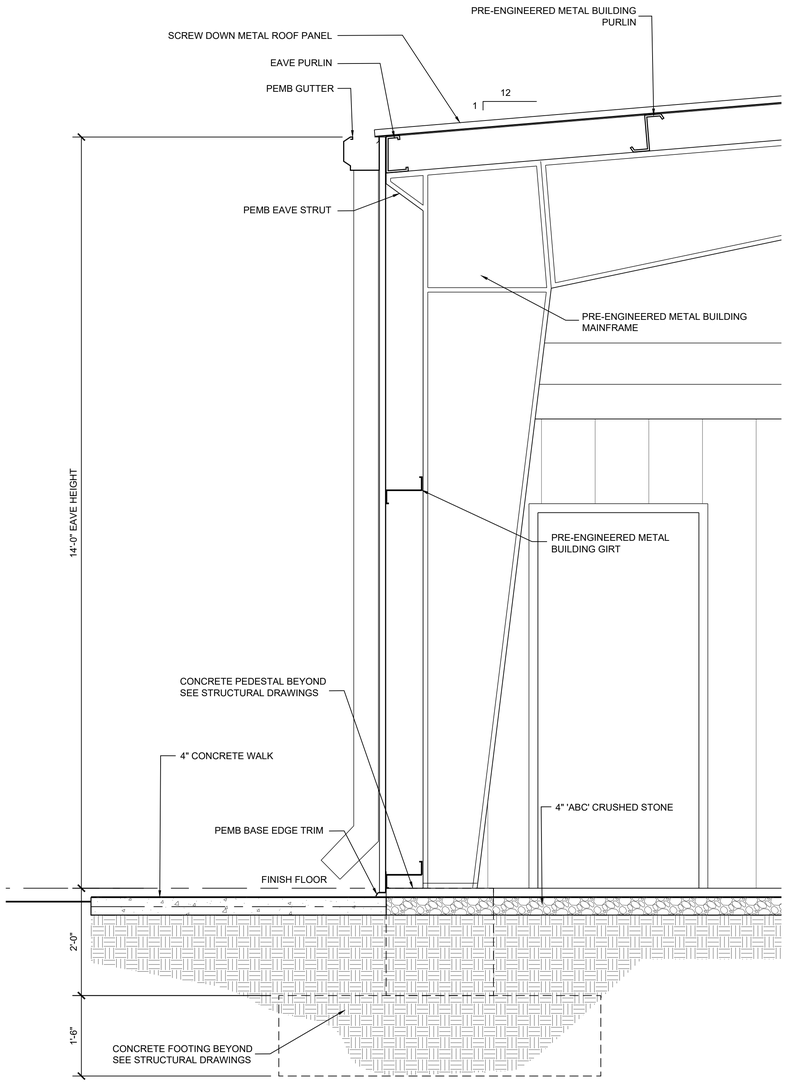
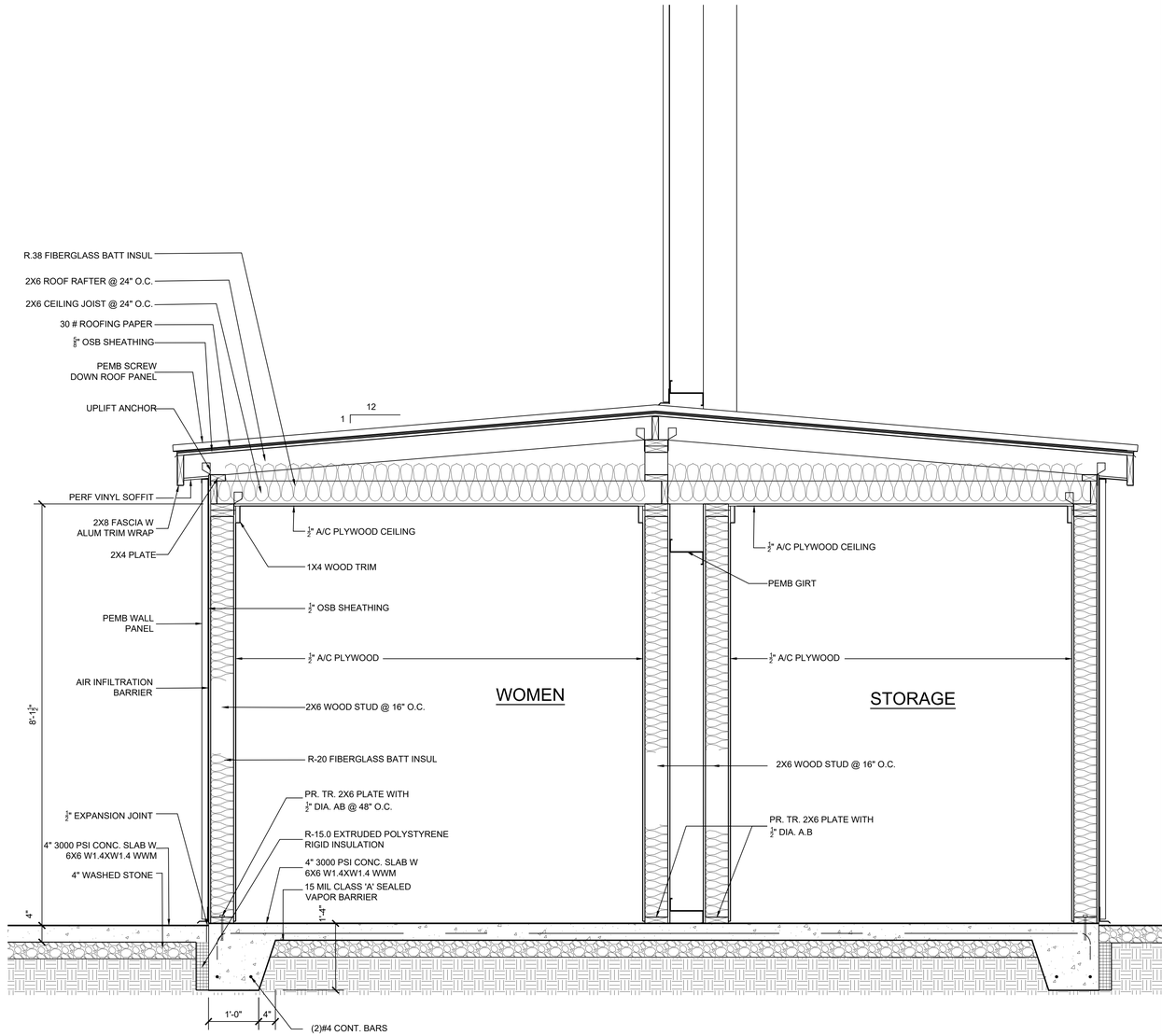
SHEET TITLE
BUILDING CROSS SECTION WALL DETAILS

A5.1



2 SIDE WALL DETAIL
A6.0 SCALE: 3/4" = 1'-0"



1 WALL DETAIL
A6.0 SCALE: 3/4" = 1'-0"

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SHEET TITLE

WALL DETAILS

A6.0

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BUILDING CODE DATA

	COVER SHEET
BC 1.0	BUILDING CODE SUMMARY
BC 1.2	LIFE SAFETY PLAN

CIVIL

COV101	COVER SHEET
VFE101	EXISTING CONDITIONS
CSN101	CIVIL SITE PLAN
CSN501	SITE DETAILS
CGN101	GRADING AND DRAINAGE PLAN
CGN501	DRAINAGE DETAILS
CCN101	PRE-CONSTRUCTION EROSION CONTROL PLAN
CCN102	POST-CONSTRUCTION EROSION CONTROL PLAN
CCN501	EROSION CONTROL DETAILS
CCN502	EROSION CONTROL DETAILS
CCN503	EROSION CONTROL NOTES
CUN101	UTILITY PLAN
CUN501	UTILITY DETAILS
LSN101	LANDSCAPE PLAN
SPC101	SPECIFICATIONS
SPC102	SPECIFICATIONS
SPC103	SPECIFICATIONS
SPC104	SPECIFICATIONS

ARCHITECTURAL

A 1.0	FLOOR PLAN
A 2.0	SCHEDULES
A 3.0	BUILDING ELEVATIONS
A 4.0	ROOF PLAN
A 5.0	BUILDING CROSS SECTIONS
A 5.1	BUILDING CROSS SECTIONS
A 6.0	WALL DETAILS

STRUCTURAL

S 1.0	FOUNDATION PLAN
S 2.0	FOUNDATION DETAILS

PLUMBING

P1	FLOOR PLAN - WASTE
P2	SCHEDULES, SPECS, PLUMBING

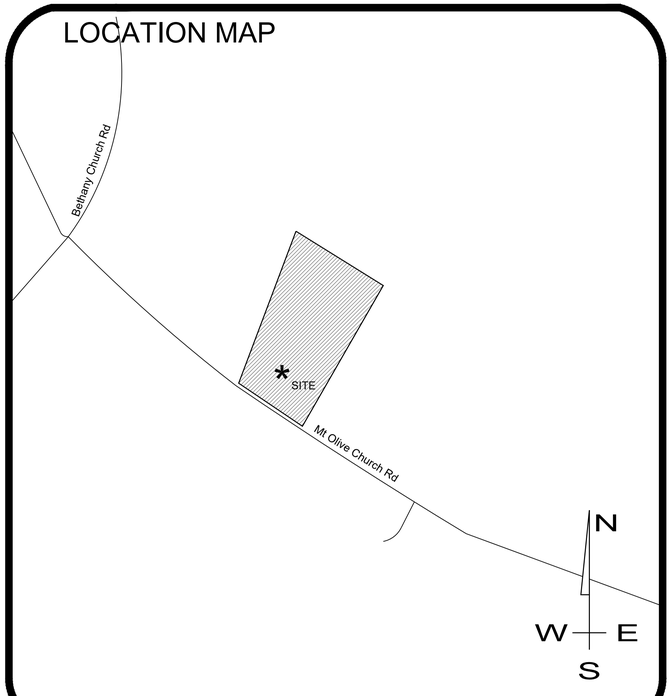
MECHANICAL

M1	FLOOR PLAN - HVAC
M2	SCHEDULES, SPECS, HVAC

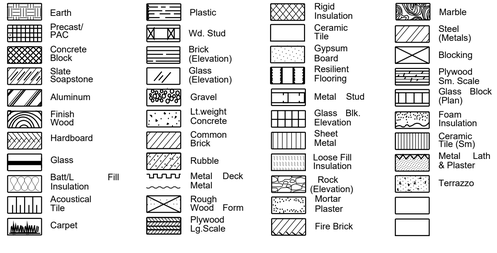
ELECTRICAL

E1	SPECIFICATIONS, SCHEDULES, APPENDIX B
E2	FLOOR PLAN - POWER
E3	FLOOR PLAN - LIGHTING
E4	SITE PLAN ELECTRICAL
E5	DETAILS
E6	DETAILS AND ETC.

LOCATION MAP



ARCHITECTURAL SYMBOLS



ABBREVIATIONS

ACOUSTICAL CEILING TILE	ACT-(TYPE)
ANCHOR BOLTS	AB
ANGLE	L ∠ -(SYM.)
ARCHITECT	ARCH
ABOVE FINISH FLOOR	AFF
BENCH MARK	BM
BLOCKING	BLK
BOARD	BD
BRICK	BRICK
BUILDING	BLDG
BULLETIN BOARD	BB
CABINET	CAB
CARPET	CPT - (TYPE)
CAST IRON	CI
CATCH BASIN	CB
CONCRETE	CONC
CONCRETE MASONRY	CMU- (FINISH)
CEILING	CLG
CENTER LINE	℄
CHALK BOARD	CH BD
CLEANOUT	CO
CLEANOUT TO GRADE	COTG
CONTRACTOR-GENERAL	GC
CONTRACTOR-MECHAN.	MC
CONTRACTOR-MECHAN.	MC
CONTRACTOR-ELECT.	EC
CONTRACTOR-PLUMBING	PC
CENTER, ON	OC
CONTINUOUS	CONT
DRAWING	DWG
DRINKING FOUNTAIN	DF
EACH	EA
EACH WAY	EW
ELECTRIC	ELEC
ELEC WATER COOLER	EWC
ENGINEER	ENGR
EXISTING	EXIST
EXPOSED	EXP
EXTERIOR INSULATION FINISH SYSTEM	EIFS
FINISH	FIN
FINISHES:	
PAINT	P
EPOXY PAINT	EP
WALL COVERNING	WC
FIRE EXTINGUISHER	FE
FLOOR	FLR
FLOOR DRAIN	FD
FLOOR	FLR
FLOOR DRAIN	FD
FOOTING	FTG
GALVANIZED IRON	GI
GYPSUM BOARD	GYP BD
HOLLOW CORE	HC
HOLLOW METAL	HM
JUNCTION BOX	J-BOX
MAN HOLE	MH
MARBLE FLOOR	MRF
MARKER BOARD	MKRBD
MASONRY OPENING	MO
MECHANICAL	MECH
PAIR	PR
PLASTER	PLAS
PLASTIC LAMINATE	PLAM
POLISHED	POL
PRESSURE TREATED	PT
PORCELAIN TILE	PORCT
QUARRY TILE	QT
REINFORCED	REINF
RUBBER	RBR
SOLID CORE	SC
STANDARD	STD
STRUCTURE	STRUCT
SUPPLY	SPLY
TEMPERATURE	TEMP
TERRAZZO	TER
THICKNESS, THICK	THK
TOILET	TLT
TONGUE & GROOVE	T&G
TYPICAL	TYP
UNDERWRITERS LAB	UL
VACUUM	VAC
VENTILATE	VENT
VINYL TILE	VT
WATER CLOSET	WC
WATERPROOF	WP
WITH	W/
WOOD	WD

CBSA architects

226 SECOND STREET NW
HICKORY, NORTH CAROLINA 28601

P.O. BOX 1239
HICKORY, NORTH CAROLINA 28603

PHONE: (828) 322-3403
FAX: (828) 322-1802

C.B.S.A. DESIGNS, INC. REGISTERED ARCHITECTURAL CORPORATION 51590 HICKORY, NC

MARTY ALLEN BEAL REGISTERED ARCHITECT 5409 NORTH CAROLINA NEWTON, N.C.

06/22/2026

MARTY ALLEN BEAL, AIA, LEED AP BD+C
PROJECT ARCHITECT
HICKORY , N.C.

PROJECT NUMBER: 2024.008

JUNE 22, 2026

CIVIL ENGINEERS
CLAYTON ENGINEERING & DESIGN
(864) 455-3456 HICKORY, N.C.

PLUMB./MECH./ELEC. ENGINEERS
BRITTAIN ENGINEERING, INC.
(828) 328-1813 HICKORY, N.C.

STRUCTURAL ENGINEERS
SWARTZ DESIGN & ENGINEERING
(828) 632-0499 TAYLORSVILLE, N.C.

2018 APPENDIX B
BUILDING CODE SUMMARY
FOR ALL COMMERCIAL PROJECTS
(Except 1 and 2 - Family Dwellings and Townhouses)

Name of Project: CATAWBA COUNTY CATTLEMEN'S ASSOCIATION EDUCATION CENTER
Address: 2894 MT. OLIVE CHURCH ROAD NEWTON, NC Zip Code 28658
Proposed Use: LIVESTOCK SHELTER
Owner or Authorized Agent: MARTY A. BEAL Phone: 828-322-3403 Email mbeal@cbsa-architects.com
Owned By: ■ City/County ☐ Private ☐ State
Code Enforcement Jurisdiction: ☐ City ■ County CATAWBA ☐ State

CONTACT MARTY BEAL / CBSA ARCHITECTS

DESIGNER	FIRM	NAME	LICENSE #	TELEPHONE #	EMAIL
Architectural	CBSA ARCHITECTS	MARTY BEAL	5409	828 322-3403	cbsa@cbsa-architects.com
Civil	CLAYTON ENGINEERING & DESIGN	WILL CLAYTON	P-1463	864 455-3456	wclayton@clayton-engineering.net
Electrical	BRITTAIN ENGINEERING	DON BRITTAIN	7883	828 328-1813	dbritain@brittainengineering.com
Fire Alarm					
Plumbing	BRITTAIN ENGINEERING	DON BRITTAIN	7883	828 328-1813	dbritain@brittainengineering.com
Mechanical	BRITTAIN ENGINEERING	DON BRITTAIN	7883	828 328-1813	dbritain@brittainengineering.com
Sprinkler-Standpipe					
Structural	SWARTZ ENGINEERING	JEFFERY SWARTZ	033411	828-632-0499	jjspe@bellsouth.net
Retaining Wall >5' High					
Pool Design					

2018 NC BUILDING CODE: ■ New Building ☐ Addition ☐ Shell / Core ☐ Phased Construction - Shell Core ☐ 1st Time Interior Completions

2018 NC EXISTING BUILDING CODE: (check all that apply) ☐ Prescriptive ☐ Repair ☐ Chapter 14 ☐ Alteration Level I ☐ Alteration Level II ☐ Alteration Level III ☐ Historic Property ☐ Change of Use

CONSTRUCTED: (Date) ____ CURRENT OCCUPANCY(S) (CH. 3) ____
RENOVATED: (Date) ____ PROPOSED OCCUPANCY(S) (CH. 3) ____
OCCUPANCY CATEGORY (Table 1604.5): Current: ____ Proposed: ____

BASIC BUILDING DATA:
Construction Type: (check all that apply) ☐ I-A ☐ I-B ☐ II-A ☐ II-B ☐ III-A ■ III-B ☐ IV ☐ V-A ☐ V-B
Sprinklers ■ No ☐ Partial ☐ Yes ☐ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ■ No ☐ Yes Class ☐ I ☐ II ☐ III ☐ Wet ☐ Dry
Primary Fire District: ■ No ☐ Yes Flood Hazard Area: ■ No ☐ Yes
Special Inspections Required: ■ No ☐ Yes

GROSS BUILDING AREA TABLE

Floor	Existing (SQ FT)	New (SQ FT)	Sub-Total
1st FLOOR	0	17,500	17,500
TOTAL	0	17,500	17,500

ALLOWABLE AREA

Primary Occupancy Classification(s):
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-1 Condition ☐ 1 ☐ 2
I-2 Condition ☐ 1 ☐ 2
I-3 Condition ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High Piled ☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ■

Accessory Occupancy Classification(s): --
Incidental Uses (Table 509): --
This separation is not exempt as a Non-Separated Use (see exceptions).
Special Uses (Chapter 4 - List Code Sections): --
Special Provisions (Chapter 5 - List Code Sections): --
Mixed Occupancy: ■ No ☐ Yes Separation: ____ Hr. Exception: --

$$\frac{\text{Actual Area of Occupancy - A2}}{\text{Allowable Area of Occupancy - A2}} + \frac{\text{Actual Area of Occupancy - R1}}{\text{Allowable Area of Occupancy - R1}} + \frac{\text{Actual Area of Occupancy - A3}}{\text{Allowable Area of Occupancy - A3}} \leq 1$$

____ + ____ + ____ = ____ ≤ 1.00

STORY NO.	DESCRIPTION AND USE	(A) IB USE AREA PER STORY (FACTUAL)	(B) ABLE SIZE AREA	(C) AREA FOR FRONTAGE INCREASE	(D) ALLOWABLE AREA OR UNLIMITED
1	LIVESTOCK SHELTER	17,500	18,000	14,875	14,875

APPENDIX C TABLE C102.1

1 Frontage area increases from Section 506.2 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width = ____ (F)
b. Total Building Perimeter = ____ (P)
c. Ratio (F/P) = ____ (F/P)
d. W = Minimum width of public way = ____ (W)

2 Unlimited area applicable under conditions of Section 507.
3 Maximum Building Area = total number of stories in the building x D (maximum 3 stories) (506.2).
4 The maximum area of open parking garages must comply with 406.5.4. The maximum area of the air traffic control towers must comply with 412.3.1.
5 Frontage increase is based on the unsprinklered area value in Table 506.2.

ALLOWABLE HEIGHT

	ALLOWABLE	SHOWN ON PLANS	CODE REFERENCE
Building Height in Feet (Table 504.3)	55'-0"	17'-0"	--
Building Height in Stories (Table 504.4)	2	1	--

1 Provide code reference if the "Shown on Plans" quantity is not based on Table 504.3 or 504.4

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING REQUIRED	RATING PROVIDED (EXPLAIN IF 0 HOUR)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	DESIGN # FOR RATED PENETRATIONS	DESIGN # FOR RATED JOINTS
Structural frame, including columns, girders, trusses		0	0				
Bearing walls							
Exterior							
North	N/A	--	--	--	--	--	--
East	N/A	--	--	--	--	--	--
West	N/A	--	--	--	--	--	--
South	N/A	--	--	--	--	--	--
Interior	N/A	--	--				
Nonbearing walls and partitions							
Exterior							
North	>30'-0"	0	0	--	--	--	--
East	>30'-0"	0	0	--	--	--	--
West	>30'-0"	0	0	--	--	--	--
South	>30'-0"	0	0	--	--	--	--
Interior walls and partitions		0	0				
Floor construction Including supporting beams and joists		N/A	--				
Floor Ceiling Assembly		N/A	--				
Columns Supporting Floors		N/A	--				
Roof construction Including supporting beams and joists		0	0				
Roof Ceiling Assembly		0	0				
Columns Supporting Roof		0	0				
Shaft Enclosures- Exit		N/A	--				
Shaft Enclosures- Other		N/A	--				
Corridor Separation		N/A	--				
Occupancy / Fire Barrier Separation		N/A	--				
Party / Fire Wall Separation		N/A	--				
Smoke Barrier Separation		N/A	--				
Tenant / Dwelling Unit / Sleeping Unit Separation		N/A	--				
Incidental Use Separation		N/A	--				

* Indicate section number permitting reduction

PERCENTAGE OF WALL OPENING CALCULATIONS

Fire Separation Distance (Measured to Property Line)	Degree of Opening Protection (Unprotected, Sprinklered)	Allowable Area	Actual Shown on Plans
NORTH / >30'-0"	UP,NS	NO LIMIT	0%
EAST / >30'-0"	UP,NS	NO LIMIT	0%
SOUTH / >30'-0"	UP,NS	NO LIMIT	0%
WEST / >30'-0"	UP,NS	NO LIMIT	0%

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting:	■ Yes	☐ No
Exit Signs:	■ Yes	☐ No
Fire Alarm:	☐ Yes	■ No
Smoke Detection Systems:	☐ Yes	■ No
Carbon Monoxide Protection:	☐ Yes	■ No

LIFE SAFETY PLAN REQUIREMENTS

Life safety Plan Sheet # BC1.1

☐ Fire and / or smoke rated wall locations (Chapter 7)
☐ Assumed and real property line locations (if not on site plan)
☐ Exterior wall opening area with respect to distance to assumed property lines (705.8)
■ Occupancy Use for each area as it relates to occupant load calculation (Table 1004.1.2)
■ Occupants loads for each area
■ Exit access travel distances (1017)
■ Common path of travel distances (Tables 1006.2.1 & 1006.3.2)
■ Dead end lengths (1020.4)
■ Clear exit widths for each exit door
■ Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.3)
■ Actual occupant load for each exit door
☐ A seperate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
☐ Location of doors with panic hardware (1010.1.10)
☐ Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
☐ Location of doors with electromagnetic egress locks (1010.1.9.9)
☐ Location of doors equipped with hold open devices
☐ Location of emergency escape windows (1030)
☐ The square footage of each fire area (202)
☐ The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
☐ Note any code exceptions or table notes that may have been utilized regarding the items above

ACCESSIBLE PARKING
(SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES REQUIRED	TOTAL # OF PARKING SPACES PROVIDED	# OF ACCESSIBLE SPACES PROVIDED: REGULAR WITH 5' ACCESS AISLE	VAN SPACES WITH: 132" ACCESS AISLE	VAN SPACES WITH: 8' ACCESS AISLE	TOTAL # ACCESSIBLE PROVIDED
EAST	--	7	0	0	1	1
NORTH	--	16	0	0	0	0
TOTAL	--	23	0	0	1	1

PLUMBING FIXTURE REQUIREMENTS
(TABLE 2902.1)

USE	WATER CLOSETS (URINALS) MALE	WATER CLOSETS (URINALS) FEMALE	WATER CLOSETS (URINALS) UNISEX	LAVATORIES MALE	LAVATORIES FEMALE	LAVATORIES UNISEX	DRINKING FOUNTAINS	SERVICE SINK	BATHTUB/ SHOWER REQUIRED	BATHTUB/ SHOWER ACCESSIBLE
EXST'G		0	0	0	0	0	0	0	0	0	0
NEW		1	1	0	0	1	1	0	0	1	1
TOTAL		1	1	0	0	1	1	0	0	1	1
REQ'D		1	1	0	0	1	1	0	0	1	1

ENERGY SUMMARY

ENERGY REQUIREMENTS:
The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Existing building envelope complies with code: ____

Climate Zone: ☐ 3 ■ 4 ☐ 5

Method of Compliance:
■ Prescriptive (Energy Code)
☐ Performance (Energy Code)
☐ Prescriptive (ASHRAE 90.1)
☐ Performance (ASHRAE 90.1)

THERMAL ENVELOPE
Roof/ceiling Assembly (each assembly)
Description of assembly: SEE DRAWING DETAIL
U-Value of total assembly: U-0.03
R-Value of insulation: R-38.00
Skylights in each assembly: N/A
U-Value of skylight: N/A
total square footage of skylights in each assembly: N/A

Exterior Walls (each assembly)
Description of assembly: SEE DRAWING DETAIL
U-Value of total assembly: U-0.05
R-Value of insulation: R-20.00
Openings (windows or doors with glazing)
U-Value of assembly: N/A
Solar heat gain coefficient: N/A
projection factor: N/A
Door R-Values: ____

Walls below grade (each assembly)
Description of assembly: N/A
U-Value of total assembly: N/A
R-Value of insulation: N/A

Floors over unconditioned space (each assembly)
Description of assembly: SEE DRAWING DETAIL
U-Value of total assembly: U-0.00
R-Value of insulation: R-0.00

Floors slab on grade
Description of assembly: N/A
U-Value of total assembly: U-0.07
R-Value of insulation: R-15.00
Horizontal/vertical requirement: BOTTOM OF FOOTING
Slab heated: N/A

STRUCTURAL DESIGN

DESIGN LOADS: SEE STRUCTURAL DRAWINGS

Importance Factors: Wind (I_w) -- Snow (I_s) -- Seismic (I_E) --

Live Loads: Roof -- psf, Mezzanine -- psf, Floor -- psf

Ground Snow Loads: -- psf

Wind Loads: Basic Wind Speed -- mph (ASCE-7)
Exposure Category --
Wind Base Shear (For MWRFS) Vx -- Vy --

SEISMIC DESIGN CATEGORY ☐ A ☐ B ☐ C ☐ D
Provide the following Seismic Design Parameters:
Occupancy Category (Table 1604.5) ☐ I ☐ II ☐ III ☐ IV
Spectral Response Acceleration S_S --%g S_1 --%g
Site Classification (ASCE 7) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F
Data Source: ☐ Field Test ☐ Presumptive ☐ Historical Data

Basic structural system (check one)
☐ Bearing Wall ☐ Dual w/Special Moment Frame
☐ Building Frame ☐ Dual w/Intermediate R/C or Special Steel
☐ Moment Frame ☐ Inverted Pendulum
Siesmic bBase Shear Vx -- Vy --

Analysis Procedure ☐ Simplified ☐ Equivalent Lateral Force ☐ Dynamic

Architectural, Mechanical, Components anchored? ☐ Yes ☐ No

LATERAL DESIGN CONTROL: Earthquake ☐ Wind ☐

SOIL BEARING CAPACITIES:
Field Test (provide copy of test report) ____ psf
Presumptive Bearing capacity -- psf
Pile size, type, and capacity ____

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone SEE MECHANICAL DRAWINGS
winter dry bulb: ____
summer dry bulb: ____

Interior design conditions
winter dry bulb: ____
summer dry bulb: ____
relative humidity: ____

Building heating load: ____

Building cooling load: ____

Mechanical Spacing Conditioning System
Unitary
description of unit: ____
heating efficiency: ____
cooling efficiency: ____
size category of unit: ____

Boiler
Size category. If oversized, state reason: ____

Chiller
Size category. If oversized, state reason: ____

List equipment efficiencies: ____

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance:
Energy Code: ☐ Prescriptive ☐ Performance
ASHRAE 90.1: ☐ Prescriptive ☐ Performance

SEE ELECTRICAL DRAWINGS

Lighting Schedule (each fixture type)
lamp type required in fixture
number of lamps in fixture
ballast type used in the fixture
number of ballasts in fixture
total wattage per fixture
total interior wattage specified vs allowed (whole building or space by space)
total exterior wattage specified vs allowed

Additional Prescriptive Compliance
☐ 506.2.1 More Efficient Mechanical equipment
☐ 506.2.2 Reduced Lighting Power Density
☐ 506.2.3 Energy recovery Ventilation systems
☐ 506.2.4 Higher efficiency Service water Heating
☐ 506.2.5 On-Site Supply of Renewable energy
☐ 506.2.6 Automatic Daylighting Control Systems

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CONSULTANT

SEAL
MARTY ALLEN BEAL
REGISTERED ARCHITECT
5409
NORTH CAROLINA
NEWTON, N.C.
06/22/2026

PROJECT

CATAWBA COUNTY CATTLEMEN'S ASSOCIATION EDUCATION CENTER

2894 MT. OLIVE CHURCH ROAD
NEWTON, NORTH CAROLINA 28658

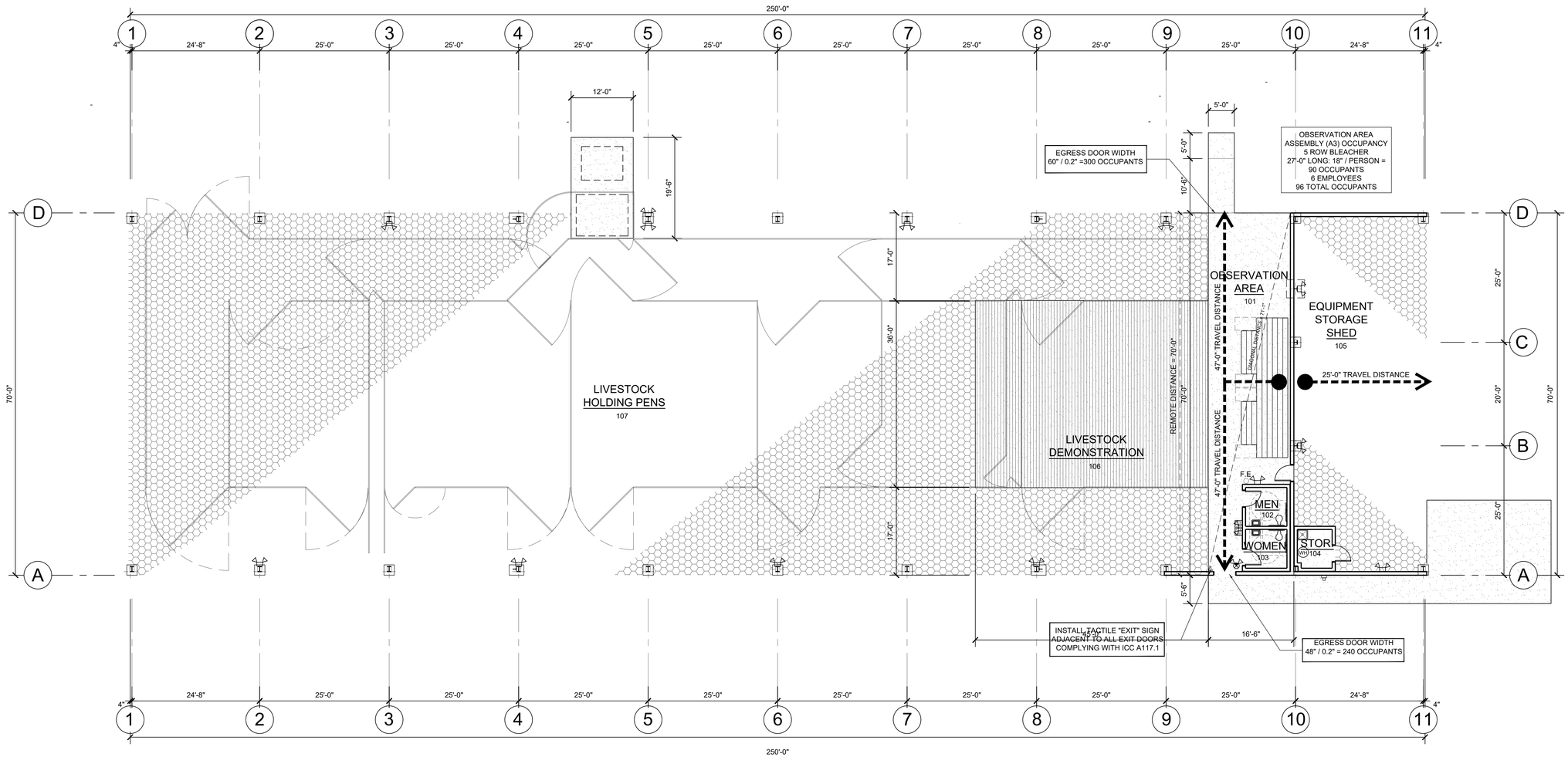
DISTRIBUTION

MARK	DATE	DESCRIPTION
SD	10-23-2025	SCHEMATIC DESIGN
DD	11-10-2025	DESIGN DEVELOPMENT
CD	06-22-2026	CONSTRUCTION DOCUMENTS

PROJECT NUMBER: 2024.008
CAD DWG FILE:
DRAWN BY: MVS
CHECKED BY: MAB

SHEET TITLE
APPENDIX B

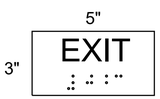
BC1.0



LIFE SAFETY PLAN LEGEND	
F.E	NEW FIRE EXTINGUISHER (10 LB "ABC" TYPE)
	EMERGENCY LIGHT W/ 90-MINUTE BATTERY BACK-UP (SEE ELECTRICAL DRWINGS)
	EXIT LIGHT & EMERGENCY LIGHT W/ 90-MINUTE BATTERY BACK-UP (SEE ELECTRICAL DRAWINGS)
	EMERGENCY EGRESS LIGHT W/ 90-MINUTE BATTERY BACK-UP (SEE ELECTRICAL DRAWINGS)
	PATH OF TRAVEL
	DIRECTION OF TRAVEL
	ORIGIN OF TRAVEL

FIRE DEPARTMENT NOTES

1. A TACTILE SIGN STATING "EXIT" AND COMPLYING WITH NCBC 1013.2 SHALL BE PROVIDED AT EACH EXIT DOOR. SEE DETAIL BELOW.
2. PREMISES IDENTIFICATION THAT MEETS THE REQUIREMENTS OF NCFC 505.1 SHALL BE PRESENT. NUMERALS SHALL BE MINIMUM 6" HIGH AND MINIMUM ½" STROKE WIDTH. THIS WILL BE VERIFIED AT THE TIME OF THE FINAL INSPECTION BY THE FIRE MARSHALL.
3. FIRE DEPARTMENT ACCESS MUST BE WITHIN 150FT OF ALL PORTIONS OF THE BUILDINGS. BOLLARDS SHALL NOT BE LOCATED AS TO RESTRICT FIRE APPARATUS ACCESS AROUND THE BUILDING.
4. PORTABLE FIRE EXTINGUISHERS SHALL BE SELECTED, INSTALLED AND MAINTAINED IN ACCORDANCE WITH 2018 NC FIRE PREVENTION CODE AND NFPA10 . FIRE EXTINGUISHERS WILL BE APPROVED BY FIRE MARSHAL AT FINAL INSPECTION.
5. EMERGENCY LIGHTING SHALL BE APPROVED BY FIRE MARSHAL AT FINAL INSPECTION.



NOTES
1. RAISED CHARACTERS & BRAILLE
2. BOTTOM OF RAISED CHARACTERS 48" MIN A.F.F.
3. TOP OF RAISED CHARACTERS 60" MAX A.F.F.
4. CENTER SIGN 9" FROM EDGE OF DOOR SWING.

2 / BC1.1 TACTILE EXIT SIGN DETAIL
NOT TO SCALE

1 / BC1.1 LIFE SAFETY PLAN
SCALE: 3/32" = 1'-0"

PLAN NORTH

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Email: cbsa@cbsa-architects.com

CONSULTANT

SEAL
MARTY ALLEN BEAL
REGISTERED ARCHITECT
5416
NORTH CAROLINA
NEWTON, N.C.
06/22/2026

PROJECT

CATAWBA COUNTY CATTLEMEN'S ASSOCIATION EDUCATION CENTER

2894 MT. OLIVE CHURCH ROAD
NEWTON, NORTH CAROLINA 28658

DISTRIBUTION		
MARK	DATE	DESCRIPTION
SD	10-23-2025	SCHEMATIC DESIGN
DD	11-10-2025	DESIGN DEVELOPMENT
CD	06-22-2026	CONSTRUCTION DOCUMENTS

PROJECT NUMBER:	2024.008
CAD DWG FILE:	
DRAWN BY:	MVS
CHECKED BY:	MAB
COPYRIGHT:	CBSA ARCHITECTS INC. 2026

SHEET TITLE

LIFE SAFETY PLAN

BC1.1

CATAWBA COUNTY
CATTLEMAN'S ASSOCIATION
EDUCATION CENTER
NEWTON, NORTH CAROLINA

LIST OF CONTACTS

STORM DRAINAGE CATAWBA COUNTY	TELEPHONE X	SOILS ENGINEER X
DOMESTIC WATER CITY OF HICKORY	GAS X	SITE PLANNING & ZONING CATAWBA COUNTY
SANITARY SEWER COUNTY HEALTH DEPARTMENT	CABLE X	FIRE DEPARTMENT NEWTON RURAL
POWER DUKE ENERGY		

PROJECT TEAM

ARCHITECT

X

STRUCTURAL ENGINEER

X

PLUMBING, MECHANICAL, ELECTRICAL

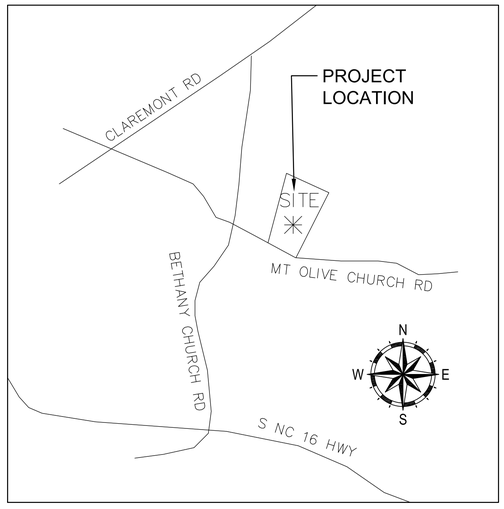
X

CIVIL ENGINEER

CLAYTON ENGINEERING & DESIGN
1209 9TH STREET NE
PO BOX 2351
HICKORY, NC 28601
PHONE: 828-455-3456
CONTACT – WILL CLAYTON, PE

SURVEYOR

X



LOCATION MAP
SCALE: N.T.S.

SHEET LIST

COV101 –COVER SHEET
VFE101 –EXISTING CONDITIONS
CSN101 –CIVIL SITE PLAN
CSN501 –SITE DETAILS
CGN101 –GRADING AND DRAINAGE PLAN
CGN501 –DRAINAGE DETAILS
CCN101 –PRE–CONSTRUCTION EROSION CONTROL PLAN
CCN102 –POST–CONSTRUCTION EROSION CONTROL PLAN
CCN501 –EROSION CONTROL DETAILS
CCN502 –EROSION CONTROL DETAILS
CCN503 –EROSION CONTROL NOTES
CUN101 –UTILITY PLAN
CUN501 –UTILITY DETAILS
LSN101 –LANDSCAPE PLAN
SPC101 –SPECIFICATIONS
SPC102 –SPECIFICATIONS
SPC103 –SPECIFICATIONS
SPC104 –SPECIFICATIONS

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P-1463
CERTIFICATE OF AUTHORIZATION

FOR AGENCY REVIEW

ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 40748 WILLIAM S. CLAYTON

FOR CONSTRUCTION : 06/22/26
DATE

REVISIONS		
NO.	DESCRIPTION	DATE
-	-	-

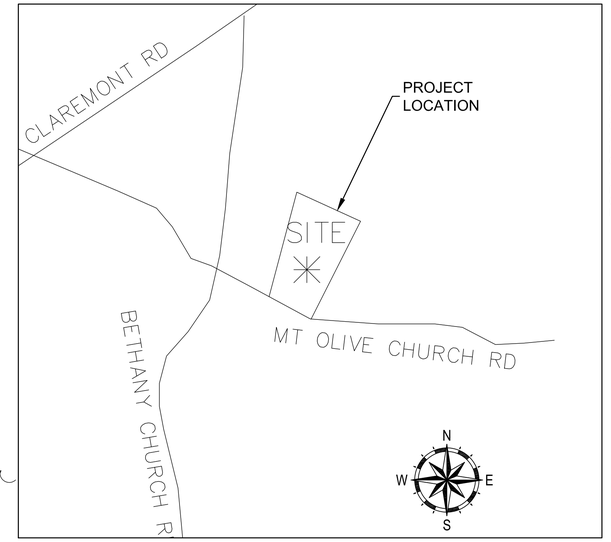
UTILITIES NOTICE:
EXISTING UNDERGROUND UTILITIES ARE SHOWN AT APPROXIMATE LOCATIONS. ACTUAL LOCATIONS MAY VARY SIGNIFICANTLY. CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT RESULT FROM HIS FAILURE TO EXACTLY LOCATE AND PROTECT ANY AND ALL UNDERGROUND UTILITIES.

CE&D JOB NUMBER: 24105

CLAYTON
ENGINEERING & DESIGN

W:\Projects\2024\24105 - Catawba County Cattlemans\300 CADD\360 dwg\COV_24105_COV_101.dwg, 7/21/2026 3:36:41 PM, william clayton

Curve	Radius	Tangent	Length	Chord	Chord Bear.
C1	2427.89'	80.18'	160.31'	160.28'	N 54°14'43" W



LOCATION MAP

SCALE: N.T.S.

NOTES THIS SHEET:

1. SURVEY PERFORMED BY:
   BUNTON SURVEYING AND MAPPING PA
   231 13TH AVE PL NW, SUITE 5
   HICKORY, NC 28601
2. CONTRACTOR RESPONSIBLE FOR FIELD VERIFYING EXISTING CONDITIONS SURVEY.
3. PARCEL ID NO. = 3659-0287-1934
4. SITE ZONING = R-30
5. PROJECT SITE ACREAGE = 16.68 ACRES
6. SUBJECT PROPERTY IS IN DESIGNATED FLOOD ZONE "X"
   (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN)
   (FIRM PANEL 3710365900J)

EXISTING CONDITIONS

SCALE: 1" = 60'

0 60' 120'

REVIEW SET / 06-17-26

FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P-1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL
40756
ENGINEER
WILLIAM S. CLAYTON
06/22/26

CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

CATAWBA COUNTY CATTLEMANS ASSOCIATION
NEWTON, NORTH CAROLINA
OWNER

EDUCATION CENTER
PROJECT TITLE

CIVIL

EXISTING CONDITIONS
DRAWING TITLE

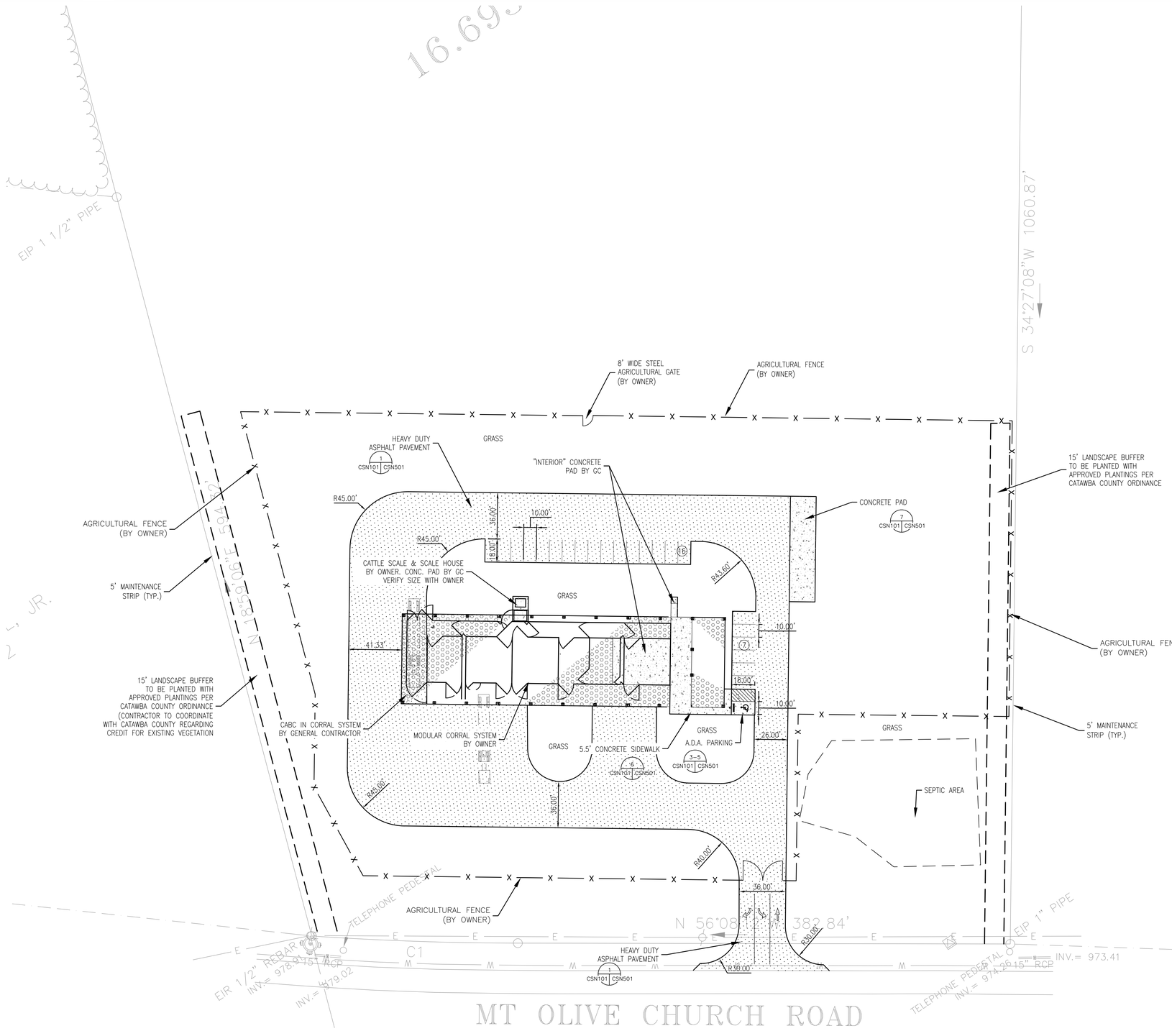
JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: TLC
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE

VFE101

SHEET 1 OF -



Curve	Radius	Tangent	Length	Chord	Chord Bear.
C1	2427.89'	80.18'	160.31'	160.28'	N 54°14'43" W

ASPHALT PAVEMENT

SITE PLAN
SCALE: 1" = 40'

0 40' 80'

PROJECT DETAILS

1. OWNER
   CATAWBA COUNTY
   PO BOX 389
   NEWTON, NC 28658
2. PARCEL I.D. NO. = 365902871934
3. SITE ZONING = R-30
4. TOTAL SITE ACREAGE =
   16.680 ACRES (9.14 ACRES IN FRONT)
5. BUILDING SIZE: 12,051 SQ FT TOTAL
6. PARKING PROVIDED: 23 VEHICLE SPACES
7. WATERSHED DISTRICT: NONE
8. IMPERVIOUS AREA
   BUILDING: 12,051 SQFT
   PARKING: 66,939 SQFT
   TOTAL: 78,990 SQFT
   BUILT UPON: 19.84%
9. SUBJECT PROPERTY IS IN DESIGNATED FLOOD ZONE "X" (AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN) FIRM PANEL #3710365900J

NOTES THIS SHEET:

1. THE OWNER SHALL SCHEDULE A PRE-CONSTRUCTION CONFERENCE WITH THE CATAWBA COUNTY ENGINEERING DIVISION BEFORE ANY WORK BEGINS. THE OWNER SHALL NOTIFY THE CATAWBA COUNTY ENGINEERING DIVISION AT LEAST 7 CALENDAR DAYS PRIOR TO COMMENCING ANY WORK ON THE SITE. FAILURE TO PROVIDE REQUIRED NOTICE SHALL RESULT IN THE OWNERS RESPONSIBILITY TO UNCOVER ANY PRIOR BELOW-GRADE WORK FOR VISUAL INSPECTION BY THE ENGINEERING DIVISION.
2. COORDINATE ALL CURB AND STREET GRADES IN INTERSECTION WITH INSPECTOR.
3. ALL ROAD IMPROVEMENTS ARE TO BE COORDINATED WITH CATAWBA COUNTY AND NCDOT ENGINEERING DEPARTMENT PRIOR TO CONSTRUCTION.
4. IN ROLLING AND HILLY TERRAINS, SWEEPING OF THE STONE BASE AND/OR APPLICATION OF A TACK COAT MAY BE REQUIRED NEAR INTERSECTIONS. THESE REQUIREMENTS SHALL BE ESTABLISHED BY THE INSPECTOR BASED ON FIELD CONDITIONS.
5. APPROVAL OF THIS PLAN IS NOT AN AUTHORIZATION TO GRADE ADJACENT PROPERTIES. WHEN FIELD CONDITIONS WARRANT OFF-SITE GRADING, PERMISSION MUST BE OBTAINED IN WRITING FROM PROPERTY OWNERS.
6. IN ORDER TO ENSURE PROPER DRAINAGE, KEEP A MINIMUM OF 0.5% SLOPE ON THE CURB.
7. POLE BASES AND ELECTRICAL DESIGN FOR PARKING LOT LIGHT POLES SHALL BE SUBMITTED PRIOR TO BEGINNING INSTALLATION.
8. UNSUITABLE SUBBASE MATERIAL NOT IDENTIFIED BY THE SOIL TESTS, BUT LOCATED DURING CONSTRUCTION, MUST BE REMOVED FROM THE RIGHT-OF-WAY AND REPLACED WITH BACKFILL.
9. WHERE VERTICAL CURB AND GUTTER EXIST, ALL DRIVEWAY RAMPS SHALL BE CONSTRUCTED OF PORTLAND CEMENT A MINIMUM OF 6-INCHES DEEP. THE RAMP MUST RISE 4-INCHES ABOVE THE FLOW LINE OF THE GUTTER AT A POINT NO CLOSER THAN 2-FEET FROM THE GUTTER.
10. ALL WORK TO BE COMPLETED IN NCDOT R/W TO BE COORDINATED WITH NCDOT.
11. SOLID WASTE REMOVAL TO BE BY ROLL-OUT PICK UP.

FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P-1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL
49758
ENGINEER
WILLIAM S. CLAYTON
06/22/26

CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

CATAWBA COUNTY CATTLEMANS ASSOCIATION
NEWTON, NORTH CAROLINA
OWNER

EDUCATION CENTER
PROJECT TITLE

CIVIL

CIVIL SITE PLAN
DRAWING TITLE

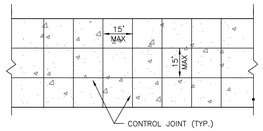
JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: EMB
CHECKED BY: WSC

REVISIONS

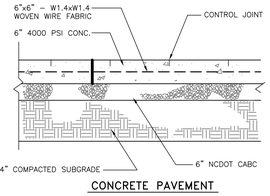
NO.	DESCRIPTION	DATE
1	REVISIONS	06/18/25
2	ADDENDUM	07/15/25
	ADJUST LAYOUT	10/06/25
	ADJUST LAYOUT	10/10/25

CSN101

SHEET - OF -



PLAN



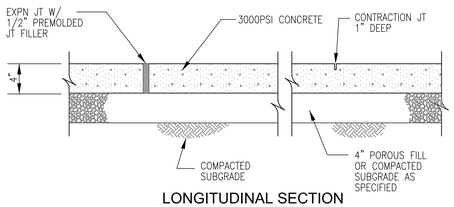
CONCRETE PAVEMENT

NOTES:

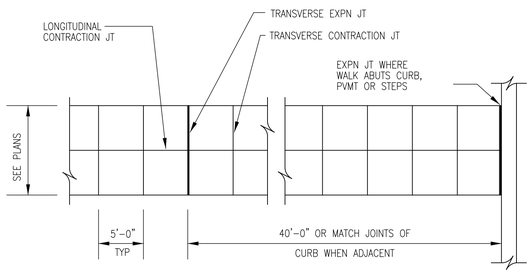
1. LONGITUDINAL AND TRANSVERSE JOINTS SHALL BE SAWED AS INDICATED.
2. THE JOINT SEAL MANUFACTURER'S SPECIFICATIONS SHALL BE COMPATIBLE WITH THE JOINT CONFIGURATION. PROVIDE TYPICAL DETAILS FOR CONSTRUCTION & EXP. JTS.
3. FOR ALL JOINTS THE BACKER ROD MATERIAL SHALL BE COMPATIBLE WITH THE COLD POURED SEALANT AND SLIGHTLY OVERSIZED TO PREVENT MOVEMENT DURING THE JOINT SEALANT OPERATION.
4. THE WIDTH OF ALL JOINTS SHALL BE CORRECTED FOR 68 DEGREE F.
5. EXPANSION JOINTS SHALL BE USED AT ALL LOCATIONS WHERE PAVMENT ABUTS A PERMANENT STRUCTURE.
6. DOWELS AND TIE BARS FOR CONSTRUCTION JOINTS SHALL BE CAST IN PLACE.

CONCRETE PAD

NO SCALE — 7 | CSN101 | CSN501



LONGITUDINAL SECTION

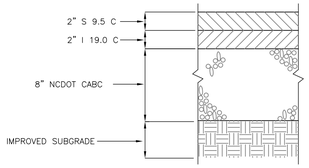


PARTIAL PLAN

WALK WIDTH	LONGITUDINAL CONTRACTION JOINT
– 5'–11"	NONE
6'–0" – 7'–11"	ONE ALONG WALK AT CENTERLINE
8'–0" – 12'–0"	TWO ALONG WALK AT THIRD POINTS

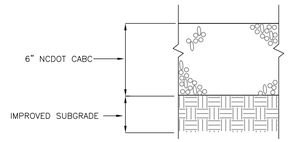
STANDARD SIDEWALK DETAILS

NO SCALE — 6 | CSN101 | CSN501



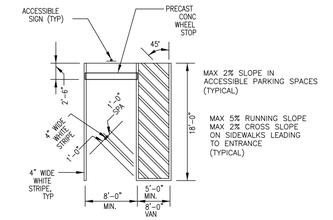
HEAVY DUTY PAVING SECTION

NO SCALE — 1 | CSN101 | CSN501



GRAVEL SURFACE

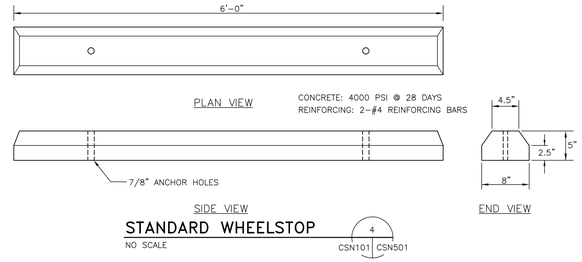
NO SCALE — 2 | CSN101 | CSN501



TYPICAL ACCESSIBLE PARKING SPACES

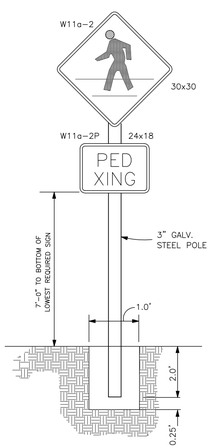
A.D.A. HANDICAP PARKING SPACE DETAIL

NO SCALE — 3 | CSN101 | CSN501

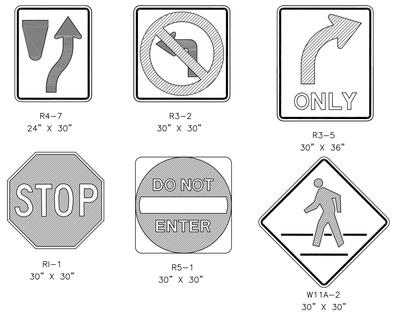


STANDARD WHEELSTOP

NO SCALE — 4 | CSN101 | CSN501



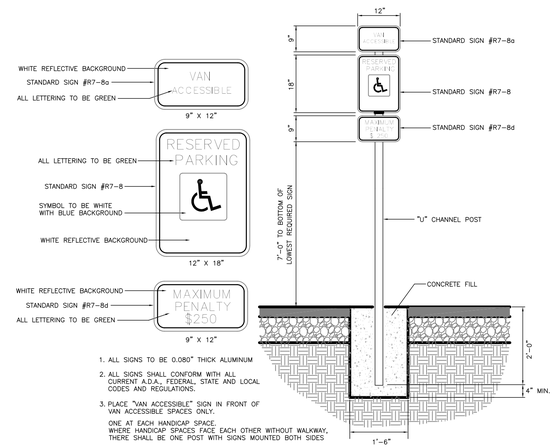
PEDESTRIAN CROSSING SIGN



1. ALL SIGNS SHALL CONFORM WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND LOCAL CODE FOR COLOR, SIZE, REFLECTIVITY, AND HEIGHT.
2. SIGNS TO PLACED AS SHOWN ON THE PLANS.
3. FOR SIGNS NOT PROTECTED BY A STANDARD PARKING BUMPER OR BEHIND THE CURB PLACE STEEL POLE IN BOLLARD PER THE HANDICAP PARKING SIGN DETAIL.

TYPICAL SIGN DETAILS

NO SCALE



1. ALL SIGNS TO BE 0.080" THICK ALUMINUM
2. ALL SIGNS SHALL CONFORM WITH ALL CURRENT A.D.A., FEDERAL, STATE AND LOCAL CODES AND REGULATIONS.
3. PLACE "VAN ACCESSIBLE" SIGN IN FRONT OF VAN ACCESSIBLE SPACES ONLY.

ONE AT EACH HANDICAP SPACE. WHERE HANDICAP SPACES FACE EACH OTHER WITHOUT WALKWAY, THERE SHALL BE ONE POST WITH SIGNS MOUNTED BOTH SIDES

A.D.A. HANDICAP PARKING SIGN

NO SCALE — 5 | CSN101 | CSN501

FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P–1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL
49758
ENGINEER
WILLIAM S. CLAYTON
07/10/26

CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

CATAWBA COUNTY
CATTLEMAN'S ASSOCIATION
NEWTON, NORTH CAROLINA
OWNER

EDUCATION CENTER
PROJECT TITLE

CIVIL

SITE DETAILS
DRAWING TITLE

JOB NUMBER:	24105
DATE:	06/22/26
DRAWN BY:	EMB
CHECKED BY:	WSC

REVISIONS

NO.	DESCRIPTION	DATE
1	REVISIONS	06/18/25

CSN501

SHEET - OF -

16.693 ACRES

AREA TO PLACE SURPLUS CUT MATERIAL
CO-ORDINATE WITH OWNER

EIP 1 1/2" PIPE

1005

1000

995

990

989

989.40

989.45

MAX 2% SLOPE
IN ACCESSIBLE
PARKING SPACES

2%

988

987

985

5%

980

N 56°32'12"W 382.84'

S 34°27'08"W 1060.87'

INV IN: 978.35

INV IN: 979.25

982.00

SD

DRIVEWAY PIPE
90 LFT
18" RCP CLASS IV
MIN 1% SLOPE

EIR 1/2" REBAR
INV.= 978.91

INV.= 979.02

TELEPHONE PEDESTAL

INV.= 973.41

MT OLIVE CHURCH ROAD

NOTES THIS SHEET:

1. ALL PRECAST DRAINAGE STRUCTURES SHALL MEET MATERIAL REQUIREMENTS OF ASTM C789 AND C850, LATEST REVISIONS.
2. ALL PRECAST DRAINAGE STRUCTURES SHALL BE INSTALLED IN ACCORDANCE WITH AASHTO DIVISION 11 SECTION 27, AND MANUFACTURERS SPECIFICATIONS.
3. THE PRECAST SUPPLIER/MANUFACTURER SHALL BE RESPONSIBLE FOR THE STRUCTURAL DESIGN OF THE STRUCTURE. GENERAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING SHOP DRAWINGS AND DESIGN CALCULATIONS, (SIGNED AND SEALED BY A LICENSED STRUCTURAL ENGINEER) FROM THE SUPPLIER TO THE ENGINEER.
4. DRAINAGE STRUCTURES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT NORTH CAROLINA DEPARTMENT OF HIGHWAYS AND TRANSPORTATION DESIGN STANDARDS.
5. UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS, AND THEREFORE THEIR LOCATION MUST BE CONSIDERED APPROXIMATE ONLY. THERE MAY BE OTHERS, THE EXISTENCE OF WHICH IS PRESENTLY NOT KNOWN. CONTRACTOR SHALL VERIFY LOCATION OF ALL UTILITIES AT HIS OWN INITIATIVE AND EXPENSE.
6. THE CONTRACTOR SHALL COORDINATE FINISHED PAVEMENT GRADES WITH ELEVATIONS AND LOCATIONS OF EXISTING ROADS AND STREETS.
7. NO WORK SHALL COMMENCE ON SITE UNTIL A LAND DISTURBING PERMIT IS ISSUED BY THE APPROPRIATE AGENCY.
8. LENGTHS OF LINES INDICATED ON THE DRAWING FOR UTILITY SYSTEMS ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY FOR DETERMINING THE EXACT AMOUNT OF PIPING REQUIRED TO FURNISH A COMPLETE WORKING SYSTEM IN ACCORDANCE WITH THE INTENT OF THE DRAWINGS.
9. DIMENSIONS AND COORDINATES SHOWN AT CURB ARE TO FACE OF CURB. COORDINATES SHOWN AT CURB INLETS ARE AT CENTER OF CURB INLET. SPOT ELEVATIONS SHOWN AT CURB INLETS ARE AT TOP OF CURB. SPOT ELEVATIONS SHOWN ON DROP INLETS ARE AT TOP OF INLETS.
10. FINISH CONTOURS SHOWN ARE TO TOP OF TOPSOIL, TOP OF PAVEMENT, TOP OF SIDEWALK, ETC. CONTRACTOR SHALL PROVIDE GRADE TO SUBGRADE ELEVATION REQUIRED. PAVEMENT SECTIONS AND SIDEWALK SECTIONS ARE PROVIDED FOR REFERENCE ONLY.
11. PROVIDE POSITIVE DRAINAGE AT ALL GRADED AREAS. PROVIDE UNIFORM (STRAIGHT) GRADE BETWEEN SPOT ELEVATIONS, FINISH CONTOURS, TOP OF INLETS, ETC.

GRADING & DRAINAGE PLAN

SCALE: 1" = 40'

0 40' 80'

FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P-1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL
40795
ENGINEER
WILLIAM S. CLAYTON
06/22/26

CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

CATAWBA COUNTY CATTLEMANS ASSOCIATION
NEWTON, NORTH CAROLINA
OWNER

EDUCATION CENTER
PROJECT TITLE

CIVIL

GRADING & DRAINAGE PLAN
DRAWING TITLE

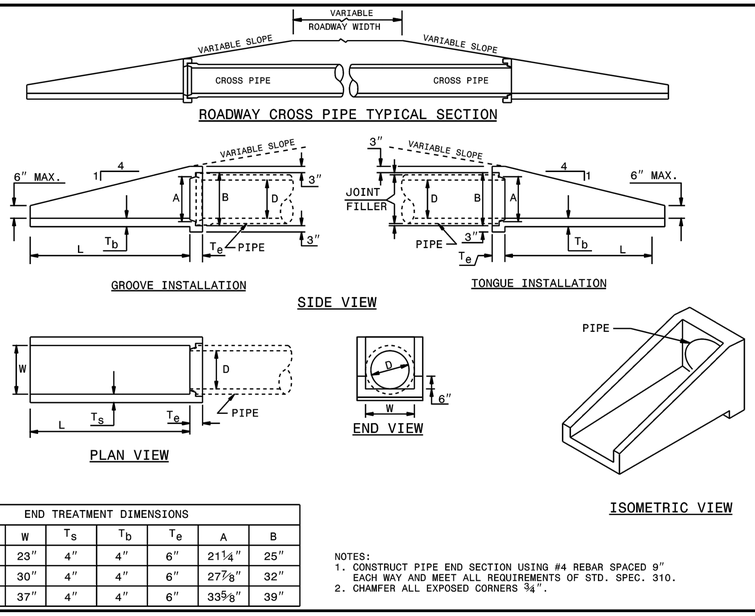
JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: EMB
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE
-	ADJUST SITE	10/06/25
-	ADJUST SITE	10/10/25
-	ADJUST SITE	02/02/26

CGN101

SHEET - OF -



END TREATMENT DIMENSIONS							
D	L	W	T_s	T_b	T_e	A	B
18"	6'-0"	23"	4"	4"	6"	21 1/4"	25"
24"	8'-2"	30"	4"	4"	6"	27 7/8"	32"
30"	10'-4"	37"	4"	4"	6"	33 5/8"	39"

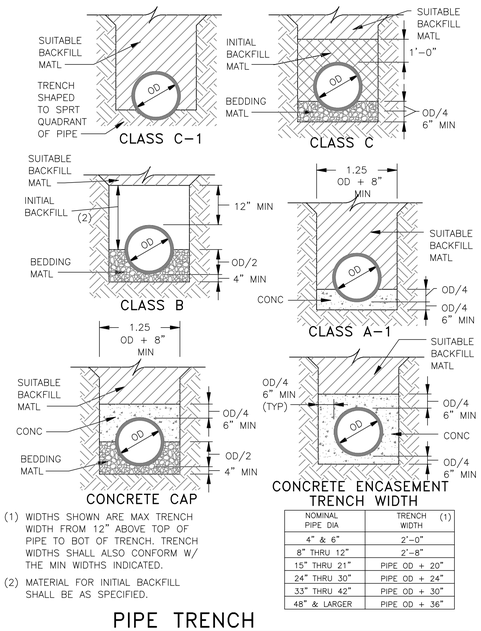
NOTES:
1. CONSTRUCT PIPE END SECTION USING #4 REBAR SPACED 9" EACH WAY AND MEET ALL REQUIREMENTS OF STD. SPEC. 310.
2. CHAMFER ALL EXPOSED CORNERS ¾".

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
CROSS PIPE END SECTION
PRECAST CONCRETE SECTION FOR 18" TO 30" PIPE

SHEET 1 OF 1
310.03



TRENCH WIDTH

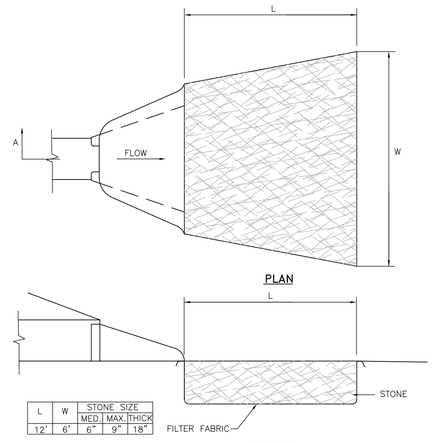
NOMINAL PIPE DIA	TRENCH WIDTH (1)
4" & 6"	2'-0"
8" THRU 12"	2'-8"
15" THRU 21"	PIPE OD + 20"
24" THRU 30"	PIPE OD + 24"
33" THRU 42"	PIPE OD + 30"
48" & LARGER	PIPE OD + 36"

(1) WIDTHS SHOWN ARE MAX TRENCH WIDTH FROM 12" ABOVE TOP OF PIPE TO BOT OF TRENCH. TRENCH WIDTHS SHALL ALSO CONFORM W/ THE MIN WIDTHS INDICATED.

(2) MATERIAL FOR INITIAL BACKFILL SHALL BE AS SPECIFIED.

PIPE TRENCH

NO SCALE



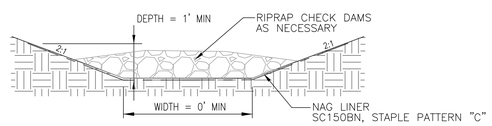
L	W	STONE SIZE		
		MED.	MAX.	THICK
12'	6'	6"	9"	18"

SECTION A

RIP-RAP DISSIPATOR

NO SCALE

2
CGN101 | CGN501



CONSTRUCTION SPECIFICATIONS:

1. REMOVE AND PROPERLY DISPOSE OF ALL TREES, BRUSH, STUMPS AND OTHER OBJECTIONABLE MATERIAL.
2. ENSURE THAT THE MINIMUM CONSTRUCTED CROSS SECTION MEETS ALL DESIGN REQUIREMENTS.
3. VEGETATE THE SWALE IMMEDIATELY AFTER CONSTRUCTION.

MAINTENANCE:

INSPECT DRAINAGE SWALE ONCE A MONTH AND AFTER EVERY RAINFALL. IMMEDIATELY REMOVE SEDIMENT FROM THE FLOW AREA AND REPAIR THE DIVERSION RIDGE. CAREFULLY CHECK OUTLETS AND MAKE TIMELY REPAIRS AS NEEDED.

DRAINAGE DITCH

NO SCALE

FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P-1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL 40756
ENGINEER
WILLIAM S. CLAYTON
06/22/26

CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

OWNER
CATAWBA COUNTY
CATTLEMAN'S ASSOCIATION
NEWTON, NORTH CAROLINA

PROJECT TITLE
EDUCATION CENTER

CIVIL

DRAWING TITLE
GRADING & STORMWATER DETAILS

JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: EMB
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE
-	ADJUST SITE	10/10/25

CGN501

SHEET - OF -

TEMPORARY SKIMMER BASIN #1	
MIN. DIMENSIONS:	124' L x 63' W
MIN. STORAGE:	11,520 CU. FT.
MIN. SURFACE AREA:	7,725 SQ. FT.
TOP ELEV:	984.00
BOT. ELEV:	980.00
SPILLWAY ELEV.:	983.25
SPILLWAY WIDTH:	14'
MAX DRAINAGE AREA:	7.61 AC
SKIMMER SIZE:	3.00"
ORIFICE SIZE:	2.00"

TEMPORARY SKIMMER BASIN NOTES:

1. DIMENSIONS MEASURED AT SPILLWAY ELEVATION. ALL TRAPS SHALL HAVE AN ADDITIONAL 1.5' OF FREEBOARD ABOVE THE SPILLWAY ELEVATION.
2. SIDE SLOPES SHALL BE NO STEEPER THAN 2:1 (H:V)

EROSION CONTROL NOTE:

PER NCDEQ AND NPDES REQUIREMENTS, GROUND STABILIZATION MUST OCCUR WITHIN 7 DAYS ON PERIMETER AREAS AND SLOPES STEEPER THAN 3:1, AND GROUND STABILIZATION MUST OCCUR WITHIN 14 DAYS ON OTHER AREAS.

THE PURPOSE OF THE EROSION CONTROL MEASURES, SHOWN ON THESE PLANS, SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS, RESULTING FROM CONSTRUCTION ACTIVITIES, FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES.

GROUND COVER: WHENEVER LAND-DISTURBING ACTIVITY IS UNDERTAKEN ON A TRACT COMPRISING MORE THAN ONE ACRE, IF MORE THAN ONE CONTIGUOUS ACRE IS UNCOVERED,

GRADE SLOPES & FILLS: THE ANGLE FOR GRADED SLOPES AND FILLS SHALL BE NO GREATER THAN THE ANGLE THAT CAN BE RETAINED BY VEGETATIVE COVER, OR OTHER ADEQUATE EROSION-CONTROL DEVICES OR STRUCTURES.

APPROVAL OF THIS PLAN IS NOT AN AUTHORIZATION TO GRADE ADJACENT PROPERTIES. WHEN FIELD CONDITIONS WARRANT OFF SITE GRADING, PERMISSION MUST BE OBTAINED FROM THE AFFECTED PROPERTY OWNER(S).

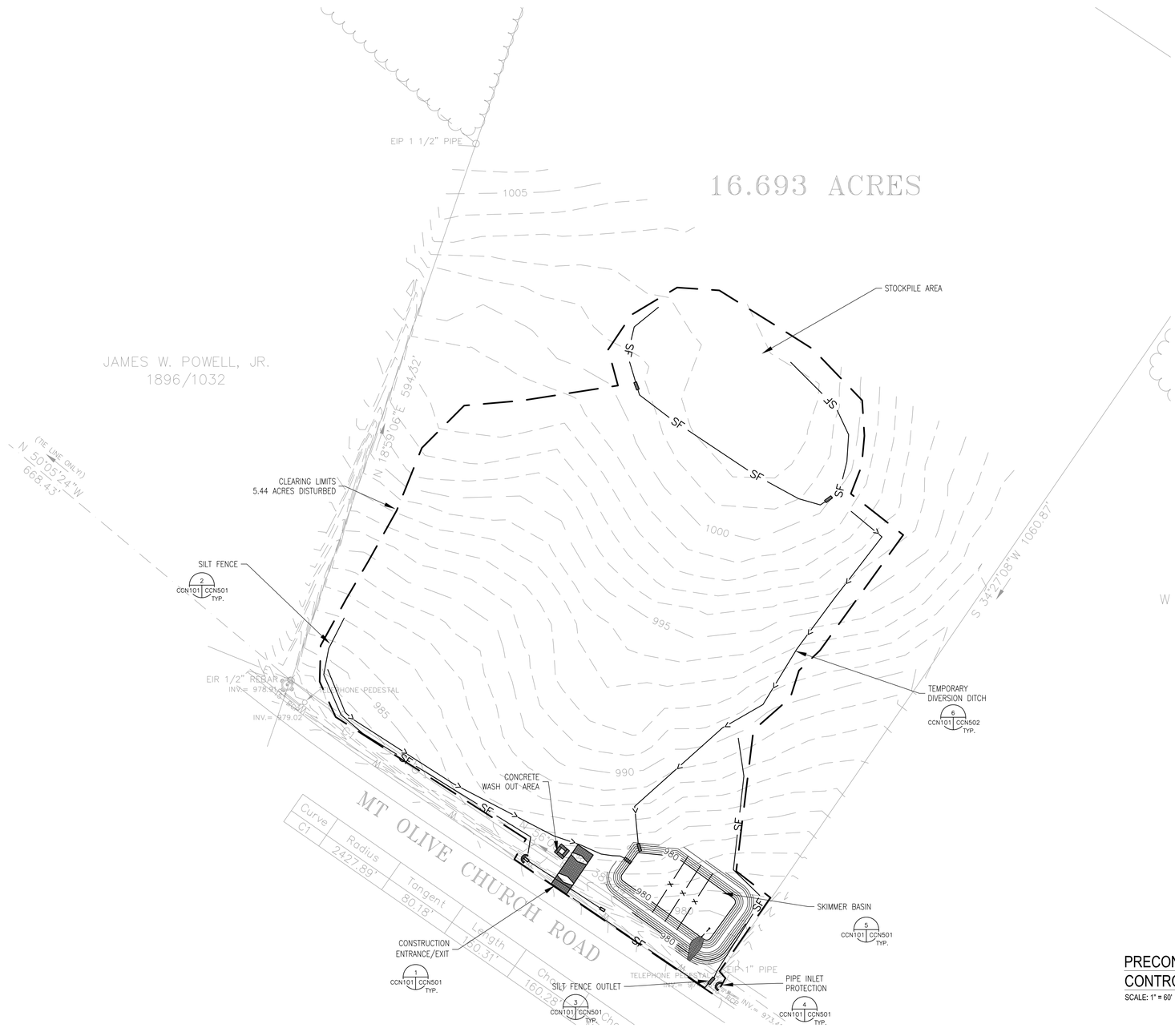
GRADING AND EROSION CONTROL LEGEND

- EXIST. MINOR CONTOUR
- EXIST. MAJOR CONTOUR
- 100 PROP. MINOR CONTOUR
- 100 PROP. MAJOR CONTOUR
- 100 PROP. SPOT ELEVATION
- SF SILT FENCE
- LIMITS OF DIST.
- TEMP. INLET PROTECTION
- TEMP. INLET PROTECTION (SILT SACK)
- TEMP. DIVERSION DITCH

EROSION AND SEDIMENT CONTROL NOTES:

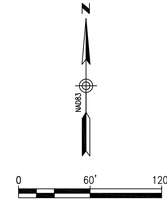
1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PROCEDURES APPROVED BY NCDEQ AND CATAWBA COUNTY. THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPROVED PROCEDURES WHICH MAY BE PERTINENT TO THE PROJECT.
2. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM NCDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS.
3. SEDIMENT CONTROL DEVICES, SUCH AS SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, CHECK DAMS OR OTHER MEASURES NOT LOCATED IN PROPOSED FILL OR EXCAVATION AREAS, SHALL BE CONSTRUCTED PRIOR TO ALL OTHER LAND DISTURBANCE. AN ON-SITE PRE-CONSTRUCTION MEETING WILL BE HELD BETWEEN THE ENGINEER AND THE CONTRACTOR TO IDENTIFY THOSE MEASURES TO BE INITIALLY INSTALLED.
4. MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ACCOMPLISHED IN ACCORDANCE WITH PROCEDURES APPROVED BY NCDEQ & CATAWBA COUNTY. MAINTENANCE WILL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES. AT THE PRECONSTRUCTION MEETING, THE CONTRACTOR WILL SUPPLY THE OWNER WITH THE NAME OF THE INDIVIDUAL WHO WILL BE RESPONSIBLE FOR ENSURING MAINTENANCE OF INSTALLED MEASURES ON A DAILY BASIS.
5. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION.
6. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT THE TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED.
7. THE CONTRACTOR SHALL STRIP AND PILE TOPSOIL AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. SILT FENCE SHALL BE PLACED AT THE TOE OF THE STOCKPILE AFTER STRIPPING OF TOPSOIL IS COMPLETE.
8. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUTFALL DITCHES FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES INSTALLATION OF EROSION CONTROL STONE WHERE REQUIRED.
9. TEMPORARY VEGETATIVE COVER SHALL BE PROVIDED IN ALL AREAS, WHICH ARE NOT DESIGNATED FOR PAVING, UNDERGROUND UTILITIES OR STRUCTURAL USES. SUCH AREAS SHALL NOT BE EXPOSED FOR PERIODS EXCEEDING 10 DAYS. TEMPORARY VEGETATIVE COVER MAY BE ELIMINATED IN FAVOR OF FINAL VEGETATIVE COVER IF CONSTRUCTION AND SEASONAL CONDITIONS PERMIT.
10. ALL AREAS DESIGNATED FOR PAVING, UNDERGROUND UTILITIES, AND STRUCTURAL USE SHALL BE STABILIZED AS SOON AS POSSIBLE, BUT NOT EXCEEDING 10 DAYS FOLLOWING INSTALLATION. NO MORE THAN 300' OF SANITARY SEWER, STORM SEWER, OR WATER LINES ARE TO BE OPEN AT ONE TIME.
11. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER. IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE ESTABLISHMENT OF GRASS COVER.
12. ALL SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS SUCH AS EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH MULCHING AND MANUFACTURER'S INSTRUCTIONS.
13. INLET PROTECTION SHALL BE PROVIDED FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME. REPLACE TEMPORARY INLET PROTECTION WITH SILT SACK, AFTER INSTALLING FRAME, GRATE, AND CURB AND GUTTER.
14. BASE COURSE MATERIAL SHALL BE PLACED IN ALL STREET & PARKING AREAS WITHIN 30 DAYS OF FINAL GRADING.
15. TEMPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED AFTER NCDEQ INSPECTION AND RELEASE. TRAPPED SEDIMENT SHALL BE SPREAD AND SEEDED.
16. SEE CCN502 FOR SEEDING, SEED BED PREPARATION AND MAINTENANCE SCHEDULE
17. SEE CCN101 FOR STORM DRAINAGE SCHEDULE.
18. TOTAL DISTURBED AREA = 5.44 ACRES.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING EROSION CONTROL PLAN APPROVAL IF NECESSARY FOR ANY RELATED BORROW AREA.
20. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY CATAWBA COUNTY PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.

CONTRACTOR WILL REFRAIN FROM TRACKING ANY SITE MATERIAL ONTO PARKING LOT OR STREET. ANY SUCH TRACKING SHOULD BE CORRECTED IMMEDIATELY.



PRECONSTRUCTION EROSION CONTROL PLAN

SCALE: 1" = 60'



FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P-1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL
49758
ENGINEER
WILLIAM S. CLAYTON
06/22/26

CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE, PO BOX 2351 HICKORY, NC 28601

CATAWBA COUNTY
CATTLEMAN'S ASSOCIATION
NEWTON, NORTH CAROLINA
OWNER

EDUCATION CENTER
PROJECT TITLE

CIVIL

PRE-CONSTRUCTION
EROSION CONTROL PLAN
DRAWING TITLE

JOB NUMBER:	24105
DATE:	06/22/26
DRAWN BY:	TLC
CHECKED BY:	WSC

REVISIONS

NO.	DESCRIPTION	DATE
2	ADDENDUM	07/15/25
	ADJUST SITE	02/02/26

CCN101

SHEET - OF -

EROSION CONTROL NOTE:

PER NCDEQ AND NPDES REQUIREMENTS, GROUND STABILIZATION MUST OCCUR WITHIN 7 DAYS ON PERIMETER AREAS AND SLOPES STEEPER THAN 3:1, AND GROUND STABILIZATION MUST OCCUR WITHIN 14 DAYS ON OTHER AREAS.

THE PURPOSE OF THE EROSION CONTROL MEASURES, SHOWN ON THESE PLANS, SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS, RESULTING FROM CONSTRUCTION ACTIVITIES, FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES.

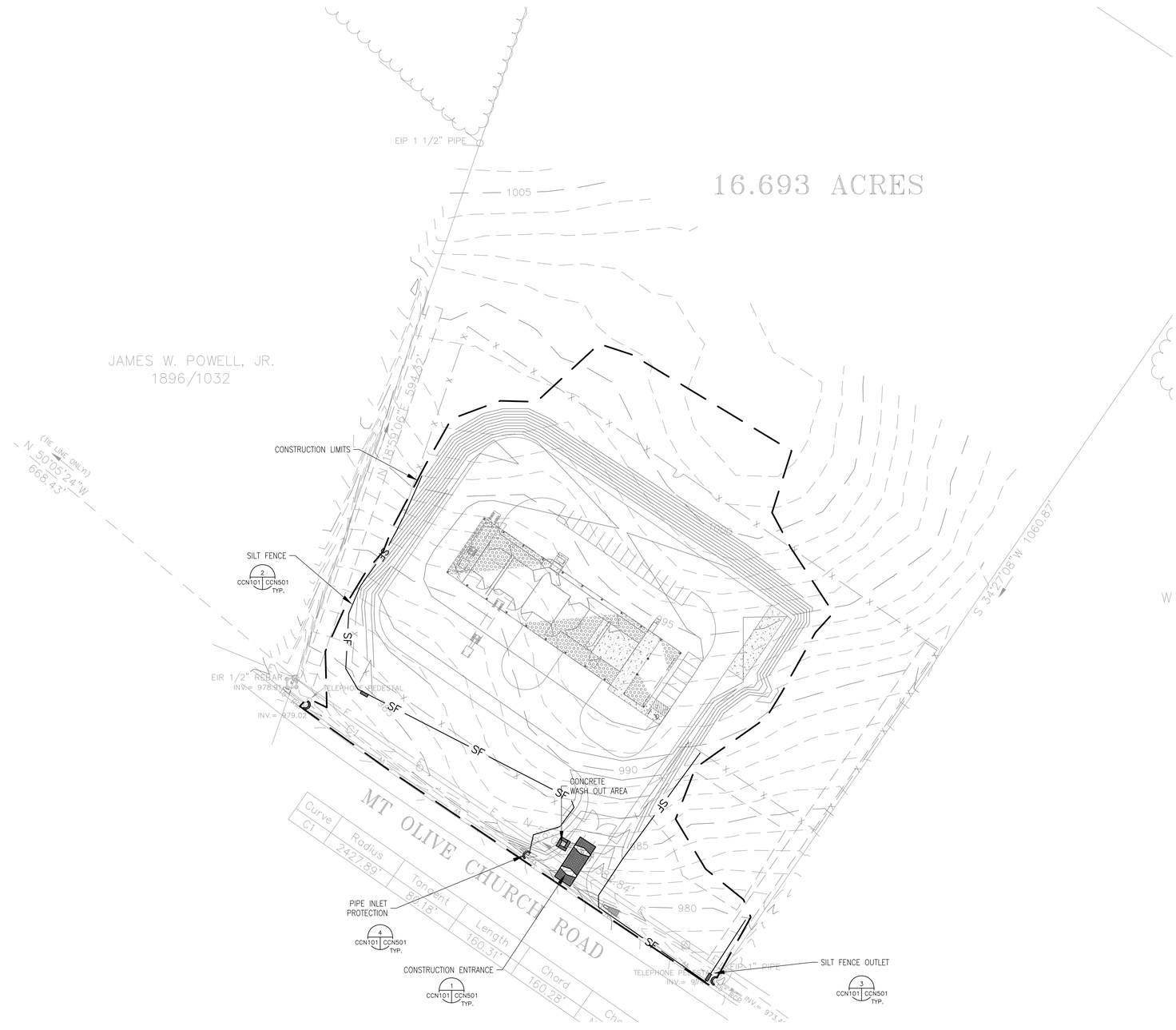
GROUND COVER: WHENEVER LAND-DISTURBING ACTIVITY IS UNDERTAKEN ON A TRACT COMPRISING MORE THAN ONE ACRE, IF MORE THAN ONE CONTIGUOUS ACRE IS UNCOVERED,

GRADE SLOPES & FILLS: THE ANGLE FOR GRADED SLOPES AND FILLS SHALL BE NO GREATER THAN THE ANGLE THAT CAN BE RETAINED BY VEGETATIVE COVER OR OTHER ADEQUATE EROSION-CONTROL DEVICES OR STRUCTURES.

APPROVAL OF THIS PLAN IS NOT AN AUTHORIZATION TO GRADE ADJACENT PROPERTIES. WHEN FIELD CONDITIONS WARRANT OFF SITE GRADING, PERMISSION MUST BE OBTAINED FROM THE AFFECTED PROPERTY OWNER(S).

GRADING AND EROSION CONTROL LEGEND

- EXIST. MINOR CONTOUR
- EXIST. MAJOR CONTOUR
- 100 PROP. MINOR CONTOUR
- 100 PROP. MAJOR CONTOUR
- 100 PROP. SPOT ELEVATION
- SILT FENCE
- LIMITS OF DIST.
- TEMP. INLET PROTECTION
- TEMP. INLET PROTECTION (SILT SACK)
- TEMP. DIVERSION DITCH



POST-CONSTRUCTION EROSION CONTROL PLAN

SCALE: 1"=60'

EROSION AND SEDIMENT CONTROL NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PROCEDURES APPROVED BY NCDEQ AND CATAWBA COUNTY. THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPROVED PROCEDURES WHICH MAY BE PERTINENT TO THE PROJECT.
2. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM NCDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS.
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4. MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ACCOMPLISHED IN ACCORDANCE WITH PROCEDURES APPROVED BY NCDEQ & CATAWBA COUNTY. MAINTENANCE WILL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES. AT THE PRECONSTRUCTION MEETING, THE CONTRACTOR WILL SUPPLY THE OWNER WITH THE NAME OF THE INDIVIDUAL WHO WILL BE RESPONSIBLE FOR ENSURING MAINTENANCE OF INSTALLED MEASURES ON A DAILY BASIS.
5. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION.
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16. SEE CCN502 FOR SEEDING, SEED BED PREPARATION AND MAINTENANCE SCHEDULE
17. SEE CGN101 FOR STORM DRAINAGE SCHEDULE.
18. TOTAL DISTURBED AREA = 4.61 ACRES.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING EROSION CONTROL PLAN APPROVAL IF NECESSARY FOR ANY RELATED BORROW AREA.
20. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY CATAWBA COUNTY PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.

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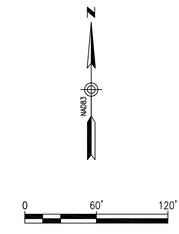

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FOR AGENCY REVIEW

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CLAYTON ENGINEERING & DESIGN, PLLC.
No. P-1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
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ENGINEER
WILLIAM S. CLAYTON
06/22/26

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CATAWBA COUNTY
CATTLEMAN'S ASSOCIATION
NEWTON, NORTH CAROLINA
OWNER

EDUCATION CENTER
PROJECT TITLE

CIVIL

POST-CONSTRUCTION
EROSION CONTROL PLAN
DRAWING TITLE

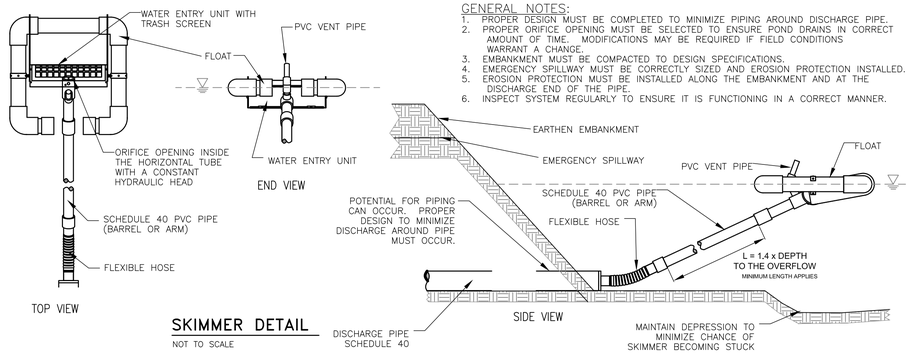
JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: TLC
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE

CCN102

SHEET - OF -

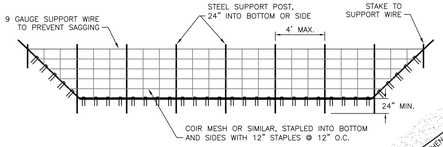


SKIMMER DETAIL

NOT TO SCALE

GENERAL NOTES:

1. PROPER DESIGN MUST BE COMPLETED TO MINIMIZE PIPING AROUND DISCHARGE PIPE.
2. PROPER ORIFICE OPENING MUST BE SELECTED TO ENSURE POND DRAINS IN CORRECT AMOUNT OF TIME. MODIFICATIONS MAY BE REQUIRED IF FIELD CONDITIONS WARRANT A CHANGE.
3. EMBANKMENT MUST BE COMPACTED TO DESIGN SPECIFICATIONS.
4. EMERGENCY SPILLWAY MUST BE CORRECTLY SIZED AND EROSION PROTECTION INSTALLED.
5. EROSION PROTECTION MUST BE INSTALLED ALONG THE EMBANKMENT AND AT THE DISCHARGE END OF THE PIPE.
6. INSPECT SYSTEM REGULARLY TO ENSURE IT IS FUNCTIONING IN A CORRECT MANNER.



CROSS-SECTION

CONSTRUCTION SPECIFICATIONS:

1. GRADE THE BASIN SO THAT THE BOTTOM IS LEVEL FRONT TO BACK AND SIDE TO SIDE.
2. INSTALL POSTS OR SAW HORSES ACROSS THE WIDTH OF THE SEDIMENT TRAP.
3. STEEL POSTS SHOULD BE DRIVEN TO A DEPTH OF 24 INCHES, SPACED A MAXIMUM OF 4 FEET APART, AND INSTALLED UP THE SIDES OF THE BASIN AS WELL. THE TOP OF THE FABRIC SHOULD BE 6 INCHES HIGHER THAN THE INVERT OF THE SPILLWAY. TOPS OF BAFFLES SHOULD BE 2 INCHES LOWER THAN THE TOP OF THE BERMS.
4. INSTALL AT LEAST THREE ROWS OF BAFFLES BETWEEN THE INLET AND THE OUTLET DISCHARGE POINT. BASINS LESS THAN 20 FEET IN LENGTH MAY USE 2 BAFFLES.
5. WHEN USING POSTS, ADD A 9 GAUGE SUPPORT WIRE ACROSS THE TOP OF THE MEASURE TO PREVENT SAGGING.
6. WRAP POROUS MATERIAL, LIKE JUTE BACKED BY COIR MATERIAL, OVER A SAWHORSE OR THE TOP WIRE. HAMMER REBAR INTO THE SAWHORSE LEGS FOR ANCHORING. THE FABRIC SHOULD HAVE FIVE TO TEN PERCENT OPENINGS IN THE WEAVE. ATTACH FABRIC TO A SUPPORT WIRE AND A SUPPORT STRUCTURE WITH ZIP TIES, WIRES, OR STAPLES.
7. THE BOTTOM AND SIDES OF THE FABRIC SHOULD BE ANCHORED IN A TRENCH OR PINNED WITH 12-INCH EROSION CONTROL MATTING STAPLES AT 12" SPACING.
8. DO NOT SPLICE THE FABRIC, BUT USE A CONTINUOUS PIECE ACROSS THE BASIN.

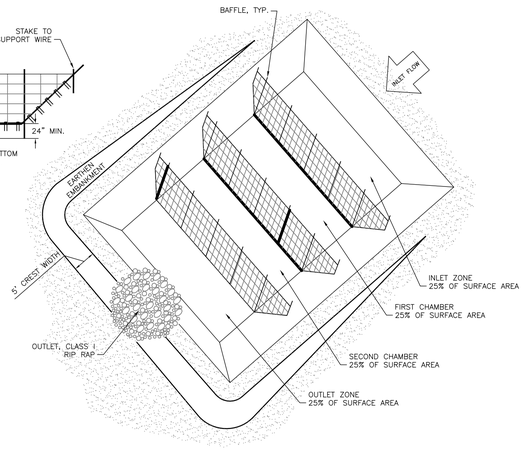
MAINTENANCE:

INSPECT BAFFLES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.

BE SURE TO MAINTAIN ACCESS TO THE BAFFLES. SHOULD THE FABRIC OF A BAFFLE COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.

REMOVE SEDIMENT DEPOSITS WHEN IT REACHES HALF FULL TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE BAFFLES. TAKE CARE TO AVOID DAMAGING THE BAFFLES DURING CLEANOUT. SEDIMENT DEPTH SHOULD NEVER EXCEED HALF THE DESIGNED STORAGE DEPTH.

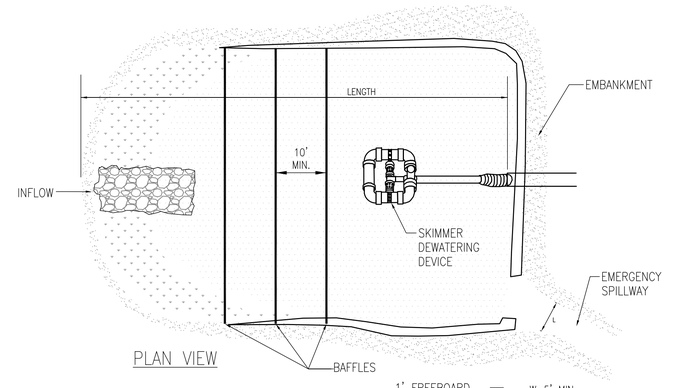
AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED, REMOVE ALL BAFFLE MATERIALS AND UNSTABLE SEDIMENT DEPOSITS, BRING THE AREA TO GRADE, AND STABILIZE IT.



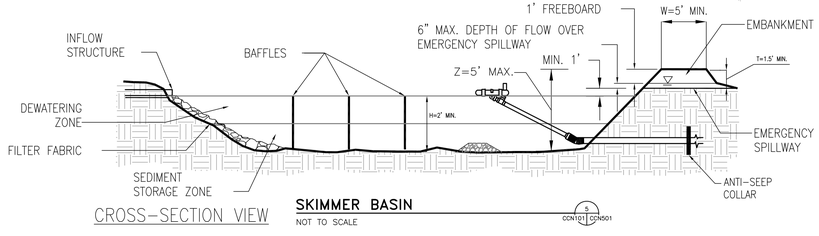
BAFFLES IN SEDIMENT TRAP

BAFFLES

NOT TO SCALE



PLAN VIEW

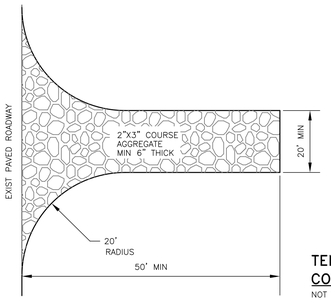


CROSS-SECTION VIEW

SKIMMER BASIN

NOT TO SCALE

CCN101-102 | CCN501



CONSTRUCTION SPECIFICATIONS:

1. CLEAR THE ENTRANCE AND EXIT AREA OF ALL VEGETATION, ROOTS, AND OTHER OBJECTIONABLE MATERIAL AND PROPERLY GRADE IT.
2. PLACE THE GRAVEL TO THE SPECIFIC GRADE AND DIMENSIONS SHOWN ON PLANS, AND SMOOTH IT.
3. PROVIDE DRAINAGE TO CARRY WATER TO A SEDIMENT TRAP OR OTHER SUITABLE OUTLET.
4. USE GEOTEXTILE FABRICS BECAUSE THEY IMPROVE STABILITY OF THE FOUNDATION IN LOCATIONS SUBJECT TO SEEPAGE OR HIGH WATER TABLE.

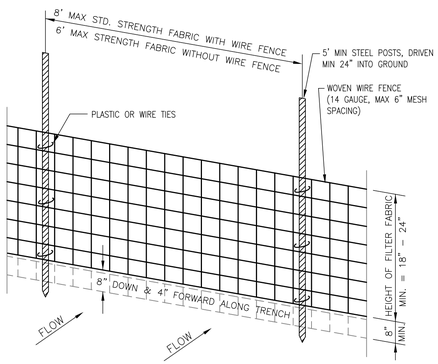
MAINTENANCE:

MAINTAIN THE GRAVEL PAD IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE CONSTRUCTION SITE. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH 2" STONE. AFTER EACH RAINFALL, INSPECT ANY STRUCTURE USED TO TRAP SEDIMENT AND CLEAN IT OUT AS NECESSARY. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TRACKED ONTO PUBLIC ROADWAYS.

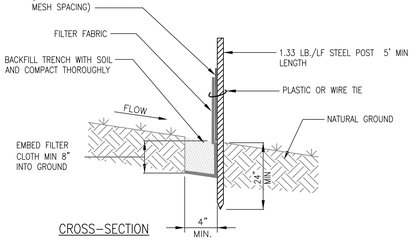
TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

NOT TO SCALE

CCN101-102 | CCN501



PERSPECTIVE VIEW



CROSS-SECTION

SILT FENCE

NOT TO SCALE

CCN101-102 | CCN501

CONSTRUCTION SPECIFICATIONS:

1. CONSTRUCT THE SEDIMENT BARRIER OF STANDARD STRENGTH OR EXTRA STRENGTH SYNTHETIC FILTER FABRICS.
2. ENSURE THAT THE HEIGHT OF THE SEDIMENT FENCE DOES NOT EXCEED 24 INCHES ABOVE THE GROUND SURFACE.
3. CONSTRUCT THE FILTER FABRIC FROM A CONTINUOUS ROLL CUT TO LENGTH OF THE BARRIER TO AVOID JOINTS. WHEN JOINTS ARE NECESSARY, SECURELY FASTEN THE FILTER CLOTH ONLY AT A SUPPORT POST WITH 4 FEET MINIMUM OVERLAP TO THE NEXT POST.
4. SUPPORT STANDARD STRENGTH FILTER FABRIC BY WIRE MESH FASTENED SECURELY TO THE UP-SLOPE SIDE OF THE POSTS. EXTEND THE WIRE MESH FASTENED SECURELY TO THE UP-SLOPE SIDE OF THE POSTS. EXTEND THE WIRE MESH SUPPORT TO THE BOTTOM OF THE TRENCH. FASTEN THE WIRE REINFORCEMENT, THEN FABRIC ON THE UP-SLOPE SIDE OF THE FENCE POST. WIRE OR PLASTIC ZIP TIES SHOULD HAVE MINIMUM 50 POUND TENSILE STRENGTH.
5. WHEN A WIRE MESH SUPPORT FENCE IS USED, SPACE POSTS A MAXIMUM OF 8 FEET APART. SUPPORT POSTS SHOULD BE DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 24 INCHES.
6. EXTRA STRENGTH FILTER FABRIC WITH 6 FEET POST SPACING DOES NOT REQUIRE WIRE MESH SUPPORT FENCE. SECURELY FASTEN THE FILTER FABRIC DIRECTLY TO POSTS. WIRE OR PLASTIC ZIP TIES SHOULD HAVE MINIMUM 50 POUND TENSILE STRENGTH.
7. EXCAVATE A TRENCH APPROXIMATELY 4 INCHES WIDE AND 8 INCHES DEEP ALONG THE PROPOSED LINE OF POSTS AND UP-SLOPE FROM THE BARRIER.
8. PLACE 12 INCHES OF THE FABRIC ALONG THE BOTTOM AND SIDE OF THE TRENCH.
9. BACKFILL THE TRENCH WITH SOIL PLACED OVER THE FILTER FABRIC AND COMPACT. THOROUGH COMPACTION OF THE BACKFILL IS CRITICAL TO SILT FENCE PERFORMANCE.
10. DO NOT ATTACH FILTER FABRIC TO EXISTING TREES.

MAINTENANCE:

INSPECT SEDIMENT FENCES ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.

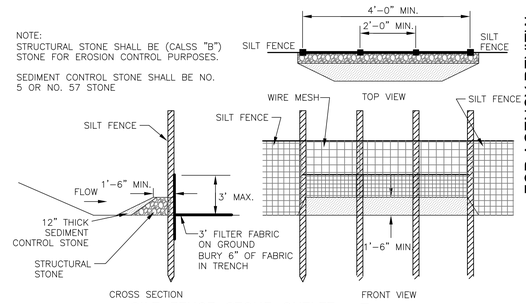
SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.

REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND REDUCE PRESSURE ON THE FENCE. TAKE CARE TO AVOID UNDERMINING THE FENCE DURING CLEANOUT.

REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

NOTE:
STRUCTURAL STONE SHALL BE (CALSS "B") STONE FOR EROSION CONTROL PURPOSES.

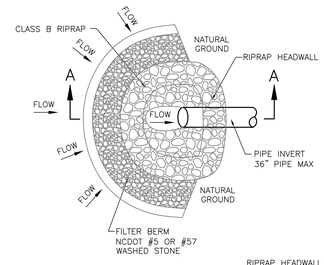
SEDIMENT CONTROL STONE SHALL BE NO. 5 OR NO. 57 STONE



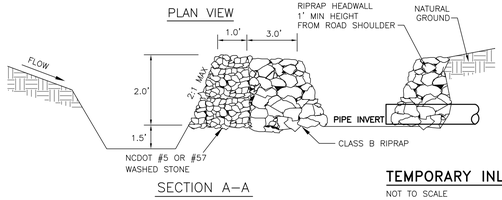
SILT FENCE STONE OUTLET

NO SCALE

CCN101-102 | CCN501



PLAN VIEW



SECTION A-A

CONSTRUCTION SPECIFICATIONS:

1. CLEAR THE AREA OF ALL DEBRIS THAT MIGHT HINDER EXCAVATION AND DISPOSAL OF SOIL.
2. INSTALL THE CLASS B OR CLASS I RIRAP IN A SEMICIRCLE AROUND THE PIPE INLET. THE STONE SHOULD BE BUILT UP HIGHER ON EACH END WHERE IT TIES INTO THE EMBANKMENT. THE MINIMUM CREST WIDTH OF THE RIPRAP SHOULD BE 3 FEET, WITH A MINIMUM BOTTOM WIDTH OF 11 FEET. THE MINIMUM HEIGHT SHOULD BE 2 FEET, BUT ALSO 1 FOOT LOWER THAN SHOULDER OF THE EMBANKMENT OR DIVERSIONS.
3. A 1 FOOT THICK LAYER OF NC DOT #5 OR #57 STONE SHOULD BE PLACED ON OUTSIDE SLOPE OF RIPRAP.
4. THE SEDIMENT STORAGE AREA SHOULD BE EXCAVATED AROUND THE OUTSIDE OF THE STONE HORSESHOE 18 INCHES BELOW NATURAL GRADE.
5. WHEN THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, FILL DEPRESSION AND ESTABLISH FINAL GRADING ELEVATIONS, COMPACT AREA PROPERLY, AND STABILIZE WITH GROUND COVER.

MAINTENANCE:

INSPECT RIP-RAP PIPE INLET PROTECTION AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (½ INCH OR GREATER) RAINFALL EVENT AND REPAIR IMMEDIATELY. REMOVE SEDIMENT AND RESTORE THE SEDIMENT STORAGE AREA TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE-HALF THE DESIGN DEPTH OF THE TRAP. PLACE THE SEDIMENT THAT IS REMOVED IN THE DESIGNATED DISPOSAL AREA AND REPLACE THE CONTAMINATED PART OF THE GRAVEL FACING.

CHECK THE STRUCTURE FOR DAMAGE. ANY RIPRAP DISPLACED FROM STONE HORSESHOE MUST BE REPLACED IMMEDIATELY.

AFTER ALL THE SEDIMENT-PRODUCING AREAS HAVE BEEN PERMANENTLY STABILIZED, REMOVE THE STRUCTURE AND ALL THE UNSTABLE SEDIMENT. SMOOTH THE AREA TO BLEND WITH THE ADJOINING AREAS AND PROVIDE PERMANENT GROUND COVER.

TEMPORARY INLET PROTECTION

NOT TO SCALE

CCN101-102 | CCN501

FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P-1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL 49758
ENGINEER
WILLIAM S. CLAYTON
06/22/26

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1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

CATAWBA COUNTY CATTLEMANS ASSOCIATION
OWNER
NEWTON, NORTH CAROLINA

EDUCATION CENTER
PROJECT TITLE

EROSION CONTROL DETAILS
DRAWING TITLE

JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: EMB
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE

CCN501

SHEET - OF -

SEEDBED PREPARATION (SP)

SP–1 FILL SLOPES 3:1 OR STEEPER TO BE SEEDED WITH A HYDRAULIC SEEDER (PERMANENT SEEDINGS). GRASS LINED CHANNELS.
1. LEAVE THE LAST 4–6 INCHES OF FILL LOOSE AND UNCOMPACTED, ALLOWING ROCKS, ROOTS, LARGE CLODS AND OTHER DEBRIS TO REMAIN ON THE SLOPE.
2. ROUGHEN SLOPE FACES BY MAKING GROOVES 2–3 INCHES DEEP, PERPENDICULAR TO THE SLOPE.
3. SPREAD LIME EVENLY OVER SLOPES AT RATES RECOMMENDED BY SEEDING METHODS (SM–1).

SP–2 FILL SLOPES 3:1 OR STEEPER (TEMPORARY SEEDINGS)
1. LEAVE A LOOSE, UNCOMPACTED SURFACE. REMOVE LARGE CLODS, ROCKS, AND DEBRIS WHICH MIGHT HOLD NETTING ABOVE THE SURFACE.
2. SPREAD LIME AND FERTILIZER EVENLY AT RATES RECOMMENDED BY SEEDING METHODS (SM–3)
3. INCORPORATE AMENDMENTS BY ROUGHENING OR GROOVING SOIL SURFACE ON THE CONTOUR.

SP–3 GENTLE AND FLAT SLOPES
1. REMOVE ROCKS, AND DEBRIS.
2. APPLY LIME AND FERTILIZER AT RATES RECOMMENDED BY SEEDING METHODS (SM–2); SPREAD EVENLY AND INCORPORATE INTO THE TOP 6" WITH A DISK, CHISEL PLOW, OR ROTARY TILLER.
3. BREAK UP LARGE CLODS AND RAKE INTO LOOSE, UNIFORM SEEDBED.
4. RAKE TO LOOSEN SURFACE JUST PRIOR TO APPLYING SEED.

14 DAY STABILIZATION CLAUSE

ALL DISTURBED AREAS WHICH ARE TO BE LEFT IDLE FOR PERIOD OF 14 DAYS OR LONGER ARE TO RECEIVE TEMPORARY VEGETATION AND /OR MULCH.

SEEDING METHODS (SM)

SM–1 FILL SLOPES STEEPER THAN 3:1 (PERMANENT SEEDINGS) USE HYDRAULIC SEEDING EQUIPMENT TO APPLY SEED AND FERTILIZER. APPLY 4000lb/acre GROUND AGRICULTURAL LIMESTONE AND 1000lb/acre 10–10–10 FERTILIZER. AFTER AUG 15, USE UNSCARIFIED SEED FOR ONE OF THE FOLLOWING NATIVE SPECIES: SWITCHGRASS, SPLITBEARD BLUESTEM, BEGGARLICE, OR PATRIDGE PEA. FOR NEATER APPEARANCES, OMIT NATIVE SPECIES AND SUBSTITUTE 40lb/acre BAHIAGRASS OR 15lb/acre BERMUDA GRASS (USE UNHULLED BERMUDA IN THE FALL).

SM–2 GENTLE TO FLAT SLOPES OR TEMPORARY SEEDINGS
1. BROADCAST SEED AT THE RECOMMENDED RATE WITH A CYCLONE SEEDER, DROP SPREADER, OR CULTIPACKER SEEDER.
2. RAKE SEED INTO THE SOIL AND LIGHTLY PACK TO ESTABLISH GOOD CONTACT.
3. APPLY 4000lb/acre GROUND AGRICULTURAL LIMESTONE AND 1000 lb/acre 10–10–10 FERTILIZER.
4. BETWEEN MAR 31–AUG 20, APPLY 50lb/acre ONE OF THE FOLLOWING NATIVE SPECIES: SWITCHGRASS, SPLITBEARD BLUESTEM, BEGGARLICE, OR PATRIDGE PEA, KEEP MOWED; SEED PERMANENT MIXTURE IN EARLY FALL.

SM–3 TEMPORARY SEDDING
1. APPLY 2000lb/acre GROUND AGRICULTURAL LIMESTONE AND 750lb/acre 10–10–10 FERTILIZER.

SM–4 GRASS LINED CHANNELS; APPLY 4000lb/acre GROUND AGRICULTURE LIMESTONE AND 1000lb/acre 10–10–10 FERTILIZER. PLACE LININGS AS NOTED ON PLANS.

MULCH (MU)

MU–1 STEEP SLOPES (3:1 OR GREATER)
APPLY 100lb/1,000 sq. ft. GRAIN STRAW. COVER WITH NETTING AND STAPLE TO THE SLOPE.

MU–2 GENTLE SLOPES (LESS THAN 3:1)
APPLY 100lb/1,000 sq. ft. GRAIN STRAW. COVER WITH ASPHALT OR WITH NETTING AND STAPLE TO THE SLOPE.

MU–3 APPLY 100lb/1000 sq. ft. AND ANCHOR STRAW BY STAPLING NETTING OVER THE TOP.

MAINTENANCE (MA)

MA–1 REFERTILIZE IN LATE WINTER OR EARLY SPRING THE FOLLOWING YEAR. MOW AS DESIRED. RESEED, FERTILIZE, AND MULCH DAMAGED AREAS IMMEDIATELY.

FERTILIZER NOTE:

FERTILIZER SHOULD BE APPLIED IN ACCORDANCE WITH SOIL TEST RESULTS. IF SOIL TEST CANNOT BE PERFORMED, GENERIC FERTILIZER APPLICATION RATES MAYBE USED.

NATIVE SPECIES:

SWITCHGRASS (PANICUM VIRGATUM)
SPLITBEARD BLUESTEM (SNDROPOGON TERNARIUS)
BEGGARLICE (DESMODIUM SPP.)
PARTRIDGE PEA (CHAMAECRISTA FASCICULATA)

EROSION CONTROL MAINTENANCE SCHEDULE

ALL SEDIMENT AND EROSION CONTROLS ARE TO BE INSPECTED AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND AFTER ANY STORM EVENT OF 0.5 INCHES OR GREATER OF PRECIPITATION DURING AND 24–HOUR PERIOD.

AREA NO.	DESCRIPTION	SEASON	SEEDING MIXTURE PERMANENT lb/ac	SEEDING MIXTURE TEMPORARY lb/ac	SEEDBED PREPARATION	SEEDING METHOD	MULCH	MAINTENANCE	NOTES
1	STEEP SLOPES; LOW MAINTENANCE (GREATER THAN 3:1)	AUG 20 – OCT 30 FEB 1 – APR 15	TALL FESCUE 100 SWITCHGRAS 30 BEGGARLICE 10		SP–1	SM–1	MU–1	MA–1	BETWEEN MAY 1 – AUG 15, ADD 10lb/acre GERMAN MILLET OR 15lb/acre SUNDAN GRASS. PRIOR TO MAY 1 OR AFTER AUG 15 ADD 40lb/acre RYE GRAIN
2	LOW MAINTENANCE AREAS (3:1 SLOPES OR LESS)	AUG 20 – OCT 25 FEB 1 – MAR 31	BLEND OF TWO TURF–TYPE FESCUES 225 BLEND OF TWO KENTUCKY BLUEGRASS VARIETIES. 25		SP–3	SM–2	MU–2	MA–1	APPLY 40lb/acre OF NITROGEN AFTER A STAND OF GRASS HAS BEEN ESTABLISHED. AVOID APPLYING NITROGEN DURING THE SUMMER MONTHS. SEE SM–2 (NOTE 4)
3	TEMPORARY SEEDING	JAN 1 – MAY 1		RYE GRAIN 120 PARTRIDGE PEA 50	SP–2	SM–3	MU–1	MA–1	TREAT TEMPORARY DIVERSION AS LOW–MAINTENANCE, PERMANENT (AREA 2) INCLUDE TOPSOIL STOCK–PILES HERE
		MAY 1 – AUG 15		GERMAN MILLET 40					
		AUG 15 – DEC 30		RYE GRAIN 120					
4	GRASS LINED CHANNELS	FEB 1 – APR 15	TALL FESCUE 200		SP–1	SM–4	MU–3	MA–1	BETWEEN APR 15 – AUG 20, PLACE GERMAN MILLET AT 40lb/acre. BETWEEN NOV 1 – FEB 1, PLACE RYE GRAIN 120lb/acre, & KOBE LESPEDEZA 50lb/acre
		AUG 20 – OCT 30	TALL FESCUE 200						

PER NCDEQ AND NPDES REQUIREMENTS, GROUND STABILIZATION MUST OCCUR WITHIN 7 DAYS ON PERIMETER AREAS AND SLOPES STEEPER THAN 3:1, AND GROUND STABILIZATION MUST OCCUR WITHIN 14 DAYS ON OTHER AREAS.

NPDES STORMWATER DISCHARGE PERMIT FOR CONSTRUCTION ACTIVITIES (NCG01)
NCDENR/DIVISION OF ENERGY, MINERAL AND LAND RESOURCES

STABILIZATION TIMEFRAMES
(EFFECTIVE AUG. 3, 2011)

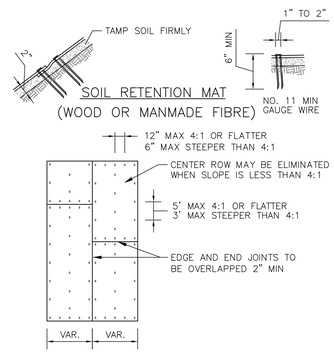
SITE AREA DESCRIPTION		STABILIZATION	TIMEFRAME EXCEPTIONS
	PERIMETER DIKES, SWALES, DITCHES, SLOPES	7 DAYS	NONE
	HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
	SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED
	SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH
	ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES

INSPECTION NOTES:

1. A RAIN GAUGE SHALL BE MAINTAINED IN GOOD WORKING ORDER ON THE SITE, UNLESS ANOTHER RAIN MONITORING DEVICE HAS BEEN APPROVED BY THE DIVISION OF WATER QUALITY.
2. A WRITTEN RECORD OF THE DAILY RAINFALL AMOUNTS SHALL BE RETAINED AND ALL RECORDS SHALL BE MADE AVAILABLE TO DWQ OR AUTHORIZED AGENT UPON REQUEST. (NOTE: IF NO RAINFALL OCCURRED, THE REPORT MUST RECORD "ZERO")
3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED TO ENSURE THAT THEY ARE OPERATING CORRECTLY. INSPECTION RECORDS MUST BE MAINTAINED FOR EACH MEASURE. AT A MINIMUM, INSPECTION OF MEASURES MUST OCCUR AT THE FREQUENCY INDICATED BELOW:
   (a) ALL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE INSPECTED AT LEAST ONCE EVERY SEVEN CALENDAR DAYS, AND
   (b) ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSPECTED WITHIN 24 HOURS AFTER ANY STORM EVENT OF GREATER THAN 0.50 INCHES OF RAIN PER 24 HOUR PERIOD.
4. ONCE LAND DISTURBANCE HAS BEGUN ON THE SITE, STORMWATER RUNOFF DISCHARGE OUTFALLS SHALL BE INSPECTED BY OBSERVATION FOR EROSION, SEDIMENTATION, AND OTHER STORMWATER DISCHARGE CHARACTERISTICS. INSPECTIONS OF THE OUTFALLS SHALL BE MADE AT LEAST ONCE EVERY SEVEN CALENDAR DAYS WITHIN 24 HOURS AFTER ANY STORM EVENT OF GREATER THAN 0.50 INCHES OF RAIN PER 24 HOUR PERIOD.
5. INSPECTIONS ARE ONLY REQUIRED TO BE MADE DURING NORMAL BUSINESS HOURS.
6. THE PERMITTEE SHALL REPORT TO THE DWQ CENTRAL OFFICE OR APPROPRIATE REGIONAL OFFICE ANY VISIBLE SEDIMENT BEING DEPOSITED IN ANY STREAM etc., ORALLY OR ELECTRONICALLY WITHIN 24 HOURS FROM THE TIME THE PERMITTEE BECAME AWARE OF THE CIRCUMSTANCES.
7. A WRITTEN SUBMISSION OF THE REPORT SHALL BE PROVIDED WITHIN 5 DAYS OF THE INCIDENT. WRITTEN REPORT SHALL CONTAIN DESCRIPTION OF THE SEDIMENT DEPOSITION, AND ACTIONS TAKEN TO ADDRESS THE CAUSE OF THE DEPOSITION.
8. RECORDS OF INSPECTIONS MADE DURING THE PREVIOUS 30 DAYS SHALL REMAIN ON THE SITE AND AVAILABLE DURING NORMAL WORKING HOURS. OLDER RECORDS MUST BE MAINTAINED FOR THREE YEARS AFTER THE PROJECT IS COMPLETED. ELECTRONIC RECORDS MAY BE USED, IF PROVIDING EQUAL ACCESS AND UTILITY AS THE HARD COPIES.
9. SEE NCG01 PERMIT FOR REQUIRED INFORMATION TO BE INCLUDED IN THE INSPECTION RECORDS.

SEQUENCE OF CONSTRUCTION ACTIVITIES:

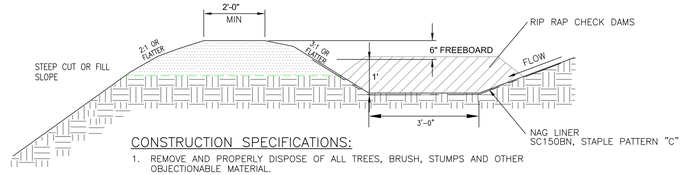
1. AFTER OBTAINING APPROVAL OF EROSION CONTROL PLANS, APPLY FOR NCG01 CERTIFICATE OF COVERAGE (COC) BEFORE ANY LAND DISTURBING ACTIVITIES CAN OCCUR. THE COC CAN BE OBTAINED BY FILLING OUT THE ELECTRONIC NOTICE OF INTENT (e–NOI) FORM AT deq.nc.gov/NCG01. PLEASE NOTE, THE e–NOI FORM MAY ONLY BE FILLED OUT ONCE THE SEDIMENT AND EROSION CONTROL PLAN HAS BEEN APPROVED.
2. ONCE COC HAS BEEN RECEIVED, PROVIDE A COPY TO THE LOCAL EROSION CONTROL OFFICE DEPARTMENT AND SCHEDULE AN ONSITE PRE–CONSTRUCTION CONFERENCE AT LEAST 48 HOURS PRIOR TO BEGINNING ANY LAND DISTURBING ACTIVITY.
3. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE, INSTALL PIPE INLET PROTECTION, PERIMETER SILT FENCE, AND SILT FENCE OUTLETS.
4. AFTER INITIAL EROSION CONTROL MEASURES ARE INSTALLED, CONTRACTOR TO CONTACT THE LOCAL EROSION CONTROL OFFICE FOR AN INITIAL INSPECTION. UPON APPROVAL OF THE INITIAL INSPECTION THE GRADING CERTIFICATE WILL BE ISSUED TO CLEAR THE REMAINDER OF THE SITE.
5. CONSTRUCT SKIMMER BASIN, GRADE TEMPORARY DIVERSION WITH RIP–RAP CHECK DAMS.
6. INSTALL SILT FENCE FOR THE STOCKPILE AREA, REMOVE TOPSOIL AND STOCKPILE FOR USE ON SLOPES. PLACE TEMPORARY SEEDING ON STOCKPILE AREA.
7. ROUGH GRADE SITE.
8. CONSTRUCT STORM DRAINAGE. INLET PROTECTION AND OUTLET PROTECTION TO BE CONSTRUCTED CONCURRENTLY WITH STORM DRAINS.
9. CONSTRUCT BUILDING. PLACE TEMPORARY SEEDING ON ALL DISTURBED AREAS.
10. COMPLETE FINAL GRADING, GRAVEL AND PAVE DRIVES AND PARKING AREA.
11. PLACE PERMANENT SEEDING AND DO FINAL LANDSCAPING.
12. AFTER SITE IS STABILIZED, AND BEFORE REMOVING ANY EROSION CONTROL MEASURES, CONTRACTOR TO CONTACT THE LOCAL EROSION CONTROL OFFICE FOR A FINAL INSPECTION OF THE PROJECT.
13. ONCE THE SITE IS COMPLETE AND STABILIZED WITH THE ESTABLISHMENT OF PERMANENT GROUND COVER, AND APPROVAL FROM THE LOCAL EROSION CONTROL OFFICE HAS BEEN GIVEN TO CLOSE OUT THE EROSION AND SEDIMENT CONTROL PLAN, THE PERMITTEES SHALL VISIT deq.nc.gov/NCG01 TO SUBMIT AN ELECTRONIC NOTICE OF TERMINATION (e–NOT). AN ANNUAL GENERAL PERMIT FEE WILL BE CHARGED UNTIL THE e–NOT HAS BEEN FILLED OUT.



NOTE:
SOIL STABILIZATION MATS SHALL BE INSTALLED PER MANUFACTURERS SPECIFICATIONS.

SOIL STABILIZATION MATS SHALL BE PLACED ON ANY DISTURBED SLOPES GREATER THAN 3:1.

SOIL STABILIZATION MAT–INSTALLATION
NO SCALE



CONSTRUCTION SPECIFICATIONS:

1. REMOVE AND PROPERLY DISPOSE OF ALL TREES, BRUSH, STUMPS AND OTHER OBJECTIONABLE MATERIAL.
2. ENSURE THAT THE MINIMUM CONSTRUCTED CROSS SECTION MEETS ALL DESIGN REQUIREMENTS.
3. ENSURE THAT THE TOP OF THE DIKE IS NOT LOWER AT ANY POINT THAN THE DESIGN ELEVATION PLUS SPECIFIED SETTLEMENT.
4. PROVIDE SUFFICIENT ROOM AROUND DIVERSIONS TO PERMIT MACHINE REGRADING AND CLEANOUT.
5. VEGETATE THE RIDGE IMMEDIATELY AFTER CONSTRUCTION, UNLESS IT WILL REMAIN IN PLACE LESS THAN 30 WORKING DAYS.

MAINTENANCE:

INSPECT TEMPORARY DIVERSIONS ONCE A WEEK AND AFTER EVERY RAINFALL. IMMEDIATELY REMOVE SEDIMENT FROM THE FLOW AREA AND REPAIR THE DIVERSION RIDGE. CAREFULLY CHECK OUTLETS AND MAKE TIMELY REPAIRS AS NEEDED. WHEN THE AREA PROTECTED IS PERMANENTLY STABILIZED, REMOVE THE RIDGE AND THE CHANNEL TO BLEND WITH THE NATURAL GROUND.

TEMPORARY DIVERSION DITCH
NOT TO SCALE

6
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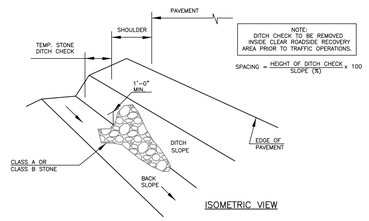
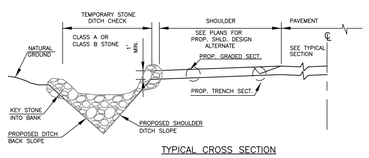
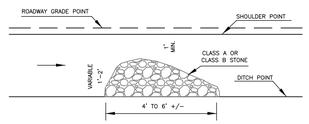


ISOMETRIC VIEW



TYPICAL CROSS SECTION



TYPICAL LONGITUDINAL SECTION

RIP–RAP CHECK DAM
NOT TO SCALE

FOR AGENCY REVIEW

CLAYTON ENGINEERING & DESIGN, PLLC.
NORTH CAROLINA
CERTIFICATE OF AUTHORIZATION
No. P–1463

SEAL 40758
PROFESSIONAL ENGINEER
WILLIAM S. CLAYTON
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CATAWBA COUNTY CATTLEMAN'S ASSOCIATION
OWNER
NEWTON, NORTH CAROLINA

EDUCATION CENTER
PROJECT TITLE

EROSION CONTROL DETAILS
DRAWING TITLE

JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: EMB
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE

CCN502
SHEET - OF -

NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING

EFFECTIVE: 04/01/19

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection Records Must Include:
(1) Rain Gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall rainfall information is available, record the cumulative rain measurement for those unattended days (and this will determine if a site visit is needed). Days on which no rainfall occurred shall be recorded as "zero". The permittee may use another rain-monitoring device approved by the division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event >/= 1.0" in 24 hours	1. Identification of the measures inspected, 2. Date & Time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of the maintenance needs for the measure, 6.Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDO's)	At least once per 7 calendar days and within 24 hours of a rain event >/= 1.0" in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date & Time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of stormwater pollution indicators such as oil sheen, floating or suspended solids or discoloration, 5. Visible indication of sediment leaving the site, 6.Description, evidence, and date of corrective actions taken.
(4) Perimeter of the site	At least once per 7 calendar days and within 24 hours of a rain event >/= 1.0" in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event >/= 1.0" in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate division regional office per Part III, section C item (2)(a) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an explanation that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be documented in the manner described:

Item to Document	Documentation Requirements
(a) Each E&SC Measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC Plan.	Initial and date each E&SC Measure on a copy of the approved E&SC Plan or complete, date and sign an inspection report that lists each E&SC Measure shown on the approved E&SC Plan. This documentation is required upon the initial installation of the E&SC Measures or if the E&SC Measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC Plan.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC Measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC Measures.	Initial and date a copy of the approved E&SC Plan or complete , date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation

In addition to the E&SC Plan documents above, the following items shall be kept on the site
and available for agency inspectors at all times during normal business hours, unless the
Division provides a site-specific exemption based on unique site conditions that make this
requirement not practical:

(a) This general permit as well as the certificate of coverage, after it is received.

(b) Records of inspections made during the previous 30 days. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

(c) All data used to complete the Notice of Intent and older inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

1. Occurrences that must be reported
Permittees shall report the following occurrences:
(a) Visible sediment deposition in a stream or wetland.

(b) Oil spills if:
- They are 25 gallons or more,
- They are less than 25 gallons but cannot be cleaned up within 24 hours,
- They cause sheen on surface waters (regardless of volume), or
- They are within 100 feet of surface waters (regardless of volume).

(a) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

(b) Anticipated bypasses and unanticipated bypasses.

(c) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Division's Emergency Response personnel at (800) 662-7956, (800) 858-0368 or (919) 733-3300.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	• Within 24 hours, an oral or electronic notification • Within 7 calendar days, a report that contains a description of the sediment and the actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and hazardous substances per item 1(b)-(c) above	• Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40CFR 122.41(m)(3)]	• A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	• Within 24 hours, an oral or electronic notification • Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment [40CFR 122.41(l)(7)]	• Within 24 hours, an oral or electronic notification • Within 7 calendar days, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40CFR 122.41(l)(6). • Division staff may waive the requirement for a written report on a case-by-case basis.

PART III, SECTION G, ITEM (4)
DRAW DOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSE OUT

Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is infeasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (for example, times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:

(a) The E&SC plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or conditions in which it will occur.
The non-surface withdrawals shall not commence until the E&SC plan authority has approved these items.

(b) The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, item (2)(c) and (d) of this permit.

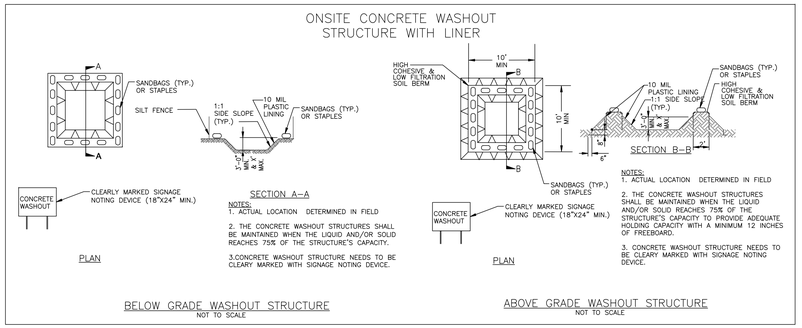
(c) Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin.
Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems.

(d) Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewatering treatment devices described in item (c) above.

(e) Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices, and

(f) Sediment removed from the dewatering treatment devices described in item (c) above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD
2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURE'S CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.
3. CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE
NOT TO SCALE

ABOVE GRADE WASHOUT STRUCTURE
NOT TO SCALE

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed.
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
• Temporary grass seed covered with straw or other mulches and tackifiers • Hydroseeding • Rolled erosion control products with or without grass seed • Appropriately applied straw or other mulch • Plastic sheeting	• Permanent grass seed covered with straw or other mulches or tackifiers • Geotextile fabrics such as permanent soil reinforcement matting • Hydroseeding • Shrubs or other permanent plantings covered with mulch • Uniform and evenly distributed ground cover sufficient to restrain erosion • Structural methods such as concrete, asphalt, or retaining walls • Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

1. Select flocculants that are appropriate for the soils being exposed during construction, selecting from the NC DWR List of Approved PAMS/Flocculants.
2. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
3. Apply flocculants at the concentrations specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions.
4. Provide ponding area for containment of treated Stormwater before discharging offsite.
5. Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

1. Maintain vehicles and equipment to prevent discharge of fluids.
2. Provide drip pans under any stored equipment.
3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
5. Remove leaking vehicles and construction equipment from service until the problem has been corrected.
6. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
8. Dispose waste off-site at an approved disposal facility.
9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

1. Do not dump paint and other liquid waste into storm drains, streams or wetlands.
2. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
3. Contain liquid wastes in a controlled area.
4. Containment must be labeled, sized and placed appropriately for the needs of site.
5. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

1. Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
2. Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
3. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

1. Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
2. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
3. Provide stable stone access point when feasible.
4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

CONCRETE WASHOUTS

1. Do not discharge concrete or cement slurry from the site.
2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
3. Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
4. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
5. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
7. Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
9. Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

1. Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
2. Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
3. Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
4. Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

1. Create designated hazardous waste collection areas on-site.
2. Place hazardous waste containers under cover or in secondary containment.
3. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING

EFFECTIVE: 04/01/19

FOR AGENCY REVIEW

NORTH CAROLINA CERTIFICATE OF AUTHORIZATION
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P-1463

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 40738 WILLIAM S. CLAYTON
06/22/26

CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

OWNER: CATAWBA COUNTY CATTLEMAN'S ASSOCIATION NEWTON, NORTH CAROLINA

PROJECT TITLE: EDUCATION CENTER

DRAWING TITLE: EROSION CONTROL NOTES

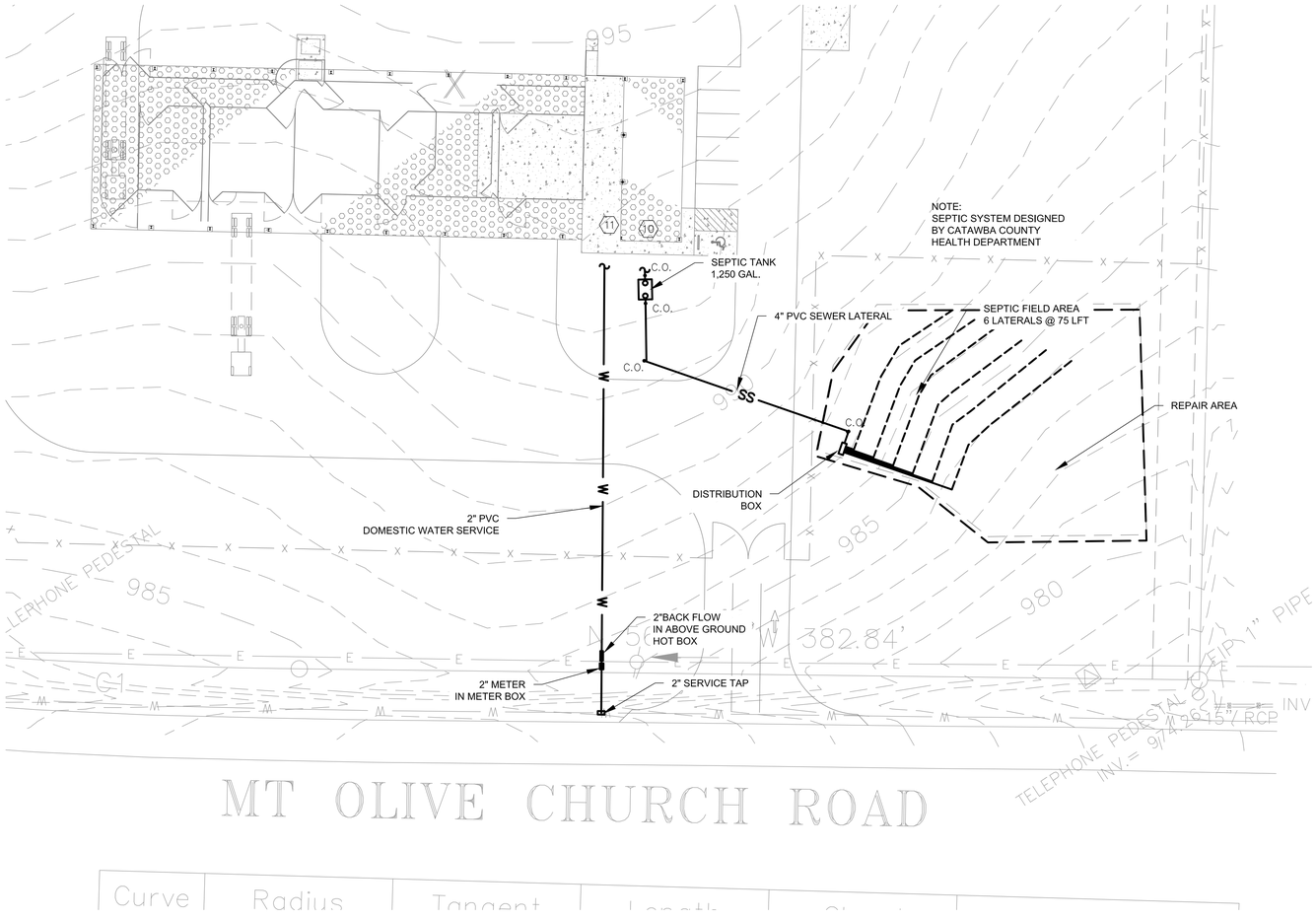
JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: EMB
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE

CCN503

SHEET - OF -



UTILITY NOTES

1. CONCRETE BLOCKING (3000 PSI) TO BE PLACED AT ALL BENDS OR AS REQUIRED UNLESS MEGA LUGS OR RESTRAINED JOINTS ARE USED.
2. STANDARD DEPTH OF COVER TO BE 3 FEET EXCEPT AT VALVE OR HYDRANT LOCATIONS OR OTHER SPECIAL SITUATIONS. COVER IS BASED ON ELEVATION BELOW EDGE OF PAVEMENT OR AS INDICATED ON THE PLANS.
3. PROVIDE POURED IN PLACE CONCRETE PADS (18"X18"X6")(OR CONCRETE DONUTS MAY BE USED AS AN ALTERNATIVE AT THE DISCRETION OF THE UTILITIES INSPECTOR) AT ALL VALVE BOXES.
4. EXTENSIONS FOR VALVE BOXES, WHEN REQUIRED, ARE TO BE VALVE BOXES OR DIP (NO PVC OR C-900).
5. ALL PAVEMENT CUTS, CONCRETE OR ASPHALT, ARE TO BE REPLACED ACCORDING TO THE STANDARD DETAILS OR AS REQUIRED BY THE NCDOT.
6. PAVEMENT CUTS ARE TO BE REPLACED IMMEDIATELY AFTER BACKFILLING OF INITIAL CUT EITHER WITH PERMANENT REPLACEMENT OR A TEMPORARY REPLACEMENT OF 10" OF BASE IF APPROVED BY THE CITY OR NCDOT.
7. REPAIRS TO MAIN BREAKS
   A. SOLID SLEEVES TO BE USED FOR CONNECTING SPIGOT ENDS SHALL BE OF THE LONG BODY TYPE
   B. ALL REPAIRS SHALL BE INSPECTED BY CITY BEFORE BACKFILLING
8. IN ANY INSTANCE WHERE IT WILL BE NECESSARY TO HAVE THE WATER SHUT OFF ON EXISTING MAINS IN ORDER TO MAKE A TIE-IN, THE WORK MUST BE DONE BY CITY FORCES OR A CONTRACTOR WORKING FOR THE CITY, SCHEDULED 48 HOURS TO 7 DAYS IN ADVANCE DEPENDING ON THE LOCATION AND TYPES OF BUSINESSES THAT WILL BE AFFECTED.
9. WHEN A WATER MAIN CROSSES AN EXISTING SEWER MAIN, THE CONTRACTOR IS TO REPLACE THE SEWER PIPE SPANNING THE DITCH WITH DUCTILE PIPE WHEN THE FOLLOWING CONDITIONS OCCUR:
   A. ANYTIME WATER MAIN IS INSTALLED UNDER A SEWER MAIN
   B. WHEN A WATER MAIN IS OVER A SEWER MAIN AND THE VERTICAL DISTANCE BETWEEN THE TWO MAINS IS 18-INCHES OR LESS (MINIMUM 12" CLEARANCE BETWEEN WATER AND SEWER MAINS).
10. WATER MAINS SHALL BE INSTALLED WITH A MINIMUM OF 10' HORIZONTAL SEPARATION FROM SEWER LINES. WHERE THIS IS NOT POSSIBLE, BOTH WATER LINE AND SEWER LINE SHALL BE DUCTILE IRON PIPE.
11. WATER LINES SHALL BE DISINFECTED AND HYDROSTATICALLY TESTED IN ACCORDANCE WITH ALL STATE AND LOCAL REQUIREMENTS.
12. ALL PLANS SHALL MEET ALL FEDERAL, STATE, AND LOCAL UTILITY PROVIDER REGULATIONS, DESIGN CRITERIA, AND CONSTRUCTION STANDARDS.

NOTES THIS SHEET:

1. BELOW GRADE WATERLINE PIPING SHALL BE AS NOTED ON PLANS. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH 15A NCAC CHAPTER 18C
2. THE CONTRACTOR SHALL GUARANTEE THE COMPLETE PLUMBING SYSTEM AGAINST DEFECTS DUE TO FAULTY MATERIALS, FAULTY WORKMANSHIP OR FAILURE DUE TO NEGLIGENCE OF THE CONTRACTOR. THE GUARANTEE PERIOD SHALL BEGIN ON THE DATE OF THE FINAL ACCEPTANCE AND SHALL CONTINUE FOR A PERIOD OF 12 MONTHS FROM ACCEPTANCE DURING WHICH TIME THE CONTRACTOR SHALL MAKE GOOD SUCH DEFECTIVE WORKMANSHIP AND MATERIALS AND ANY DAMAGE RESULTING THEREFROM, WITHIN A REASONABLE TIME OF NOTICE GIVEN BY THE OWNER.
3. BELOW GRADE SANITARY SEWER PIPING SHALL BE AS SHOWN ON PLANS. ALL PIPE JOINTS SHALL BE OF AN INTEGRAL BELL AND SPIGOT OF THE SAME MATERIAL AS THE PIPE WITH A SOLID CROSS-SECTION RUBBER "O" RING SECURELY LOCKED IN PLACE AT THE POINT OF MANUFACTURE. SERVICE SADDLES AND OTHER FITTINGS SHALL BE SUPPLIED BY THE PIPE MANUFACTURER AND SHALL BE OF THE SAME MATERIAL AND TYPE OF CONSTRUCTION AS THE PIPE MATERIAL.
4. AT COMPLETION OF WORK, CONTRACTOR SHALL PROVIDE A COMPLETE SET OF OPERATING AND MAINTENANCE MANUALS FOR ALL EQUIPMENT TO THE OWNER.
5. CONTRACTOR SHALL COORDINATE PROPOSED UNDERGROUND UTILITIES W/ THE UTILITIES AS SHOWN ON THE PLUMBING AND MECHANICAL SITE PLANS
6. CONTRACTOR SHALL INSTALL NEW SANITARY SEWER LINE IN ACCORDANCE WITH 15A NCAC 2T. 0305.
7. CONTRACTOR SHALL MAINTAIN 10 FT MINIMUM HORIZONTAL SEPARATION BETWEEN NEW WATERLINE AND EXISTING SEWER LINES, AND AT CROSSINGS, WATERLINE MUST CROSS ABOVE THE EXISTING SEWER LINE WITH A MINIMUM CLEARANCE OF 18 INCHES.
8. NEW WATERLINE TO HAVE A MINIMUM COVER OF 3 FT.
9. CONTRACTOR SHALL OBTAIN PERMITS REQUIRED FOR WATER MAIN EXTENSION AND FOR CONSTRUCTION OF SANITARY SEWER LINES.
10. SEE PLUMBING PLANS FOR SEWER CONTINUATION.
11. SEE PLUMBING PLANS FOR WATER CONTINUATION.

N
0 30' 60'

UTILITY PLAN
SCALE: 1" = 30'

FOR AGENCY REVIEW

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CLAYTON ENGINEERING & DESIGN, PLLC.
No. P-1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA PROFESSIONAL SEAL 40795 ENGINEER WILLIAM S. CLAYTON
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CATAWBA COUNTY CATTLEMANS ASSOCIATION
OWNER
NEWETON, NORTH CAROLINA

EDUCATION CENTER
PROJECT TITLE

CIVIL

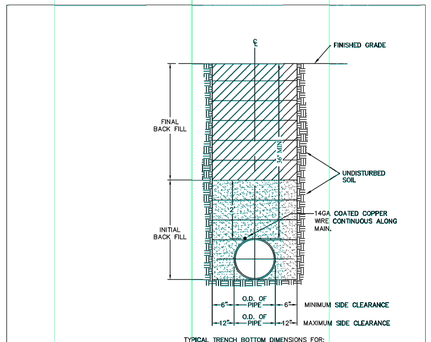
UTILITY PLAN
DRAWING TITLE

JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: EMB
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE
2	ADDENDUM	07/15/25
	ADJUST SITE	02/02/26

CUN101
SHEET - OF -



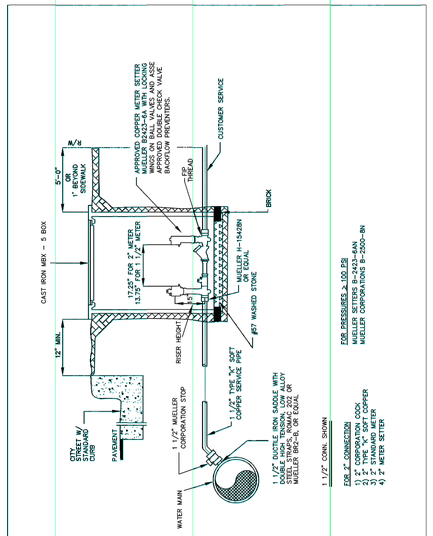
TRENCH DETAIL
CLASS D FLAT SUBGRADE

DEPTH OF BEDDING MATERIAL BELOW PIPE	
D	d (MIN.)
27" & SMALLER	6"
30" – 60"	12"
66" & LARGER	18"

NOTES:
1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 2" OR LARGER TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILLED MATERIAL SHALL BE SUITABLE MATERIAL.
4. BACK FILL SHALL BE COMPACTED IN 6" LAYERS IN TRAFFIC AREAS, 12" LAYERS IN NON-TRAFFIC AREAS USING VIBRATORY EQUIPMENT.

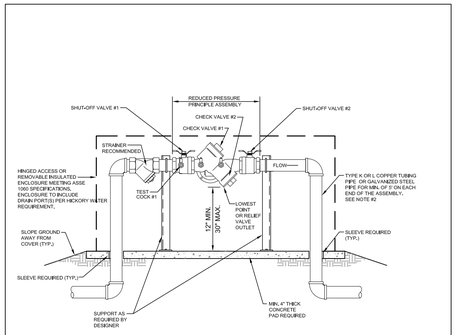
NOT TO SCALE

HICKORY	CITY OF HICKORY		
	WATER LINE TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS	DATE: 2-1-07	SHEET 1 OF 1 STD. NO. 508



NOT TO SCALE

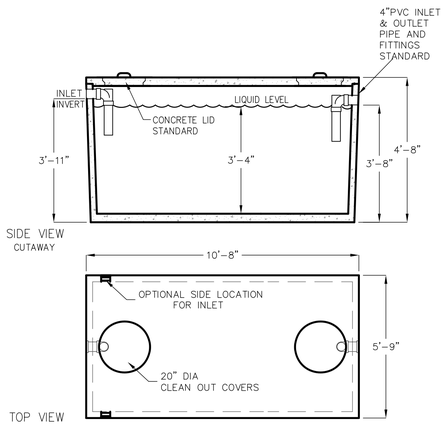
HICKORY	CITY OF HICKORY		
	TYPICAL WATER SERVICE CONNECTION (1 1/2" & 2")	DATE: 1)-16-18	SHEET 2 OF 2 STD. NO. 515



NOTES:
1. BACKFLOW PREVENTION ASSEMBLIES (BPA's) SHALL CONFORM TO HICKORY WATER SPECIFICATIONS. SHUT-OFF VALVES ARE SPECIFIC TO EACH APPROVED BPA AND NO SUBSTITUTIONS OF SHUT-OFF VALVES ARE PERMITTED. REFER TO HICKORY WATER APPROVED LIST OF BPA's.
2. PIPE MATERIAL AND FITTINGS SHALL BE AS SPECIFIED IN HICKORY WATER STANDARDS & SPECIFICATIONS.
3. INSULATED ENCLOSURE SHALL BE AS SPECIFIED IN HICKORY WATER ENCLOSURE INFORMATION - HEATED INSULATED ENCLOSURE IS RECOMMENDED, NO INSULATION SHALL BE WRAPPED AROUND BPA.
4. ALL LOCATIONS FOR BPA'S REQUIRE HICKORY WATER APPROVAL AND MUST BE OUTSIDE OF ZONING SET-BACK/ DIRECTLY BEHIND METER.
5. THERE SHALL BE NO TAPS, PIPING BRANCHES, UNAPPROVED BYPASS PIPING, HYDRANTS, FIRE DEPT. CONNECTION POINTS, OR OTHER WATER - USING APPURTENANCES CONNECTED TO THE SUPPLY LINE BETWEEN ANY WATER METER AND ITS HICKORY WATER - REQUIRED BACKFLOW PREVENTER.
6. EACH HICKORY WATER-REQUIRED BPA IS REQUIRED TO BE TESTED BY A HICKORY WATER - APPROVED CERTIFIED TESTER PRIOR TO PLACING THE WATER SYSTEM IN SERVICE. TEST RESULTS SHALL BE SUBMITTED TO HICKORY WATER WITHIN 30 DAYS AND TESTED ANNUALLY THEREAFTER SUBMITTING RESULTS TO HICKORY WATER.
7. ALL INSTALLATIONS INTENDED FOR ADDRESSING HICKORY WATER REQUIREMENTS, REQUIRE PRIOR APPROVAL FROM THE APPROPRIATE HICKORY WATER BACKFLOW INSPECTOR.

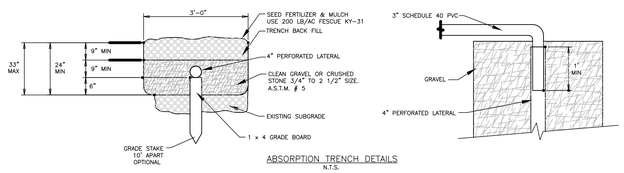
NO SCALE

STANDARD DETAILS BACKFLOW PREVENTION	REDUCED PRESSURE PRINCIPLE ASSEMBLY (RP) 1 1/2" & 2" ABOVE GROUND



- LIQUID CAPACITY: 1250 GALLONS TANK DESIGNED FOR NON-TRAFFIC USE WITH A MAXIMUM LOAD OF 500 PSF AND DRY SOIL CONDITIONS (WATER TABLE BELOW TANK). EARTH COVER OVER TANK NOT TO EXCEED 3'.
- THE PRECAST CONCRETE TANK SHALL BE PLACED ON LEVEL, UNDISTURBED SOIL OR APPROVED COMPACTED FILL.
- EFFLUENT FILTERS ARE AVAILABLE UPON REQUEST.
- CONCRETE: 4,000 PAI MIN AFTER 28 DAYS
- ALL REINFORCEMENT PER ASTM 1227
- ALL REINFORCEMENT PER ASTM 1227

1250 GALLON SEPTIC TANK



ABSORPTION TRENCH DETAILS
N.T.S.

FOR AGENCY REVIEW

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CATAWBA COUNTY CATTLEMANS ASSOCIATION
OWNER
NEWTON, NORTH CAROLINA

EDUCATION CENTER
PROJECT TITLE

CIVIL

UTILITY DETAILS
DRAWING TITLE

JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: EMB
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE
2	ADDENDUM	07/15/25
	SITE ADJUSTMENT	02/02/26

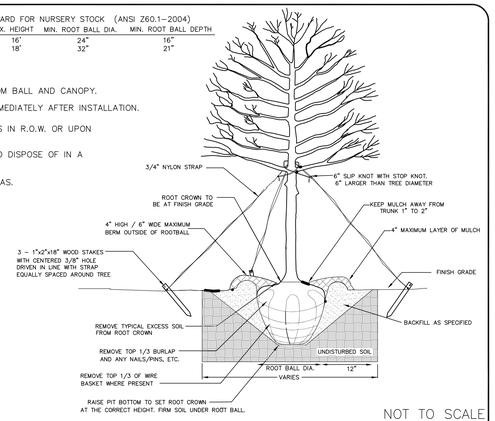
CUN501
SHEET - OF -

ALL TREES SHALL MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1–2004)

FOR EXAMPLE: CALIPER	HEIGHT (RANGE)	MAX. HEIGHT	MIN. ROOT BALL DIA.	MIN. ROOT BALL DEPTH
2.5"	12'-14'	16'	24"	16"
3"	14'-16'	18'	32"	21"

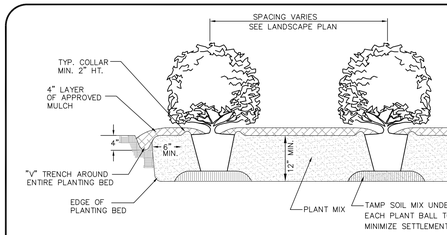
NOTES:

1. REMOVE WIRE AND NYLON TWINE FROM BALL AND CANOPY.
2. SOAK ROOT BALL AND PLANT PIT IMMEDIATELY AFTER INSTALLATION.
3. STAKING IS REQUIRED FOR ALL TREES IN R.O.W. OR UPON REQUEST OF ARBORIST.
4. REMOVE EXCESS SOIL FROM SITE AND DISPOSE OF IN A LEGAL MANNER.
5. RESEED UNMULCHED, DISTURBED AREAS.



NOT TO SCALE

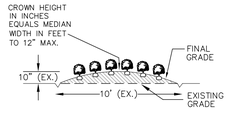
TREE PLANTING
(FOR SINGLE AND MULTI–STEM TREES)



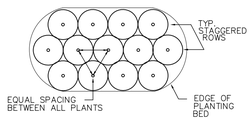
TYPICAL PLANTING BED DETAIL

NOTES:

1. SCARIFY ROOT MASS OF CONTAINERIZED PLANT MATERIAL.
2. INSTALL CONTAINERIZED PLANTS AT FINSHED GRADE
3. TAMP PLANTING MIX FIRMLY AS PIT IS FILLED AROUND EACH PLANT BALL.
4. OMIT COLLAR AROUND EACH SHRUB WHEN IRRIGATION SYSTEM IS PRESENT.
5. SOAK EACH PLANT BALL AND PIT IMMEDIATELY AFTER INSTALLATION.



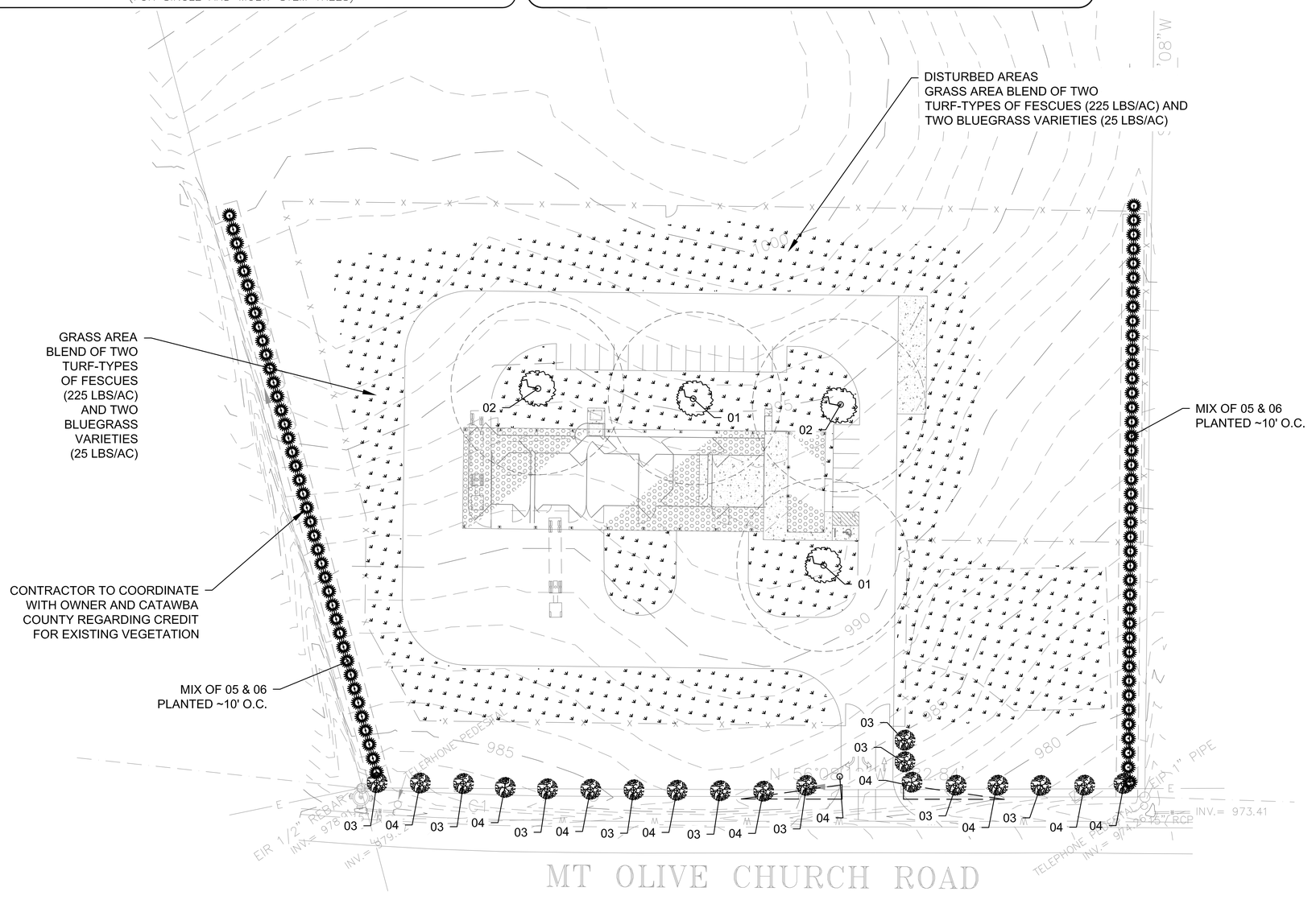
TYPICAL BED CROWNING



TYPICAL PLANTING BED PLAN

NOT TO SCALE

SHRUB PLANTING BED

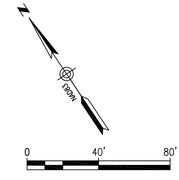


LANDSCAPE PLAN
SCALE: 1" = 40'

LANDSCAPE LEGEND		
KEY	QUANTITY	COMMON NAME (BOTANICAL NAME)
LARGE CANOPY TREES		
01	2	'PALISADE' AMERICAN HORNBEAM (CARPINUS CAROLINIANA – CCSQU)
02	2	'STEWART SELECT' LIVE OAK (QUERCUS VIRGINIANA)
UNDERSTORY TREES		
03	10	'BENI FUJI' KOUSA DOGWOOD (COMUS KOUSA)
04	10	'CHERRY RUFFLES' CAROLINA CHERRY LAUREL (PRUNUS CAROLINIANA)
SHRUBS		
05	40	'EMERALD GREEN' AMERICAN ARBORVITAE (THUJA OCCIDENTALIS)
06	40	'FOSTER' HOLLY (ILEX X ATTENUATE 'FOSTERI')

LANDSCAPE NOTES:

(1) NEW PLANTING STANDARDS
NEW PLANTINGS SHALL COMPLY WITH THE FOLLOWING STANDARDS:
(A) MINIMUM SIZE
(1) DECIDUOUS CANOPY OR SHADE TREES SHALL HAVE A MINIMUM HEIGHT OF 8' AND BE A MINIMUM OF 2.5" IN CALIPER AT THE TIME OF PLANTING, AS DETERMINED IN THE AMERICAN STANDARD FOR NURSERY STOCK, ANSI Z60.1–2004, AS AMENDED.
(2) UNDERSTORY, SMALL MATURING, OR ORNAMENTAL TREES SHALL HAVE A MINIMUM HEIGHT OF 6' AND BE A MINIMUM OF 1 1/4" IN CALIPER AT TIME OF PLANTING, AS DETERMINED IN THE AMERICAN STANDARD FOR NURSERY STOCK, ANSI Z60.1–2004, AS AMENDED.
(3) EVERGREEN TREES SHALL HAVE A MINIMUM HEIGHT OF 6' AND BE A MINIMUM OF 2" IN CALIPER AT THE TIME OF PLANTING.
(4) MULTI–STEM TREES, WHETHER CANOPY OR UNDERSTORY, SHALL HAVE AT LEAST THREE STALKS AND BE A MINIMUM OF EIGHT FEET IN HEIGHT ABOVE GROUND LEVEL AT THE TIME OF PLANTING.
(5) LARGE SHRUBS SHALL BE AT LEAST 3' IN HEIGHT AT THE TIME OF PLANTING, AND SHALL REACH THE REQUIRED MINIMUM PERFORMANCE HEIGHT WITHIN FOUR YEARS OF INSTALLATION.
(6) SMALL SHRUBS SHALL BE AT LEAST 24" IN HEIGHT, AND 3 GALLON CONTAINER AT THE TIME OF PLANTING, AND SHALL REACH THE REQUIRED MINIMUM PERFORMANCE HEIGHT WITHIN FIVE YEARS OF INSTALLATION.
(7) IN CASES WHERE AN AGGREGGATE CALIPER INCH (ACI) REQUIREMENT IS UTILIZED TO DERIVE A REQUIRED AMOUNT OF VEGETATION, AND THE ACI FIGURE INCLUDES A FRACTION, AND APPLICANT MAY:
(A) UTILIZE A TREE OR TREES WITH A CALIPER INCH MEASUREMENT EXCEEDING THE MINIMUM SIZE AT TIME OF PLANTING STANDARD OF THIS SUBSECTION IN ORDER TO MEET THE REQUIRED ACI; OR
(B) ROUND THE ACI FIGURE UPWARDS UNTIL THE FIGURE CORRESPONDS WITH A WHOLE NUMBER OF TREES MEETING THE MINIMUM SIZE AT TIME OF PLANTING STANDARD.
(8) IN CASES WHERE APPLICATION OF THE REQUIREMENTS IN THE SUBSECTION RESULT IN A FRACTION IN THE NUMBER OF SHRUBS TO BE PROVIDED, THE MINIMUM NUMBER OF SHRUBS TO BE PROVIDED SHALL BE ROUNDED UPWARDS TO THE NEXT HIGHEST WHOLE NUMBER.



FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P–1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL 40758
ENGINEER
WILLIAM S. CLAYTON
06/22/26

CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

CATAWBA COUNTY CATTLEMANS ASSOCIATION
OWNER
NEWTON, NORTH CAROLINA

EDUCATION CENTER
PROJECT TITLE

CIVIL

LANDSCAPE PLAN
DRAWING TITLE

JOB NUMBER:	24105
DATE:	06/22/26
DRAWN BY:	TLC
CHECKED BY:	WSC

REVISIONS

NO.	DESCRIPTION	DATE

LSN101
SHEET - OF -

SECTION 01568 SEDIMENT AND EROSION CONTROL
PART 1 GENERAL
1.1 SECTION INCLUDES
A. Erosion and sediment control shall be provided during the entire construction period as specified herein.
1.2 REFERENCED SECTIONS
A. Section 02820 – Grassing
1.3 REQUIREMENTS
A. Contractor shall comply with all local, state and federal laws, ordinances, rules and regulations pertaining to erosion and sediment control, including those promulgated by the State Administrative Code. Contractor shall indemnify and hold harmless the Owner and Engineer from and against all claims, damages, losses and expenses resulting from such work.
B. Obtain Land Disturbance Permit from governmental agency having jurisdiction over project site.
C. Contractor shall install and maintain a rain gauge, onsite, during construction.
PART 2 PRODUCTS
Not used
PART 3 EXECUTION
3.1 EROSION AND SEDIMENT CONTROL MEASURES
A. Contractor shall take all measures to control erosion and sedimentation along pipeline rights_of_way, at the construction site, including borrow and waste areas and temporary access roads, and at off_site areas especially vulnerable to damage from erosion and sedimentation. Work shall be scheduled so that areas subject to erosion are exposed for the shortest possible time. Temporary protection shall be required for exposed or disturbed areas until permanent vegetation is established, and shall consist of temporary grass cover (see Section 02820 – Grassing), mulch, netting or plastic sheets; except that temporary grass cover shall be provided where specifically noted on the plans. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization is achieved or after the temporary measures are no longer required, unless otherwise directed. Trapped sediment remaining in place after removal of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.
B. Temporary Silt Fences: Immediately after site clearing, temporary silt fences shall be placed in the locations as shown on the plans or as necessary to prevent erosion. Silt fences shall consist of a specially manufactured woven or nonwoven drainage and filtration fabric attached to a temporary support system of galvanized woven wire mesh and steel or wood posts. Height of fabric above grade shall be as shown. Fabric skirt shall be buried to anchor the bottom edge of the fabric. Posts shall be spaced not more than 10 feet apart.
1. As far as practicable, fences shall be located on uniform contours and arranged at right angles to the runoff direction. Fence ends shall be turned up the contour for a short distance to prevent bypass of silt.
2. Silt fences shall be inspected periodically and all necessary repairs promptly made. Sediment deposits shall be removed when deposits reach one_half the height Of the fence. Removed sediment shall be disposed of in a suitable area and stabilized to prevent erosion and sedimentation.
3. Silt fences shall be removed as soon as disturbed areas and slopes have been properly stabilized.
4. Filter fabric attached to existing chain link fence for erosion control purposes shall be installed as detailed for temporary silt fences, including height of fabric above grade and fabric skirt anchoring requirements. Fabric shall be the same material used for temporary silt fences. Fabric shall be removed as soon as disturbed areas and slopes have been stabilized.
C. Silt Fence Inlet Protection shall be provided for storm drain inlet protection as detailed on the plans.
1. Barriers shall be inspected after each rainfall and repairs made as required. Sediment deposits shall be removed when deposits reach one–half the height the barrier. Removed sediment shall be disposed of in a suitable area and stabilized to prevent erosion and sedimentation. Barriers shall be removed the area stabilized when the drainage area has been properly stabilized.
D. Stream Crossings:
1. Adequate sedimentation and erosion control measures must be implemented and maintained on the project site to avoid impacts to downstream aquatic resources. Temporary or permanent herbaceous vegetation should be planted on all bare soil within 15 days of ground disturbing activities to provide long–term erosion control.
2. Under no circumstances should rock, sand or other materials be dredged from the wetted stream channel or opposite banks under authorization of this permit, except in the immediate vicinity of the sewer line crossing. Instream dredging has catastrophic effects on aquatic life, and disturbance of the natural form of the stream channel will likely cause the downstream erosion problems, possible affecting other land owners.
3. All instream construction should be conducted in a dry work area. Sandbags, cofferdams, jersey barriers, flexible pipe, or other diversion structures should be used to minimize excavation into flowing water.
4. If utility lines are to be encased in concrete, adequate precautions should be taken to prevent direct contact between wet concrete and stream water. Uncured concrete affects water quality and is toxic to fish and other aquatic organisms.
5. Natural materials should be used as much as possible to restore stream banks at crossings. Riprap should be limited to the stream bank below the high water mark, and vegetation should be used for stabilization above high water mark.
6. All affected wetland areas must be restored to pre–construction contour and condition.
7. All mechanized equipment operated in or near surface waters should be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials.
3.2 EMERGENCY CONDITIONS
A. If unusually intense storms cause planned control measures to fail, prompt restoration and cleanup of sediment deposits shall be made, including damage to adjacent property. If construction is delayed or shut down, temporary cover of exposed and disturbed areas shall be provided.
END OF SECTION

SECTION 02050 DEMOLITION AND REMOVAL
PART 1 GENERAL
1.1. RELATED DOCUMENTS
A. GENERAL: Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, material, equipment, and services indicated on the Drawings or specified herein or reasonably necessary for and incidental to a complete job.
1.1. DESCRIPTION OF WORK
A. GENERAL: The demolition of existing vegetation in indicated areas, removal of striping and curb and gutter, removal/reworking/verification of stone base, as well as demolition of sections of the existing retaining wall and fence. Also includes the relocation of one metal storage building at the direction of the Owner.
1.1. SUBMITTALS
A. GENERAL: Submit proposed salvage, demolition and removal procedures to the Engineer for approval before work is started. Procedures shall provide for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a detailed description of methods and equipment to be used for each operation and of the sequence of operations.
1.1. REQUIREMENTS
A. GENERAL: The work includes demolition or removal of all construction indicated or specified. Do not begin demolition until authorization is received from the Engineer; refer to paragraph TITLE TO MATERIALS, hereinafter.
Remove rubbish and debris from the job site daily, unless otherwise directed; do not allow accumulations inside or outside the building(s). Store materials that cannot be removed daily in areas specified by the Engineer.
1.1. PROTECTION
A. EXISTING WORK: Protect existing work which is to remain in place, that is to be reused, or which is to remain the property of the Owner, by temporary covers, shoring, bracing, and supports. Items which are to remain and [which are to be salvaged and] which are damaged during performance of the work shall be repaired to their original condition or replaced with new. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal work.
B. TREES: Protect trees within the project site that might be damaged during demolition and that are indicated to be left in place, by a 6–foot high fence. Erect fence a minimum of 5 feet from the trunks of individual trees or follow the outer perimeter of branches of clumps of trees. Restore trees scarred or damaged by Contractor equipment or operations to a satisfactory condition or replace as determined by the Engineer. The Engineer shall approve restoration prior to its initiation.
C. FACILITIES: Protect all electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities.
1.1. EXPLOSIVES
A. GENERAL: Use of explosives will not be permitted.
1.1. BURNING
A. GENERAL: Burning will not be permitted.
PART 2 PRODUCTS
Not Applicable to this Section
PART 3 EXECUTION
3.1 INSPECTION
A. GENERAL: Examine the areas and conditions under which demolition and removal will be performed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.
3.2 EXISTING FACILITIES TO BE REMOVED
A. STRUCTURES: Remove indicated existing structures in their entirety and as indicated.
3.3 DISPOSITION OF MATERIAL
A. TITLE TO MATERIALS: Except where indicated otherwise or specifically specified otherwise in other sections, all materials and equipment removed, and not reused, shall become the property of the Contractor and shall be removed from the Owner's property. Title to all materials resulting from demolition, and all materials and equipment to be removed, is vested in the Contractor upon approval by the Engineer of the Contractor's demolition and removal procedures, and authorization by the Engineer to begin demolition. The Owner will not be responsible for the condition or loss of, or damage to, such property after notice to proceed. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.
B. REUSE OF MATERIALS AND EQUIPMENT: Carefully remove and store materials and equipment indicated to be reused or relocated to prevent damage, and reinstall as the work progresses.
3.4 CLEAN UP
A. DEBRIS AND RUBBISH: Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas. Clean up spillage from streets and adjacent areas.
B REGULATIONS: Comply with federal, state, and local hauling and disposal regulations.
(End of Section 02050)

SECTION 02220 EXCAVATION AND BACKFILL
1. GENERAL
1.1. RELATED DOCUMENTS
1.1.1. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.
1.2. DESCRIPTION OF WORK
1.2.1. The extent of excavation and backfill is limited to the areas of construction, and includes (but is not necessarily limited to) stockpiling of topsoil, site grading, excavation of footings and trenches, de–watering, filling, backfilling, compaction, finish grading, and spreading of topsoil.
1.2.2. Perform all excavation, de–watering, sheeting, bracing, and backfilling in such a manner as to eliminate all possibility of undermining or disturbing the foundations of existing structures.
1.3. QUALITY ASSURANCE
1.3.1. REFERENCED STANDARDS: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards. Comply with the provisions of the following codes and standards, except as otherwise shown or specified.

ASTM C33	Standard Specification for Concrete Aggregate
ASTM D698	Test Methods for Moisture_Density Relations of Soils and Soil–Aggregate Mixtures Using 5.5 lb. (2.49 kg) Rammer and 12 inch, (304.8 mm) Drop
ASTM D3282	Recommended Practice for Classification of Soils and Soil_Aggregate Mixtures for Highway Construction Purpose

1.3.2. SOIL TESTING AND INSPECTION SERVICE: At the option of the Owner, additional compaction tests of all fill areas will be made by an independent testing laboratory. Rework any fill areas which fail to meet the compaction requirements as herein specified and perform this work at no additional cost to the Owner. Testing of fill areas will be provided by the Owner and paid for by the Owner, except that tests which reveal non_conformance with the Specifications and all succeeding tests for the same area, until conformance with the Specifications is established, shall be at the expense of the Contractor.
1.4. JOB CONDITIONS
1.4.1. EXISTING UTILITIES
1.4.1.a. Prior to beginning any excavation, locate all existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
1.4.1.b. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Engineer immediately for directions as to procedure. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. The Contractor shall repair damaged utilities to the satisfaction of the Owner and utility companies at no additional cost to the Owner.
1.4.1.c. Do not interrupt existing utilities serving facilities occupied and used by others, except when permitted in writing by the Owner, and then only after acceptable temporary utility services have been provided.
1.4.1.d. Demolish, and completely remove from site, existing underground utilities that conflict with construction and are no longer active. Coordinate with utility companies for shut_off of services if lines are active.
1.4.2. ~~BLASTING: Perform all necessary blasting in complete accordance with Section 02211, BLASTING.~~
1.4.3. TEMPORARY PROTECTION: Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
1.4.4. SHEETING AND BRACING: Make all excavations in accordance with the rules and regulations promulgated by the Department of Labor, Occupational Safety and Health Administration, "Safety and Health Regulations for Construction." Furnish, put in place, and maintain such sheeting, bracing, etc., as may be necessary to support the sides of the excavation and to prevent any movement of earth which could in any way diminish the width of the excavation to less than that necessary for proper construction, or could otherwise injure or delay the work, or endanger adjacent structures, roads, utilities, or other improvements.
1.4.5. DE–WATERING:
1.4.5.a. Provide pumping and drainage facilities adequate to keep the excavated area sufficiently dry from ground water and surface runoff so as not to adversely affect construction procedures or cause excessive disturbance of underlying natural soils. The drainage of all water resulting from pumping shall be arranged so as not to cause damage to adjacent properties.
1.4.5.b. Control the grading on the site so that the surface of the ground will properly slope to prevent the accumulation of water on excavated or filled areas.
1.4.5.c. The lowering of the existing groundwater levels due to the construction activities, including de–watering, shall not cause settlement of adjacent structures which would result in damage. If required, provide cutoff walls and/or recharge system to maintain ground water levels at elevations which will not cause damage to adjacent structures or facilities.
1.4.6. SITE INFORMATION
1.4.6.a. ~~The soil data, included in Appendix "A", is furnished to the Contractor for information only. The data on indicated subsurface conditions are not intended as representations or warranties of the continuity of such conditions. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn therefrom by the Contractor.~~
1.4.6.b. ~~Additional test borings and other exploratory operations may be made by the Contractor at no additional cost to the Owner, provided such operations are acceptable to the Engineer.~~
1.4.6.c. ~~If the Contractor relies upon any non_factual element of the soils report, such as opinions, interpretations of the facts, extrapolations, comments on the facts, or inferences drawn from the facts, he does so at his own risk. The Owner shall not be liable for any costs incurred as a result of the Contractor's election to rely upon non_factual elements of the soils report.~~
2. PRODUCTS
2.1. DEFINITIONS
2.1.1. SATISFACTORY SUBGRADE SOIL MATERIALS: Soils complying with ASTM D 3282, soil classification Groups A_l, A_2_4, A_2_5, and A_3.
2.1.2. UNSATISFACTORY SUBGRADE SOIL MATERIALS: Soils described in ASTM D 3282, soil classification Groups A_2_6, A_2_7, A_4, A_5, A_6, and A_7; also peat and other highly organic soils, unless otherwise acceptable to the Engineer.
2.1.3. COHESIONLESS SOIL MATERIALS: Gravels, sand_gravel mixtures, sands, and gravelly_sands.
2.1.4. COHESIVE SOIL MATERIALS: Clayey and silty gravels, sand_clay mixtures, gravel_silt mixtures, clayey and silty sands, sand_silt mixtures, clays, silts, and very fine sands.
2.2. SOIL MATERIALS
2.2.1. BACKFILL AND FILL MATERIALS: Provide satisfactory soil materials for backfill and fill, free of masonry, rock, or gravel larger than (2) inches in any dimension, and free of metal, gypsum, lime, debris, waste, frozen materials, vegetable, and other deleterious matter. Use only excavated material that has been sampled, tested, and certified as satisfactory soil material.
2.2.2. CRUSHED STONE: Crushed stone or crushed gravel placed under structures as indicated on the Drawings or used for pipe bedding shall meet the requirement of ASTM C 33, Gradation 57.
2.2.3. BORROW MATERIALS
2.2.3.a. Provide from off site all materials needed in addition to site excavations. Include in the [Unit Price] Bid all costs for obtaining, hauling, and placing this material.
2.2.3.b. All borrow materials proposed for use must be approved by the Engineer before materials are hauled to the site. Notify the Engineer at least fourteen (14) days in advance of hauling any borrow material to the site so that borrow materials can be tested before being used.
3. EXECUTION
3.1. GENERAL
3.1.1. INSPECTION: Examine the areas and conditions under which excavating and backfilling is to be performed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.
3.1.2. DE–WATERING:
3.1.2.a. Prevent surface water and/or ground water from flowing into excavated areas. Use berms or drainage ditches to divert surface drainage away from the excavation. Use an approved subsurface de–watering system, such as bailing, pumping or a well point system as conditions warrant, to remove ground water from areas to be excavated. The costs of de–watering shall be included in the respective bid items as required of the completion of the work in accordance with the Contract Documents. There will be no individual pay item for de–watering.
3.1.2.b. The design of the subsurface de–watering system shall allow the contractor to develop a substantially dry and workable subgrade for the execution of subsequent operations. Ground water level shall be lowered at least three (3) feet below the final excavation elevation, prior to excavating within two feet of final subgrade elevation. Maintain pumps, sumps, suction and discharge lines, and other de–watering system components necessary to convey water away from the excavation.
3.1.2.c. Dispose of all water pumped or drained from the work in a suitable manner without undue interference with other work, damage to pavements, other surfaces or property. Provide suitable temporary pipes, flumes or channels for water which may flow along or across the site of the work.
3.1.3. MATERIAL STORAGE:
3.1.3.a. Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
3.1.3.b. Locate and retain soil materials away from edge of excavations.
3.1.4. DISPOSAL OF SURPLUS MATERIAL: Surplus excavated material not needed or acceptable for backfill shall, upon approval of the Engineer, be removed from the construction site and legally disposed of.
3.1.5. BRIDGING TRENCHES
3.1.5.a. Provide suitable and safe bridges and other crossings where required for the accommodation of travel; provide access to the property during construction, and remove said structures thereafter.
3.1.5.b. Bridge or backfill trenches in any portion of the travel lanes of roads at the end of each day's operation to provide for safe travel. No additional compensation will be made for this work.
3.1.6. PROTECTION OF STREAMS: Exercise reasonable precaution to prevent the silting of streams. Provide, at Contractor's expense, temporary erosion and sediment control measures to prevent the silting of streams and existing drainage facilities as directed by the Engineer or as indicated on the Drawings.
3.1.7. AIR POLLUTION:
3.1.7.a. Comply with all pollution control rules, regulations, ordinances, and statutes which apply to any work performed under the Contract, including any air pollution control rules, regulations, ordinances and statutes, or any municipal regulations pertaining to air pollution.
3.1.7.b. During the progress of the work, maintain the area of activity, including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. If the Engineer decides that it is necessary to use calcium chloride or more effective dust control, furnish and spread the material, as directed, and without additional compensation.
3.2. EXCAVATION
3.2.1. GENERAL: Excavation consists of the removal and disposal of all materials encountered for footings, foundations, pipe work, and other construction as shown on the Drawings. Perform all excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
3.2.2. STRIPPING: Remove all topsoil, vegetable matter, and organic materials over proposed excavations. Stockpile the stripped materials which are suitable for reuse and preserve for respreading on completed surfaces. Protect and maintain topsoil stockpile until needed.
3.2.3. EXCAVATION CLASSIFICATION: All excavation will be performed as unclassified excavation.
3.2.4. UNAUTHORIZED EXCAVATION:
3.2.4.a. Unauthorized excavation consists of the removal of materials beyond indicated elevations without specific direction of the Engineer. Under footings, foundations, bases, etc., fill unauthorized excavation by extending the indicated bottom elevation of the concrete to the bottom of the excavation, without altering the required top elevation. Lean concrete fill may be used to bring elevations to proper position only when acceptable to the Engineer.
3.2.4.b. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.
3.2.5. EXCAVATION FOR STRUCTURES
3.2.5.a. Conform to elevations and dimensions shown within a tolerance of plus or minus one inch, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction required, and for inspection.
3.2.5.b. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete is placed. Trim bottoms to required lines and grades to leave solid base to receive concrete. Final footing excavations should not be allowed to remain open overnight without covering unless permitted by Engineer.
3.2.6. TRENCH EXCAVATION
3.2.6.a. GENERAL:
(1) Perform all excavation of every description and of whatever substance encountered so that pipe or conduit can be laid to the alignment and depth shown on the Drawings.
(2) Brace and shore all trenches, where required, in accordance with the rules and regulations, promulgated by the Department of Labor, Occupational Safety and Health Administration, "Safety and Health Regulations for Construction".
(3) Make all excavations by open cut unless otherwise specified or indicated on the Drawings.
3.2.0.a. WIDTH OF TRENCHES: Excavate trenches sufficiently wide to allow proper installation of pipe, fittings and other materials and not more than 12 inches clear of pipe on either side at any point. Do not widen trenches by scraping or loosening materials from the sides. Where supports, and sheeting and bracing are required, trench may be of extra width so as to permit the placing of the trench supporting material.
3.2.0.b. TRENCH EXCAVATION IN EARTH: Earth excavation includes all excavation of whatever substance encountered. In locations where pipe is to be bedded in earth excavated trenches, fine grade the bottoms of such trenches to allow firm bearing for the bottom of the pipe on undisturbed earth. Where any part of the trench has been excavated below the grade of the pipe, fill the part excavated below such grade with pipe bedding material and compact at the Contractor's expense.
3.2.0.c. TRENCH EXCAVATION IN FILL: If pipe is to be laid in embankments or other recently filled material, first place the fill material to the finish grade or to a height of at least one foot above the top of the pipe, whichever is the lesser. Take particular care to ensure maximum consolidation of material under the pipe location. Excavate the pipe trench as though in undisturbed material.
3.2.0.d. TRENCH EXCAVATION IN ROCK: Excavate rock, when encountered, to provide a clearance of at least 12 inches on each side of pipe, valves and fittings. Excavate trench below the bottom of the pipe barrel to a depth of 6 inches, unless shown otherwise on the Drawings, and refill with a compacted gravel bedding as herein specified or indicated on the Drawings.
3.2.0.e. TRENCH BOTTOM IN POOR SOIL: Excavate and remove unstable or unsatisfactory soils to a width and depth, as directed by the Engineer, and refill with a thoroughly compacted gravel bedding. The undercutting and filling with gravel bedding of unstable soils caused by flooding or insufficient dewatering shall be at the expense of the Contractor.
3.2.0.f. BELL HOLES: Provide bell holes at each joint to permit the joint to be made properly and to provide a continuous bearing and support for the pipe.
3.2.1. EXCAVATION NEAR EXISTING UTILITIES AND STRUCTURES
3.2.1.a. EXISTING UTILITIES
(1) Attention is directed to the fact that there are pipes, drains, and other utilities in locations [adjacent to] the proposed work. Where information is available as to the location of existing pipes, drains, and other utilities, the approximate locations have been indicated on the Drawings; however, the completeness or accuracy of the information given is not guaranteed.
(2) As the excavation approaches pipes, conduits, or other underground structures, discontinue digging by machinery and excavate by means of hand tools, as directed. Such manual excavation, when incidental to normal excavation, is included in the work to be done under items involving normal excavation.
(3) Where determination of the exact location of a pipe or other underground structure is necessary for doing the work properly, the Contractor may be required to excavate test pits to determine such locations. When such test pits may be properly considered as incidental to other excavation, the work is understood to be included as a part of the excavation.
3.2.0.a. EXISTING STRUCTURES
(1) Support and protect from damage all existing pipes, poles, wires, fences, guard rails, curbing, catch basins, manholes, property line markers, and other structures which do not require temporary or permanent relocation.
(2) Restore or replace damaged items, without compensation, to the condition in which they were found immediately before the work under this project was begun.
3.2.1. ROCK EXCAVATION
3.2.1.a. GENERAL:
(1) Rock consists of such materials in the original bed or well defined ledges which, in the opinion of the Engineer, cannot be removed with pick and shovel, ditching machine, backhoe, or other similar devices, and which requires drilling and blasting, or the use of jack hammers or bullpoints. Concrete and masonry structures that require drilling and blasting for removal will be considered as rock unless otherwise provided for herein. Boulders or detached pieces of rock having volumes of more than 8 cubic feet are considered as rock.
(2) Excavate rock, if encountered, to the lines and grades indicated on the Drawings or as directed; dispose of the excavated materials, and furnish acceptable material for backfill in place of the excavated rock.
(3) In general, excavate rock in pipe trenches so as to be no less that 12 inches from the pipe after it has been laid. Before the pipe is laid, backfill the trench to the correct subgrade with thoroughly compacted, suitable material or, when so specified or indicated on the Drawings, with the same material as that required for bedding the pipe, furnished and placed at the expense of the Contractor.
3.2.0.a. EXCESS ROCK EXCAVATION:
(1) If rock is excavated beyond the limits indicated on the Drawings, specified, or authorized in writing by the Engineer, the excess excavation, whether resulting from overbreakage or other causes, shall be backfilled, by and at the expense of the Contractor, as specified below:
(2) In pipe trenches, fill excess excavation below the elevation of the top of the bedding, cradle, or envelope with material of the same type, placed and compacted in the same manner, as specified for the bedding, cradle, or envelope. Fill excess excavation above said elevation with earth as specified in the paragrah 3.3.2., TRENCH BACKFILL.
(3) In excavations for structures, fill excess excavation in the rock beneath foundations with concrete. Fill other excess excavation with earth as specified in the paragraph 3.3.1., BACKFILL AROUND STRUCTURES.
3.2.0.a. SHATTERED ROCK: If the rock below normal depth is shattered due to drilling or blasting operations of the Contractor, and the Engineer considers such shattered rock to be unfit for foundations, remove the shattered rock and backfill the excavation with concrete as required, except that in pipe trenches, screened gravel may be used for backfill, if approved. All such removal and backfilling shall be done by and at the expense of the Contractor.
3.2.0.b. PREPARATION OF ROCK SURFACES
(1) Whenever so directed during the progress of the work, remove all dirt and loose rock from designated areas and clean the surface of the rock thoroughly, using steam to melt snow and ice, if necessary. Remove water in depressions as required so that the whole surface of the designated area can be inspected to determine whether seams or other defects exist.
(2) Leave the surfaces of rock foundations sufficiently rough to bond well with the structures and embankments to be built thereon, and if required, cut to rough benches or steps.

3.2.0.b (CONTINUED)
(1) Before any structure or embankment is built on or against the rock, clean from the rock all vegetation, dirt, sand, clay, boulders, scale, excessively cracked rock, loose fragments, ice, snow, and other objectionable substances. Use picking, barring, wedging, streams of water under sufficient pressure, stiff brushes, hammers, steam jets, and other effective means to accomplish this cleaning. Remove all free water left on the surface of the rock.
3.2.0.c REMOVAL OF BOULDERS: Remove piles of boulders or loose rock encountered within the limits of earth embankments to a suitable place of disposal.
3.2.0.d DISPOSAL OF EXCAVATED ROCK: Excavated rock may be used in backfilling trenches subject to the following limitations:
(1) Do not use pieces of rock larger than permitted under the paragraph 3.3.2., TRENCH BACKFILL.
(2) The quantity of rock used as backfill in any location must not be so great as to result in the formation of voids.
(3) Do not place rock backfill within 16 inches of the surface of the finish grade, or in embankments for aeration basins.
(4) Dispose of surplus excavated rock as specified in the subsection entitled DISPOSAL OF SURPLUS MATERIAL.
3.3 BACKFILL
3.3.1 BACKFILL AROUND STRUCTURES
3.3.1.a GENERAL: Unless otherwise specified or indicated on the Drawings, use suitable material for backfill which was removed in the course of making the construction excavations. Do not use frozen material for the backfill and do not place backfill upon frozen material. Remove previously frozen material before new backfill is placed.
3.3.1.b MATERIAL: Approved selected materials available from the excavations may be used for backfilling around structures. Obtain material needed in addition to that of construction excavations from approved banks or other approved deposits. Furnish all borrow material needed on the work. Place and compact all material, whether from the excavation or borrow, to make dense, stable fill. Use fill material which contains no vegetation, masses or roots, individual roots over 18 inches long or more than 1/2–inch in diameter, stones over 4 inches in diameter, or porous matter. Organic matter must not exceed minor quantities.
3.3.1.c PLACING BACKFILL: Do not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected, without distortion, cracking, or other damage. Make special leakage tests, if required, as soon as practicable after the structures are structurally adequate and other necessary work has been done. Use the best of the excavated materials in backfilling within 2 feet of the structure. Avoid unequal soil pressures by depositing the material evenly around the structure. Place fill and backfill in layers not more than 6 inches thick, except as specified otherwise herein, and compact each layer evenly to the specified density. Do not backfill against concrete without Engineer's approval.
3.3.2 TRENCH BACKFILL
3.3.2.a GENERAL:
(1) Unless otherwise specified or indicated on the Drawings, use suitable material for backfill which was removed in the course of making the construction excavations. Do not use frozen material for the backfill and do not place backfill on frozen material. Remove previously frozen material before new backfill is placed. Start backfilling as soon as practicable after the pipes have been laid, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, and proceed until its completion.
(2) With the exception mentioned below in this paragraph, do not backfill trenches at pipe joints until after that section of the pipeline has successfully passed any specified tests required. Should the Contractor wish to minimize the maintenance of lights, and barricades, and the obstruction of traffic, he may, at his own risk, backfill the entire trench as soon as practicable after installation of pipe and the related structures have acquired a suitable degree of strength. He shall, however, be responsible for removing and later replacing such backfill, at his own expense, should he be ordered to do so in order to locate and repair or replace leaking or defective joints or pipe.
3.3.0.a MATERIALS: The nature of the materials will govern both their acceptability for backfill and the methods best suited for their placement and compaction in the backfill. Both are subject to the approval of the Engineer. Do not place stone or rock fragments larger than (2) inches in greatest dimension in the backfill. Do not drop large masses of backfill material into the trench in such a manner as to endanger the pipe line. Use a timber grillage to break the fall of material dropped from a height of more than 5 feet. Exclude pieces of bituminous pavement from the backfill unless their use is expressly permitted.
3.3.0.b ZONE AROUND PIPE: Place bedding material to the level shown on the Drawings and work material carefully around the pipe to insure that all voids are filled, particularly in bell holes. For backfill up to a level of 2 feet over the top of the pipe, use only selected materials containing no rock, clods or organic materials. Place the backfill and compact thoroughly under the pipe haunches and up to the mid–line of the pipe in layers not exceeding 6 inches in depth. Place each layer and tamp carefully and uniformly so as to eliminate the possibility of lateral displacement. Place and compact the remainder of the zone around the pipe and to a height of one foot above the pipe in layers not exceeding 6 inches and compact to a maximum density of at least 100 percent as determined by ASTM D698.
3.3.0c TAMPING
(1) Deposit and spread backfill materials in uniform, parallel layers not exceeding 12 inches thick before compaction. Tamp each layer before the next layer is placed to obtain a thoroughly compacted mass. Furnish and use, if necessary, an adequate number of power driven tampers, each weighing at least 20 pounds for this purpose. Take care that the material close to the bank, as well as in all other portions of the trench, is thoroughly compacted. When the trench width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done effectively and without damage to the pipe, backfill may, on approval, be compacted by the use of suitable rollers, tractors, or similar powered equipment instead of by tamping. For compaction by tamping (or rolling), the rate at which backfilling material is deposited in the trench shall not exceed that permitted by the facilities for its spreading, leveling and compacting as furnished by the Contractor.
(2) Wet the material by sprinkling, if necessary, to insure proper compaction by tamping (or rolling). Perform no compaction by tamping (or rolling) when the material is too wet either from rain or applied water to be compacted properly.
3.3.0.a TRENCH COMPACTION: Compact backfill in pipe trenches to the maximum density as shown on the Drawings, or as listed in the subsection entitled COMPACTION, with a moisture content within the range of values of maximum density as indicated by the moisture–density relationship curve.
3.4 SITE GRADING
3.4.1 GENERAL: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finish the surface within specified tolerances; compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
3.4.2 GROUND SURFACE PREPARATION: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface. Shape the subgrade as indicated on the Drawings by forking, furrowing, or plowing so that the first layer of new material placed thereon will be well bonded to it.
3.4.3 PLACEMENT AND COMPACTION
3.4.3.a Place backfill and fill materials in layers not more than 6 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to the required percentage of maximum density for each area classification. Do not place backfill or material on surfaces that are muddy, frozen or contain frost or ice.
3.4.3.b In areas not accessible to rollers or compactors, compact the fill with mechanical hand tampers. If the mixture is excessively moistened by rain, aerate the material by means of blade graders, harrows, or other approved equipment, until the moisture content of the mixture is satisfactory. Finish the surface of the layer by blading or rolling with a smooth roller, or a combination thereof, and leave the surface smooth and free from waves and inequalities.
3.4.3.c Place backfill and fill materials evenly adjacent to structures, to the required elevations. Take care to prevent wedging action of backfill against structures. Carry the material uniformly around all parts of the structure to approximately the same elevation in each lift.
3.4.3.d When existing ground surface has a density less than that specified under the subsection entitled COMPACTION for the particular area classification, break up the ground surface, pulverize, moisture–condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
3.4.4 GRADING OUTSIDE BUILDING LINES: Grade to drain away from structures to prevent ponding of water. Finish surfaces free from irregular surface changes.
3.4.5 PLANTING AREAS: Finish areas to receive topsoil to within not more than one inch above or below the required subgrade elevations, compacted as specified, and free from irregular surface changes.
3.4.6 WALKS: Shape the surface of areas under walks to line, grade, and cross–section, with the finish surface not more than zero inches above or one inch below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains.
3.4.7 PAVEMENTS
3.4.7.a Shape the surface of the areas under pavement to line, grade and cross section, with finish surface not more than 1/2–inch above or below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains. Include such operations as plowing, discing, and any moisture or aerating required to provide the optimum moisture content for compaction.
3.4.7.b Fill low areas resulting from removal of unsatisfactory soil materials, obstructions, and other deleterious materials, using satisfactory soil material. Shape to line, grade, and cross section as shown on the Drawings.
3.4.8 GRADING SURFACE OR FILL UNDER BUILDING SLABS: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/4–inch when tested with a 10–foot straightedge.
3.4.9 PROTECTION OF GRADED AREAS: Protect newly graded areas from traffic and erosion, and keep free of trash and debris. Repair and re–establish grades in settled, eroded, and rutted areas to specified tolerances.
3.4.10 RECONDITIONING COMPACTED AREAS: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather prior to acceptance of work, scarify surface, reshape, and compact to required density prior to further construction.
3.5 RESPREADING TOPSOIL
3.5.1 GENERAL
3.5.1.a This work consists of preparing the ground surface for topsoil application and removing topsoil from stockpile and placing and spreading the topsoil on smooth, graded areas in accordance with these Specifications.
3.5.1.b Supply topsoil reasonably free from subsoil, clay lumps, stones, or other similar objects larger than 2 inches in greatest diameter, brush, stumps, roots, objectionable weeds or litter, excess acid or alkali, or any other material or substance which may be harmful to plant growth or a hindrance to subsequent smooth grading, planting, and maintenance operations.
3.5.1.c Respread topsoil on all excavated areas and areas damaged by the work.
3.5.1.d Clear the surface of the areas to be topsoiled of all stones larger than (2) inches in greatest dimension and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, and the proper growth of the desired planting. Maintain the grades on the areas to be topsoiled in a true and even condition. Where grades have not been established, smooth grade the area and leave the surface at the prescribed grades in an even and properly compacted condition, which insofar as practical will prevent the formation of low places or pockets where water will stand.
3.5.1.e Dump the topsoil in separate piles uniformly distributed on the designated areas so that when spread it will give a 4–inch depth of compacted topsoil over the graded area. Leave in place the piles of topsoil on any given area until it has been determined that the requirements of the Specifications have been met and spreading has been authorized by the Engineer. Evenly spread the topsoil over the areas by a blade grader or other equipment. Spread in such a manner that grassing operations can proceed with a minimum of soil preparation or tilling. Correct any irregularities in the surface, resulting from topsoiling or other operations, insofar as practical to prevent the formation of low places and pockets where water will stand. Do not place topsoil when it or the ground surface is frozen, excessively wet, or in a condition otherwise unsatisfactory for preparation of planting surfaces or smooth grading operations.
3.5.1.f After the topsoil has been spread and the area smoothed to the specified grades, clear the surface of all stones, roots, other objects larger than 2 inches in greatest diameter, and of all wire, brush or other objects that may interfere with subsequent planting or maintenance operations. Remove promptly any topsoil or other dirt which may be brought upon concrete as a result of hauling of topsoil.
3.6 COMPACTION
3.6.1 GENERAL: Control soil compaction during construction providing at least the minimum percentage of density specified for each area classification.
3.6.2 PERCENTAGE OF MAXIMUM DENSITY REQUIREMENTS: After compaction, all fill will be tested in accordance with Method "C" of ASTM D698, unless specified otherwise. Except as noted otherwise for the zone around pipe, provide not less than the following percentages of maximum density of soil material compacted at optimum moisture content, for the actual density of each layer of soil material–in–place.
STRUCTURE FOUNDATIONS:Top 12" – 100%; Remainder – 95%UNDER BUILDING SLABS:Top 12" – 100%; Remainder – 95%UNPAVED AREAS:Compact full depth to – 92%WALKWAYS:Top 18" – 100%; Remainder – 95%DRIVES AND PARKING:Top 24" – 100%; Remainder – 98%TRENCH BACKFILL (PAVED AREAS):Top 18" – 100%; Remainder – 95%TRENCH BACKFILL (UNPAVED AREAS):Compact full depth to – 92%ALL OTHER BACKFILL: Top 24" – 100%; Remainder – 95%.
3.6.3 MOISTURE CONTROL: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until moisture content is reduced to a satisfactory value, as determined by moisture–density relation tests.
3.7 CARE AND RESTORATION OF PROPERTY
3.7.1 GENERAL
3.7.1.a Enclose the trunks of trees which are to remain adjacent to the work with substantial wooden boxes of such height as may be necessary to protect them from piled material, equipment or equipment operation. Use excavating machinery and cranes of suitable type and operate the equipment with care to prevent injury to remaining tree trunks, roots, branches and limbs.
3.7.1.b Do not cut branches, limbs, and roots except by permission of the Engineer. Cut smoothly and neatly without splitting or crushing. In case of cutting or unavoidable injury to branches, limbs, and trunks of trees, neatly trim the cut or injured portions and cover with an application of grafting wax or tree healing paint as directed.
3.7.1.c Protect by suitable means all cultivated hedges, shrubs and plants which might be injured by the Contractor's operations. Promptly heel in any such trees or shrubbery necessary to be removed and replanted. Perform heeling in and replanting under the direction of a licensed and experienced nurseryman. Replant in their original position all removed shrubbery and trees after construction operations have been substantially completed and care for until growth is re–established.
3.7.1.d Replace cultivated hedges, shrubs, and plants injured to such a degree as to affect their growth or diminish their beauty or usefulness, by items of kind and quality at least equal to the kind and quality existing at the start of the work.
3.7.1.e Do not operate tractors, bulldozers or other power–operated equipment on paved surfaces if the treads or wheels of the equipment are so shaped as to cut or otherwise injure the surfaces.
3.7.1.f Restore all surfaces, including lawns, grassed, and planted areas which have been injured by the Contractor's operations, to a condition at least equal to that in which they were found immediately before the work was begun. Use suitable materials and methods for such restoration. Maintain all restored plantings by cutting, trimming, fertilizing, etc., until acceptance. Restore existing property or structures as promptly as practicable and do not leave until the end of construction period.
3.7.2 FENCES: Remove fences which interfere with the Contractor's operation and (unless otherwise specified) later restore them to a condition at least as good as that in which they were found immediately before the work was begun, all without additional compensation. Restore fences as promptly as possible and do not leave until the end of the construction period.
3.7.3 PROPERTY MARKERS: Replace property line markers which are disturbed or removed. Have this work performed by a Registered Land Surveyor.
(End of Section 02220)

FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P–1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL
40758
ENGINEER
WILLIAM S. CLAYTON
06/22/26

CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

CATAWBA COUNTY
CATTLEMAN'S ASSOCIATION
NEWTON, NORTH CAROLINA
OWNER

EDUCATION CENTER
PROJECT TITLE

CIVIL

PROJECT SPECIFICATIONS
DRAWING TITLE

JOB NUMBER:	24105
DATE:	06/22/26
DRAWN BY:	WSC
CHECKED BY:	WSC

REVISIONS

NO.	DESCRIPTION	DATE

SPC101
SHEET - OF -

SECTION 02222 – EXCAVATION, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 – GENERAL

1.01 SUMMARY
This section includes the excavation, bedding and backfilling of utilities necessary to perform work indicated on drawings and contract documents.

1.02 RELATED REQUIREMENTS
Construction drawings
Specs. Section 02110 SITE PREPARATION
Specs. Section 02200 EARTHWORK

1.03 SUBMITTALS
A. Shop drawings or details pertaining to site utilities are not required unless use of materials, methods, equipment or procedures contrary to drawings or these specifications are proposed. Do not perform work until required shop drawings have been accepted by Owner.
B. The Contractor shall contact all utility companies and determine if additional easements will be required to complete the project. Contractor shall provide written confirmation of the status of all easements to the owner's Construction Manager at the time of the preconstruction conference or no later than 90 days prior to the project possession date.

PART 2 – PRODUCTS
A. Bedding Material: Processed sand and gravel free from clay lumps, organic or other deleterious material and complying with following gradation requirements:

U.S. Sieve Size	Percent Passing (by weight)
1 inch	100
3/4–inch	90–100
3/8–inch	20–55
No. 4	0–10
No.8	0–5

B. Steel Casing Pipe: Comply with AWWA C–201 or C–202, minimumgrade B, size and wall thickness as indicated on drawings.

PART 3 – EXECUTION

3.01 SUMMARY
A. Set all lines, elevations and grades for utility and drainage system work and control system for duration of work, including careful maintenance of bench marks, property corners, monuments or other reference points. Maintain in operating condition existing utilities, active utilities and drainage systems encountered in utility installation. Repair any surface or subsurface improvement shown on drawings. Verify location, size, elevation and other pertinent data required to make connections to existing utilities and drainage systems as indicated on drawings. Contractor shall comply with local codes and regulations.

3.02 EXCAVATION, TRENCHING AND BACKFILLING
A. Perform excavation as indicated for specified depths. During excavation, stockpile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading, slides or cave–ins.
B. Remove excavated materials not required or not suitable for backfilling or embankments and waste off–site. Any structures discovered during excavation(s) shall be disposed of as specified.
C. Prevent surface water from flowing into trenches or other escalations by temporary grading or other methods, as required. Remove accumulated water in trenches or other excavations by pumping or other acceptable methods.
D. Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel–type trenching machines are used, do not use clods for backfill. Dispose of unsuitable material and provide other suitable material at no additional cost to owner.
E. All excavation shall be unclassified.

3.03 TRENCH EXCAVATION
A. The local utility companies shall be contacted before excavation shall Dig trench at proper width and depth for laying pipe, conduit or Cut trench banks as nearly vertical as practical and remove stones as necessary to avoid point–bearing. Over–excavate rock, wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous and uniform bedding as directed by soils engineer.
B. All trench excavation side walls greater than 5 feet in depth shall be sloped, shoring, sheeted, braced or other wise supported by means of the sufficient strength to protect the workmen within them in accordance with the applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration and by local ordinances. Lateral travel distance to an exit ladder or steps shall not be greater than 25 feet in trenches 4 feet or deeper.
C. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length, except where necessary to excavate for bell holes, proper sealing of pipe joint, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer or wider than deeded to make joint connection properly.
D. Trench width requirements below the top of the pipe shall not be less than 12" not more than 18" wider than outside surface of any pipe or conduit that is to be installed to designated elevations and grades. All other trench width requirements for pipe, conduit or cable shall be at least practical width that will allow for proper compaction of trench backfill.
E. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances.
1. Water Mains: 36" to top of pipe barrel
2. Sanitary Sewer: Elevations and grades as indicated on drawings.
3. Storm Sewer: Depths, elevations and grades as shown on drawings.
4. Electrical Conduits: 24" minimum to top of conduit or as required by NEC 300–5, NEC 710–36 codes or the local utility company requirements, whichever is deeper.
5. TV Conduits: 18" minimum to top of conduit or as required by the local utility company, whichever is deeper.
6. Telephone Conduits: 18" minimum to top of conduit, or as required by the local utility company, whichever is deeper.
7. Gas Mains and service: 30" minimum to top of pipe, or as required by the local utility company, whichever is deeper.

3.04 SHEETING AND BRACING
Provide sheeting and bracing, when necessary, in trenches and other excavations where protection of workmen required. Sheeting may be removed after sufficient backfilling to protect against damaging or injurious caving.

3.05 PIPE BEDDING
Accurately cut trenches for pipe or conduit that is installed to designed elevations and grades to line and grade from 4" below bottom of pipe and to width as specified. Place 4" of bedding material, compact in bottom of trench, and accurately shape to conform to lower portion of pipe barrel. After pipe installation, place select backfill as determined in Section 02200, and compact in maximum 8" layers measured loose to the top of the trench.

3.06 TRENCH BACKFILLING
A. Criteria: Trenches shall not be backfilled until required tests are performed and the utility systems comply with and are accepted by applicable governing authorities. Backfilling trenches as specified. If improperly backfilled, reopen to depth required to obtain proper compaction. Backfill and compact, as specified, to properly correct condition in an acceptable manner.
B. Backfilling: After pipe or conduit has been installed, bedded and tested as specified, backfill trench or structure excavation with specified material placed in 8" maximum loose lifts. Compact to minimum density of 98% of optimum density in accordance with ASTM D 698.
C. Compaction: Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.
D. Compaction Testing: If determined by the owner and at the owner's expense an independent testing laboratory shall perform testing at intervals not exceeding 200'–0" or trench for the first and every other eight–inch (8") lift of compacted trench backfill and furnish copies of test results as specified.

SECTION 02401 – WATER VALVES, VALVE BOXES, AIR RELIEF VALVES AND TAPPING SLEEVE & VALVES

1.1 INTRODUCTION
This section covers the requirements for furnishing and installing the abovementioned items and their respective appurtenances as detailed on the plans. This shall include all labor, equipment, materials and incidentals that are necessary to complete installation of subject items in accordance with the plans and specifications. All supplied materials shall be of a type and class as specified herein. This section will specify storage and handling, excavation, bedding, laying and coupling of joints and backfilling. All construction shall be as specified as herein, unless written deviation is received from the Engineer. Work under this section shall be measured by the actual number of components and paid for at unit prices established in the Contract.

1.2 CATALOG CUT SUBMITTALS
Contractor shall submit 4 copies of catalog cuts to Engineer for review for all materials that are required to complete the work as described in the associated plans. Engineer will retain two sets of original submittals and return two sets to the Contractor with the appropriate response annotated.

1.3 STORAGE AND HANDLING
The Contractor shall inspect the materials upon receipt for visible defects prior to off loading. The Contractor shall unload all valves and appurtenances as so to avoid any deformation or other injury. The Contractor shall implement appropriate measures during storage such that no storm water may pass through or encumber the materials. All materials shall be stored in such a manner that they will drain and so protect them from contamination or freezing. If any material is found to be defective during installation, then same material shall be removed and replaced with appropriate quality and type at the Contractors expense.

1.4 MATERIALS
A. Gate Valves:
All Gate Valves shall as a minimum reflect a rating of 200 psi, contain clearway equal to the full nominal diameter of the adjoining pipe, be open left operation (counterclockwise), reflect the name and date of manufacture, be of non–rising stem type, contain a directional arrow for operation cast into the body, have a 2" operating nut for control and contain Mechanical Joint connections. All requirements shall be meet unless specified on the plans or directed by the Engineer in writing. All materials shall withstand a hydraulic test pressure of equal to twice the rated pressure and Contractor shall provide written proof of test from manufacturer upon request.

A.1 Resilient Seated Wedge Valve:
Gate Valves 2" through 36" diameter shall be of cast iron or ductile iron body, resilient seated wedge type valves conforming to the requirements of AWWA Standard C 509 and/or AWWA Standard C 500. Unless specifically approved in writing by the Engineer all valves shall be from one manufacturer and all parts interchangeable.

Gate valves shall conform to ASTM A–536 as it relates to cast iron or ductile iron manufacturer of the body, bonnet and gate. Shell thickness of components shall conform to the thickness in Table 2, Sect. 4.4 of AWWA Standard C 509 or AWWA Standard C 500 as appropriate. Valve body and bonnet coating shall conform to AWWA Standard C 550 and include fusion bonded epoxy coating for the interior and exterior surfaces of the valve. The gate shall be completely covered with a rubber coating securely fixed to all ferrous surfaces. The gate and rubber coating shall conform to ASTM D429. Valve stems shall be of cast bronze construction. Valves shall contain a stuffing box, which located above the thrust collar, which will contain O–rings for sealing. The valve shall be of type construction that allows replacement of the ring seals while the valve is fully open and under pressure. Valves 16" and larger in diameter shall be designed and constructed in such a manner as to include beveled reduction gears to reduce the number of turns and torque required to operate valves.

A.2 Double Disc Valves:
Gate valves larger than 36" diameter shall be ductile iron body, double disc parallel seat conforming to AWWA Standard C 500. All valves shall be from one manufacturer with interchangeable parts. Gate valves shall conform with ASTM A 536 as it relates to manufacturer of body, bonnet and gate constructed of ductile iron. Entire valve body and bonnet shall be coated on interior and exterior surfaces.

Gates shall be constructed of cast iron smooth and continuous without pockets on either face. Cam surfaces shall be open to the bottom. Gate ring seals shall be inserted into a dovetail groove under pressure and make up a single insertable finish. Gate valves shall operate as a bottom wedging design with a two–part wedge contact. Wedge and Hook shall be separate castings. Valve stems shall be of cast bronze construction. Valves shall contain a stuffing box, which located above the thrust collar, which will contain O–rings for sealing. The valve shall be of type construction that allows replacement of the ring seals while the valve is fully open and under pressure. Valves 16" and larger in diameter shall be designed and constructed in such a manner as to include beveled reduction gears to reduce the number of turns and torque required to operate valves. All rollers, tracks and scrapers shall be of bronze casting. Bypasses shall be supplied and installed as a part of all valves. Bypass shall be a minimum of 3" diameter and operating mechanism shall be of resilient seated wedge type.

B. Valve Boxes:
All valve boxes shall be adjustable screw type with a base sized to fit over the valve yoke and a lid with "water" cast integral. All valve boxes shall be constructed of domestic or foreign cast iron that complies with the requirements of ASTM A 48. Valve boxes shall be the appropriate range of adjustment for the site and Contractor should minimize the use of extensions.

C. Air Valve:
All air valves shall operate as both an air/vacuum valve and air release valve simultaneously in one unit. The air/vacuum portion of the appurtenance shall operate such that during the filling operation, or when necessary, it will allow large amounts of air to be expelled from the line to avoid substantially compressing air in the line and also operate to effectively allow air to reenter the line in the case that internal pressures would approach negative values, such as happens with line breaks or separations. The air release portion of the valve shall operate such that it automatically releases minute amounts of air as necessary while in service. All air valves shall contain a rating of 150 psi with a test rating of 300 psi. Body and cover shall be manufactured of cast iron conforming to ASTM A126, Class B. The float shall be stainless steel with stainless steel guide and rated to withstand ultimate system surge pressure successfully. Valves 4" and larger shall have floats of stainless steel with dual stainless steel guides and rated to withstand ultimate system surge pressure successfully. The body and cover shall be constructed of cast iron and be concentrically located. All internal parts shall be stainless steel or Buna–N rubber.

D. Tapping Sleeve and Valve:
All sleeves shall have flanged outlet of appropriate size and strength to accommodate the tapping valve. Tapping valve shall be resilient seat wedge gate valve design with each flange capable of accepting the sleeve, tap machine face, or mechanical joint connection to adjacent pipe. Tapping sleeves up to 12" shall be Stainless Steel Wrap Around type. Tapping sleeves 12" and larger shall be Ductile Iron Full Body type. All tapping sleeve and valves shall be of the size and type detailed on the plans. Stainless steel tapping sleeves shall be constructed of two–piece stainless steel jointed by grade 18–8 stainless steel bolts. The gasket shall be girded virgin SBR compound rated for water service per ASTM D2000 and the gasket shall provide full range pipe coverage. Outlet pipe shall be constructed of grade 18–8 stainless steel and be schedule 5. All sleeves shall contain a ¾" test outlet with brass plug for the purpose of air testing the sleeve. All connections to the existing system shall be coordinated with the Water Purveyor having jurisdiction.

1.5 INSTALLATION
A. Excavation
This section shall cover the excavation and proper disposal of any and all materials disturbed during the construction of trenches which is further defined as all excavation necessary for the proper installation storm or sanitary sewers and any appurtenances and waterlines and any appurtenances. This section shall further cover any work deemed appropriate by the Engineer. Excavation shall be done to the lines and grades as depicted or detailed on the plans or as directed by the Engineer. All work involving this section shall be coordinated with any Grading, Site Utility work or other construction on the project site and shall be maintained satisfactorily so that adequate drainage is provided at all times. Any roots that protrude into the trench lines shall be trimmed flush with the trench walls.
All excavation shall be open cut unless otherwise depicted on the plans or specifically authorized by the Engineer. If after excavation the bottom of the proposed trench is found to contain rock, materials which can not be removed with standard and prudent construction equipment or is unsuitable for providing a uniform bearing surface then same material shall be removed to a depth not less than 8" below proposed depth, backfilled with approved material and compacted. Excavation widths shall be such that not less than one full diameter of the pipe is clear between the outside face of the pipe and each closest trench wall or inside face sheeting, shoring, or trench box as necessary. Excavated materials to be used during backfill operation shall be suitable material, significantly free from debris and/or rocks and approved by the Engineer. Acceptable material which is excavated shall be neatly and compactly deposited at the sides of the trench where space provides but at no time closer than 2' 0" from the closest side of the trench. When stockpiling of material is required, the Contractor at his expense shall do so at an approved site and this site shall be kept and neat to avoid unsightly appearance. Stockpiling shall be arranged to allow for natural drainage without pollution of water by erosion.

B. Sheeting, Bracing and Trench Boxes
As appropriate reference to OSHA Regulation 1926.652(b), the Contractor will be required to keep the sides of excavation vertical by sheet, bracing or the use of trench boxes to prevent movement by slides or settling of the side, to prevent injury or displacement of pipe or appurtenance or diminished the required working space adjacent to pipe. Furthermore, the Contractor may be required, for the purpose of preventing injury to persons, property or adjacent structures, to leave sheeting or bracing in place. All measures employed, when required, shall extend a minimum of 18" above existing grade and a maximum of 48" above grade. In no case shall timbers, beams or other sheeting/bracing materials be left in the trench, which may form or promote voids that cannot easily be corrected during the backfilling operation or compaction of backfill. It is agreed upon by these specifications that where it is necessary to leave sheeting or bracing intact and backfilled that the Owner is under no obligation to pay Contractor for time or materials involved in constructing such measures. Contractor shall assume and accept any and all risk associated with or encumbered by failure to implement proper and necessary sheeting, bracing or trench box use on any excavation and will be held responsible for caving, settlement and all other damages resulting there from.

C. Valves
Prior to each installation, the Contractor shall make sure the interior is wiped clean and the valve is test operated by opening and closing. All valves shall be set with the operating mechanism plumb and at the location depicted on the plans. Initial backfill shall be thoroughly compacted by hand around the valve body to a distance of 12" in all directions and compaction by mechanical means such as vibratory trench roller or striking compactor shall be thoroughly achieved to a distance of 3' 0" each side.

D. Valve Boxes
A valve box shall be installed over every underground valve. All valve boxes shall be set plumb with the valve; the operating mechanism of the valve shall be centered in the top opening and their lid flush with finished grade.

E. Air Valves
All air valves shall be installed in a cast iron meter box with a minimum of 18" by 24" clear inside dimension and at the exact location as depicted on the plans.

F. Tapping Sleeve and Valve
All tapping sleeves shall be installed at the exact location as depicted on the plans. All tapping sleeves shall be installed per strict conformance with manufactures specification, flange perfectly horizontal with existing pipe and bolts tightened with a torque wrench to the proper specification. All tapping valves shall follow valve installation requirements. The tapping sleeve shall be air tested prior to performing the tap into the existing line.

1.6 BACKFILLING AND COMPACTION
A. Trenches shall be backfilled immediately upon approval of pipeline construction.
B. Roadways and Crossing
Full depth and width of trench shall be backfilled by placing material in uniform layers not to exceed 12" thick and shall be thoroughly compacted by approved mechanical compactors under optimum moisture conditions. Compaction of the trench shall be to 95% as determined by Standard Proctor Test for all areas outside the paved area and any depth exceeding 18" below finished surface of asphalt. The top 18" of any trench directly under pavement or within 36" of the edge of pavement shall be compacted to 100% as determined by Standard Proctor Test. If existing material is not suitable for obtaining compaction then select backfill shall be used when requested by the Engineer. All paving and base course affected shall be removed and replaced with new material of equal or better quality with like texture and color as the adjacent pavement. All backfill methods shall be in strict compliance with manufacturer's recommendations and all methods shall be instituted such that no damage, misalignment, or unjointing of the pipe or appurtenances is experienced.
Backfill shall be kept free of organics (grasses, sticks, stumps, roots etc.), stones (all stones over 1" diameter within first 12" of backfill and all stones over 2.5" diameter for the remainder of the backfill), any frozen soil or other soil which is not suitable for backfill (highly plastic clay) or any other objectionable items. All backfill shall be installed and graded in a manner that erosion or saturation will not negatively affect the backfilled area. Heavy equipment shall not be operated over any pipe or appurtenance until it has been properly backfilled and has minimum cover as required by the plans. Where any part of the required cover is above proposed finished grade, the Contractor shall place, maintain and lastly remove such material at no additional cost to the Owner. Any pipe or appurtenance, which becomes mis–aligned, shows excessive settlement or has been damaged by the Contractor shall be corrected or replaced as deemed necessary by the Engineer/Owner at no additional cost to the Owner. Prior to acceptance, the Contractor shall properly maintain all installations in such a manner that they will operate without failure.
C. Finish Grading
All areas disturbed shall be graded to a continuous finish without irregularities or abrupt changes and shall not consist of areas, which will retain water or cause foreseeable future maintenance. Prior to acceptance, all debris, excess material, trash or any unsightly occurrence shall be removed and the project site shall be in a neat and satisfactory condition.

SECTION 02451 REINFORCED CONCRETE PIPE

1. GENERAL
1.1. RELATED DOCUMENTS
1.1.1. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, material, equipment, and services indicated on the Drawings or specified herein or reasonably necessary for and incidental to a complete job.
1.2. DESCRIPTION OF WORK
1.2.1. The work includes the installation of all reinforced concrete pipe shown on the Drawings.
1.2.2. RELATED WORK SPECIFIED ELSEWHERE:
Excavation and Backfill Section 02220
1.3. QUALITY ASSURANCE
1.3.1. REFERENCED STANDARDS: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards:

NCDOT	North Carolina Department of Transportation Standard Specifications for Highway Construction, Latest Edition
ASTM C33	Concrete Aggregates
ASTM C76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C150	Portland Cement
ASTM C361	Reinforced Concrete Low_ Head Pressure Pipe
ASTM C443	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
AASHTO M 198	Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets
ASTM C507	Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
ASTM C877	External Sealing Bands for Noncircular Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C990	Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

1.3.2. MANUFACTURER'S QUALIFICATIONS: Only the products of a manufacturer regularly engaged in the manufacture of pipe used for the conveyance of water will be acceptable.
1.3.3. INSPECTION AND ACCEPTANCE OF PIPE: Acceptance will be on the basis of design, material tests, and inspection of the complete product. The quality of all materials used in the pipe, the process of manufacture, and the finished pipe shall be subject to inspection by the Engineer. Inspection may be made at the place of manufacture, or on the job site after delivery, or at both places and the pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though sample pipe units may have been accepted as satisfactory at the place of manufacture. All pipe which is rejected must be immediately removed from the project site by the Contractor.
1.3.4. SUBMITTALS SHOP DRAWINGS; PIPE: Before fabrication, submit for approval drawings showing pipe dimensions, joints, reinforcement and other details.
1.3.5. MANUFACTURER'S CERTIFICATION: Manufacturer shall submit a letter certification stating that the pipe is manufactured and tested in accordance with ASTM C76 (latest edition).
2. PRODUCTS
2.1. MANUFACTURE OF PIPE
2.1.1. GENERAL: Use new pipe complying with ASTM C76 or ASTM C507, and with the additional requirements specified herein. Unless otherwise noted on the Drawings, provide Class III pipe with Wall B. All pipe approved will have an interior surface which is free from roughness, projection, indentations, offsets or irregularities of any kind.
2.1.2. PIPE LENGTHS: Furnish pipe in nominal 8 foot lengths. Shorter lengths may be used where required by Construction details or when approved by the Engineer.
2.1.3. LIFT HOLES will not be permitted in pipe.
2.1.4. REPAIRS: Pipe may be repaired, if necessary, because of occasional minor imperfections in manufacture or accidental injury during handling and will be acceptable if, in the opinion of the Engineer, the repairs are sound, properly finished and cured, and the repaired pipe conforms to the requirements of ASTM C76. Use mortar for repairs which has a compressive strength of 6,000 psi at the end of 28 days.
2.1.5. MARKING: Mark all pipe in accordance with ASTM C76; no pipe will be accepted unless these markings appear on all pipe.
2.2. JOINTING
2.2.1. GENERAL: Use rubber gaskets for flexible watertight joints. Conform to ASTM C443.
3. EXECUTION
3.1. INSPECTION
3.1.1. Examine the areas and conditions under which the pipe is to be installed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.
3.2. EXCAVATION
3.2.1. GENERAL: Excavate trenches in accordance with Section 02220, EXCAVATION AND BACKFILL.
3.3. PIPE HANDLING
3.3.1. GENERAL: Transport pipe to the job site and handle in such a manner as not to damage the pipe.
3.3.2. STOCKPILING: Stockpile within the rights_ of_ way so that no dangerous conditions will exist to life or property. Store pipe so that damage to surfaces and/or structures will be prevented. Provide suitable devices to support pipe when it is lifted.
3.4. PIPE INSTALLATION
3.4.1. GENERAL: Adhere to the rules, regulations and requirements of OSHA, Occupational Safety and Health Act.
3.4.2. PRECAUTIONS: Lay pipe in dry trenches only. Keep all trenches completely free of water during bedding, laying and jointing of pipe. De–water and use sheeting where required by field conditions. Pump or drain all water away from the work and dispose of in a suitable manner so that no damage occurs outside the construction easement. Do not permit water to rise in an unbackfilled trench after pipe has been placed. Promptly repair any damage within the construction easement.
3.4.3. TOLERANCES: Unless otherwise directed by the Engineer in writing, lay all pipe straight between changes in alignment and at uniform grade between change in grade. When jointed in the trench, the pipe shall form a true and smooth line.
3.4.4. PIPE LENGTHS: Lay pipe in nominal 8 foot lengths; except the joints adjacent to any manhole shall have a minimum length of 2 feet.
3.4.5. TRENCH AND BED FOR PIPE: Conform to the requirements of NCDOT Standard Specifications.
3.4.5.a. After delivery alongside the trench, visibly inspect each length of pipe for damaged surfaces, breakage and conformance to specifications.
3.4.5.b. Acceptable pipe may be marked with paint or other permanent marking material so that the marks are plainly visible after installation in the trench and before the pipe is covered. Reject, stockpile, and remove from the site all pipe not conforming to specifications.
3.4.5.c. See Drawings for Bedding Conditions. Where no other bedding is indicated, place pipe on a shaped bed of undisturbed material. Before pipe is placed on the bedding material, excavate suitable bell holes so that after placement of the pipe, only the barrel receives bearing pressure from the supporting material. Support the entire length of the unit as shown on the Drawings.
3.4.5.d. Place pipe into its position in the trench in such manner and by such means as approved by the Engineer. Furnish approved devices to support all parts of the pipe unit when it is lifted. Protect pipe during handling against impact shocks and free falls. Do not permit hooks to come in contact with premoulded joint surfaces. Lower pipe into position in the trench and joint without disturbing the bedding or adjoining section of pipe.
3.4.5.e. Handle pipe having premoulded joint rings or attached couplings so that no weight, including the weight of the pipe itself, will bear on or be supported by the jointing material. Take care to avoid dragging the spigot ring on the ground or allowing it to be damaged by contact with gravel, crushed stone, or other hard objects. Do not subject the bell and spigot sections to direct stress of any kind except that required to effect the jointing.
3.4.6. PIPE LAYING:
3.4.6.a. Unless otherwise shown on the Drawings, all pipe will be laid in open trench construction. Start laying pipe at the lowest point and install the pipe so that the spigot end points in the direction of flow. Lay pipe to conform to the lines and grades indicated on the Drawings, unless otherwise directed by the Engineer in writing.
3.4.6.b. Clean all joint surfaces after the pipe units are aligned in the trench and are ready to be joined. Immediately before jointing the pipe, lubricate the bell or groove in accordance with the manufacturer's recommendations. Then carefully push pipe unit into place without damage to the pipe or gasket. Use suitable devices to force the pipe together so that they will fit with a minimum open recess inside or outside and so that they will have tightly sealed joints. Lay each pipe unit to form a close joint with the next adjoining pipe and bring the inverts continuously to the required grade.
3.4.6.c. Immediately after the pipe units are put together, inspect the position of the gasket in the joint using an approved feeler gauge to make sure it is properly positioned. Pull apart and remake all joints, using new gaskets, if the gasket has become damaged or improperly positioned.
3.4.6.d. Make all joints in accordance with manufacturer's recommendations which are subject to approval by the Engineer. Prior to backfill, fill bell holes with bedding materials and compact so that the spigot will not move in the bell of the adjoining pipe under backfill load. Do not permanently support pipe on saddles, blocking or boulders.
3.4.7. TEMPORARY PLUGS: At all times when pipe laying is not actually in progress, close the open end of pipe by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, do not remove the plug until all danger of earth or other material entering the pipe has passed.
3.4.8. STOPPERS: Close open ends of pipe or fittings to be used for future connections as shown on the Drawings.
3.4.9. BLOCKING: Provide concrete blocking where indicated on the Drawings.
3.4.10. BACKFILL: When pipe has been properly bedded, backfill trenches in accordance with Section 02220, EXCAVATION AND BACKFILL.
3.5. CLEAN UP
3.5.1. Follow backfill, as closely as conditions will allow, with clean up operations.
4. MEASUREMENT AND PAYMENT
4.1. GENERAL
The Bid Price shall constitute full compensation for doing each item of work including all activities and incidentals required for the installation and completion of each item in accordance with the Contract Drawings, Specifications and requirements. Unless otherwise indicated and identified as a separate Bid Item to be measured and paid for as an individual and independent item of work, the Bid Price for each item shall be full compensation for the following activities: Furnishing and installing all materials and equipment, including excavation, disposal of surplus excavated or material, backfill, compaction, all necessary shoring and bracing, de–watering, handling water flows, protection of or removing and replacing base and pavement, property corners, signs, fences, landscaping, lawns, above and below ground utility lines and appurtenances, installation and maintenance of temporary sediment and erosion control facilities, maintenance of drives and streets, and cleaning up and establishing a permanent stand of grass on all unpaved disturbed surfaces incidental to the work item specified in the Contract Documents or required in restoring existing property disturbed during construction to its original condition or better. The price shall also constitute full compensation for all cleaning and testing of pipelines, testing of materials installed, and barricades, lighting, and flagmen as required for the protection of public.
ITEM NO. 1 – REINFORCED CONCRETE PIPE
Pipe will be paid for at the unit price per linear foot for pipe of various materials, types, and sizes measured from center to center of manholes and for various depths of cut measured on the centerline of the trench from the invert of the pipe to ground surface. The price shall include clearing, grubbing, unclassified excavation, stone removal, material laying, pipe bedding material, jointing, backfill, compaction, connection to manholes, pipe testing, surface restoration, cleanup, and all other work required for the satisfactory installation of pipe, except for other items listed in the bid.

SECTION 02454 STRUCTURES

1. GENERAL
1.1. RELATED DOCUMENTS
Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.
1.2. DESCRIPTION OF WORK
This item shall consist of constructing catch basins, drop inlets and junction boxes, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the Engineer.
1.3. RELATED WORK SPECIFIED ELSEWHERE:
Excavation and Backfill Section 02220
1.4. QUALITY ASSURANCE
1.4.1. REFERENCE STANDARDS: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these specifications shall in no way invalidate the minimum requirements of the referenced standards.

NCDOT	North Carolina Department of Transportation Standard Specifications for Highway Construction (Latest Edition)
ASTM A615	Deformed and Plain Billet _ Steel Bars for Concrete Reinforcement
ASTM A616	Rail_ Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A617	Axle_ Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A706	Low_ Alloy Steel Deformed Bars for Concrete Reinforcement
ASTM C55	Concrete Building Brick
ASTM C270	Mortar for Unit Masonry

1.5. SUBMITTALS
1.5.1. SHOP DRAWINGS; MANHOLE FRAME AND COVERS AND MANHOLE STEPS: Submit for approval shop drawings for grates, drains, manhole covers, frames and steps.
1.5.2. SHOP DRAWINGS; PRECAST CONCRETE MANHOLE SECTIONS: Submit for approval shop drawings for each type precast manhole sections.
2. PRODUCTS
2.1. GENERAL: Unless otherwise noted on the Drawings, the Contractor has the option of providing manholes constructed of concrete brick, concrete masonry units or precast manholes or vaults.
2.2. PORTLAND CEMENT CONCRETE: Concrete shall be 3,000 psi (28 day), as defined by the North Carolina Department of Transportation Standard Specifications for Highway Construction, (Latest Edition), Portland Cement and Portland Cement Concrete. All concrete shall be ready_ mixed as produced by a reputable manufacturer, acceptable to the Engineer.
2.3. REINFORCING STEEL: Reinforcing steel shall conform to ASTM A615, A616, A617, or A706, Grade 60 and of the applicable size as indicated on the Detail Drawings.
2.4. CONCRETE BRICK: Concrete brick shall be sound, hard, regular and uniform in shape and of standard size (8" long x 2_ 1/4" high x 3_ 5/8" wide). Concrete brick shall conform to ASTM Specifications C55, Grade N_ 1.
2.5. MORTAR: Mortar shall be composed of Portland Cement, hydrated lime, and sand, in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 to 1:1/2. Mortar shall conform to ASTM C270, Type M.
2.6. CASTINGS:
2.6.1. The casting for the frames and covers shall be of good quality, strong, tough, even_ grained cast iron, smooth, free from scale, lumps, blisters, sand holes, and defects of every nature which would render them unfit for the service for which they are intended.
2.6.2. Frames and covers shall be as shown on the Drawings or approved equal.
2.7. PRECAST MANHOLES OR VAULTS
2.7.1. MANHOLE BASES, CAST–IN–PLACE CONCRETE: Conform to the requirements of Section 03300, CAST_ IN_ PLACE CONCRETE.
2.7.2. MANHOLE BASES, PRECAST CONCRETE: Conform to the requirements of ASTM C478.
2.7.3. MANHOLE SECTIONS, PRECAST CONCRETE:
2.7.3.a. Precast concrete manholes consist of a base section, riser sections, a transition and cone. Provide pipe openings, of suitable size to fit the pipe, in the base section or riser sections as required. Conform to the requirements of ASTM C478 with the following exceptions and additional requirements:
Cement: Type II, except as otherwise approved.
Minimum Wall Thickness: 5 inches
Use gasket type joints as specified herein.
Steam cure sections, do not ship for at least five days.
2.7.3.b. Acceptance of the sections will be on the basis of material tests and inspection of the completed project.
2.7.3.c. Suitably shape the tops of the bases by means of accurate bell_ ring forms to receive the barrel sections.
2.7.4. RISER JOINTS: Provide riser joints of the rubber gasket type in which the gaskets are in compression and which will permit both longitudinal and angular movement. Design the bell and spigot ends to confine the gasket when the joint is in its final position. Provide each section with proper ends made of concrete formed on machined rings to insure accurate joint surfaces. The diameters of the joint surface, depended upon to compress the gasket, shall not vary from the theoretical diameters by more than 1/16 inch. Seal the joint with a rubber gasket so that the joint will remain tight under all conditions of service. Joints must be capable of withstanding an internal hydrostatic pressure of 10 psi with no visible signs of leakage.
2.7.5. GASKETS: Provide gaskets which conform to applicable sections of ASTM C361. Use gaskets of a special rubber composition having a texture to assure a watertight and permanent seal and the product of a manufacturer having at least five years experience in the manufacture of rubber gaskets for pipe joints. Use gaskets which are a continuous ring of flexible joint rubber of a composition and texture which are resistant to common ingredients of sewage, industrial wastes, and ground_ water and which will endure permanently under the conditions likely to be imposed by this service.
2.8. CONCRETE MASONRY UNITS
2.8.1. HOLLOW LOAD_ BEARING CONCRETE MASONRY UNITS: All concrete masonry units shall be modular in size with a nominal 8" by 16" face dimension for standard units and shall conform to ASTM C90, Grade N, Type I.
2.8.2. MASONRY JOINT REINFORCING: Joint reinforcing shall be made of zinc coated steel wire conforming to ASTM A_ 166 Class 1 or ASTM A_ 82 and shall be of the welded wire ladder type design with Standard No. 9 gauge (0.1483") side rods and No. 9 gauge cross ties. Acceptable products include, "Blok_ Lok" by A. A. Wire Products Co. and "Ladur Type" by Duro_ O_ Wal, Inc.
3. EXECUTION
3.1. GENERAL
3.1.2. BASES: Structure bases may be precast or cast_ in_ place as indicated on the Drawings.
3.1.3. FRAMES, COVERS, AND/OR GRATES: Set manhole frames with the tops conforming accurately to the grade of the pavement of finished ground surface or as indicated on the Drawings or as directed. Set frames in a full bed of mortar so that the space between the top of the structure masonry and the bottom flange of the frame shall be completely filled with mortar and made watertight. Place a thick ring of mortar extending to the outer edge of the masonry all around the bottom flange. Finish the mortar flush with the top of the flange and with a slight slope to shed water away from the frame.
3.2. PRECAST STRUCTURES
3.2.1. PRECAST MANHOLE SECTIONS:
3.2.1.a. Handle and install each section in such a manner and by such means as to prevent damage. Set sections vertical with sections in true alignment.
3.2.1.b. Install base sections on firm stabilized foundation so prepared to prevent settlement and misalignment. Place pipe openings at the exact elevation and location to receive entering pipes.
3.2.1.c. Install riser sections, transitions and top sections level and plumb. Make joints in accordance with manufacturer's instructions to ensure a watertight installation.
3.2.1.d. After entering pipes are placed in the pipe openings and set to true alignment and grade, fill the annular space between the pipe and opening with a non_ shrink grout to seal the joint watertight or with brick and mortar. When brick and mortar are used the outside of the brick shall be plastered with mortar 1/2 inch thick.
3.2.1.e. Lift holes will be allowed in precast manhole sections. After setting sections in place, thoroughly plug all holes in sections with mortar. Make mortar one part cement to 1_ 1/2 parts sand; mix with water until slightly damp to the touch (just short of balling) and hammer mortar into the holes until it is dense and an excess of paste appears on the surface. Then finish smooth and flush with the adjoining surfaces.
3.3. BRICK STRUCTURES
3.3.1. LAYING BRICK:
3.3.1.a. Use only clean brick. Moisten as directed until bricks are neither so dry as to absorb water from the mortar, nor so wet as to be slippery when laid. Lay each brick in a full bed of mortar without requiring subsequent grouting, flushing, or filling. Walls of all structures shall consist of two widths of brick. When laying brick, the direction of every sixth (6) course shall be rotated 90 degrees to provide a tie between the brick courses.
3.3.1.b. Lay brick in level courses with mortar joints approximately 1/2" wide and uniform in thickness. Tool exposed joints and strike flush joints which will be plastered.
3.3.1.c. Set pipes as the work progresses. Completely fill the space between the pipe and masonry to insure a watertight seal.
3.3.2. PLASTERING AND CURING BRICK: Plaster outside face of masonry with mortar 1/2 inch thick. If required, moisten masonry prior to application of plaster. Carefully spread and trowel the plaster so that all cracks are thoroughly worked out. After hardening, check the plaster for bond and soundness by tapping. Remove replace any unbonded or unsound plaster.
3.4. CONCRETE MASONRY UNIT STRUCTURES (CMU)
3.4.1. LAYING CMU'S: CMU's shall not be wetted prior to laying. Lay CMU's in a level running bond pattern and in a full bed of mortar approximately 3/8 inch wide and uniform in thickness. Tool all exposed joints and strike flush joints which will be plastered. Cut CMU's by acceptable methods.
3.4.2. REINFORCEMENT:
3.4.2.a. All CMU structures shall have both wall reinforcement and joint reinforcement. Wall reinforcement shall consist of a number 4 rebar placed in every other cell of CMU walls, and shall be tied to the bottom slab reinforcement. All rebar shall be tied with a minimum 12 inch lap. Upon placing rebar each cell of CMU's shall be filled with 4,000 psi concrete.
3.4.2.b. Joint reinforcement shall consist of the ladder type and shall be placed every 16" in height. Joint reinforcing shall be set in a full bed of mortar and shall be tied to adjoining walls with corner "L" units, 32"x32" minimum.
3.4.3. WALL OPENINGS: Opening in walls around pipes shall be filled with either brick and mortar or non_ shrink grout.

FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P–1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL
40758
ENGINEER
WILLIAM S. CLAYTON
06/22/26

CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

CATAWBA COUNTY
CATTLEMAN'S ASSOCIATION
NEWTON, NORTH CAROLINA
OWNER

EDUCATION CENTER
PROJECT TITLE

CIVIL

PROJECT SPECIFICATIONS
DRAWING TITLE

JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: WSC
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE

SPC102
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SECTION 02500 – LEAKAGE TESTING
1.1 INTRODUCTION
All structures are required to be watertight and all pressure and gravity piping and pipelines shall be tested by the Contractor as directed by this section and/or the Engineer/Owner. All tests shall be organized by the Contractor at the Engineers convenience. All labor, equipment, water, materials, gauges, meters and any other items shall be furnished by the Contractor at his expense. In the case of a failed test, minor defects
will be corrected and retested immediately. Any failure due to a major defect will constitute stopping the test and rescheduling with Engineer/Owner.
1.2 STRUCTURES
All fluid containing structures shall be subject to a gravity pressure test by filling the structure with water to overflow, or as directed by the Engineer, and observing the water level for a period not less than 24 hours. Leakage will be considered to be within the allowable limits for structures when there is no visible sign of leakage evident by either moisture on exposed surfaces or water level drop in excess of 1 inch within the 24–hour period. All wall castings or penetrations shall be plugged temporarily during the test period. If leakage exceeds the allowable limit, the work shall be repaired by removing and replacing the defective portions, waterproofing the inside and outside or by other
methods as approved by the Engineer.
1.3 PRESSURE PIPING
All pressure piping shall be subject to a hydrostatic pressure/leakage test in accordance with AWWA C605–13. Upon satisfactorily constructing the pipeline, including all appurtenances called for on the associated plans, and effectively backfilling the trench the hydrostatic test shall be conducted. The Contractor shall prepare a testing plan/schedule to be approved by the Engineer, which will effectively test the entire section to be constructed, and at no time test more than 4000 lf of pipeline at one time. As the pipeline is being filled with water in preparation of the test, all air shall be expelled from the pipe. If sufficient exit points are not available, the Contractor at his expense shall install air reliefs of a type and location as approved by the Engineer. The pipeline shall be subjected to a hydrostatic pressure of 150 psi or 50 psi above existing line static pressures, which ever is greater, for a period of 2 hours or as specified by the Engineer. Pressure shall be applied to the line by means of hand pump for lines 2" and smaller or by approved mechanical means for larger lines

Allowable leakage shall not exceed that determined by the following formula:

$$L = \frac{SD\,(P)^{1/2}}{148{,}000}$$

L = Allowable leakage in gallons per hour.
S = Length of line under test in feet.
D = Nominal diameter of pipe in inches.
P = Average test pressure in psi.

Any visible leak shall be corrected to minimize water leakage no matter of the allowable leakage calculation. All pipe and appurtenances found to be defective during the hydrostatic test shall be removed and/or corrected at the Contractors expense and Engineers approval. All materials shall be subject to manufacturer's recommendations for storage, pretesting, etc. After a successful test has been obtained the Contractor shall notify the Engineer in writing and request written recognition from Engineer of acceptable test results.

SECTION 02611 GRADED AGGREGATE BASE COURSE
1. GENERAL
1.1. RELATED DOCUMENTS
Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, material, equipment, and services indicated on the Drawings, or specified herein or reasonably necessary for and incidental to a complete job.
1.2. DESCRIPTION OF WORK
The work includes the placement of a graded aggregate base course upon a prepared subgrade and a prime coat, when directed, at locations shown on the Drawings.
1.3. RELATED WORK SPECIFIED ELSEWHERE
Excavation and Backfill Section 02220
1.4. QUALITY ASSURANCE
1.4.1. Referenced Standards: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards. NCDOT North Carolina Department of Transportation Standard Specifications for Highway Construction, Latest Edition
1.4.2. Qualifications Of Workmen: Assign at least one person who is thoroughly trained and experienced in the skills required, who is completely familiar with the design and application of the work described for this Section, and who will be present at all times during progress of the work of this Section and direct all work performed under this Section.
1.4.3. For actual finishing of asphaltic concrete surfaces and operation of the required equipment, use only personnel thoroughly trained and experienced in the skills required.
1.5. JOB CONDITIONS
1.5.1. DUST CONTROL: Use all means necessary to prevent the spread of dust during performance of the work of this Section. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the job site.
2. PRODUCTS
2.1. GRADED AGGREGATE BASE COURSE
2.2. Comply with the applicable material requirements of NCDOT Standard Specifications for Highway Construction.
2.3. PRIME COAT
2.4. Comply NCDOT Standard Specifications for Highway Construction, Bituminous Materials, for base priming when specified on the Drawings or directed by the Engineer.
3. EXECUTION
3.1. INSTALLATION, GENERAL
3.1.1. Subgrade: Preparation of the subgrade is covered in the applicable provisions of Section 02220, EXCAVATION AND BACKFILL. Construct the subgrade to consist of compacted fill material specified in the referenced section.

3.1.2 Loose Material: Remove all loose material from the compacted subgrade surface immediately before placing base course.
3.1.3 Proof–Roll: Proof–roll prepared subgrade surface to check for unstable areas and the need for additional compaction. Notify the Engineer of unsatisfactory conditions. Do not begin base course work until such conditions have been corrected and are ready to receive paving.
3.1.4 Thicknesses: Install thickness of base course as indicated on the Drawings. In–place compacted thicknesses will not be acceptable if exceeding the following allowable variation from thicknesses shown on the Drawings:
3.1.5 Base Course: 1/2–inch
3.1.6 Surface Smoothness: Test the finished surface of the base course for smoothness, using a 3.1m straightedge applied parallel with, and at right angles to, centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerance for smoothness:
3.1.7 Base Course Surface: 1/4–inch
3.1.8 Grade Control: Establish and maintain the required lines and grades, including crown and cross–slope, for each course during construction operations.
3.2 GRADED AGGREGATE BASE COURSE
3.2.1 General: This work shall consist of a graded aggregate base course composed of materials as described in NCDOT Standard Specifications for Highway Construction, placed on a prepared foundation, mixed, shaped, compacted, and primed (when directed), all in accordance with these specifications. The base course shall conform to the lines, grades, dimensions and cross–sections shown on the Plans or as directed by the Engineer.
3.2.2 Installation Requirements: Comply with the requirements of NCDOT Standard Specifications for Highway Construction.
3.2.3 Prime Coat: Comply with the requirements of NCDOT Standard Specifications for Highway Construction.
(End of Section 02611)

SECTION 02612 BITUMINOUS PAVING
1. GENERAL
1.1. RELATED DOCUMENTS
1.2. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, material, equipment, and services indicated on the Drawings, or specified herein or reasonably necessary for and incidental to a complete job.
1.3. DESCRIPTION OF WORK
1.3.1. GENERAL:
1.3.1.a. The extent of bituminous paving is shown on the Drawings and includes (but is not necessarily limited to) bituminous paving of roads, driveways, and parking areas.
1.3.1.b. The work includes the placement of an graded aggregate base course upon a prepared subgrade, a bituminous tack coat and wearing surface of asphaltic concrete.
1.3.2. RELATED WORK SPECIFIED ELSEWHERE: Excavation and Backfill Section 02220
1.4. QUALITY ASSURANCE
1.4.1. REFERENCED STANDARDS: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards. NCDOT North Carolina State Highway Department Standard Specifications for Highway Construction, Latest Edition
1.4.2. QUALIFICATIONS OF WORKMEN:
1.4.2.a. Assign at least one person who is thoroughly trained and experienced in the skills required, who is completely familiar with the design and application of the work described for this Section, and who will be present at all times during progress of the work of this Section and direct all work performed under this Section.
1.4.2.b. For actual finishing of asphaltic concrete surfaces and operation of the required equipment, use only personnel thoroughly trained and experienced in the skills required.
1.5. JOB CONDITIONS
1.5.1. WEATHER LIMITATIONS: Apply bituminous tack coats only when the ambient temperature in the shade is above 50 degrees F. and when the temperature has not been below 35 degrees F. for 12 hours immediately prior to application. Construct bituminous surface course only when atmospheric temperature is above 40 degrees F., when the underlying base is dry, and when the weather is not rainy. Base course may be placed when air temperature is not below 30 degrees F. and rising, unless otherwise directed by the Engineer.
1.5.2. DUST CONTROL: Use all means necessary to prevent the spread of dust during performance of the work of this Section. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the job site.
1.5.3. PROTECTION: Use all means necessary to protect pavement materials before, during, and after installation, and to protect the installed work and materials of all other trades.
1.5.4. REPLACEMENTS: In the event of damage, immediately make all repairs and replacements necessary, to the approval of the Engineer, and at no additional cost to the Owner.
1.6. PRODUCT DELIVERY
1.6.1. GENERAL: Transport asphalt cement mixtures from the mixing plant to the project site in trucks having tight, clean compartments. Provide covers over asphalt cement mixture when delivering to protect the mixture from weather and to prevent loss of heat. During period of cool weather or for long–distance deliveries, provide insulation around entire truck bed surfaces.
2. PRODUCTS
2.1. GRADED AGGREGATE BASE COURSE: Comply with the applicable Subsections of NCDOT Specifications, GRADED AGGREGATE BASE COURSE (with prime).
2.2. HOT MIX ASPHALT SURFACE COURSE: Comply with the requirements of NCDOT Specifications, HOT MIX ASPHALT SURFACE COURSE.
2.2.1. COMPOSITION OF MIXTURE: Comply with the requirements of NCDOT Specifications, Composition of Mixture, Type 1. Furnish samples if requested by the Engineer.
2.3. PARKING LINE PAINT: Provide white lane marking paint with chlorinated rubber base, a factory–mixed, quick–drying, non–bleeding material complying with FS TT–P–115, Type III, unless otherwise acceptable to the Engineer.
3. EXECUTION
3.1. INSPECTION
3.1.1. Examine the areas and conditions under which the bituminous paving will be installed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.
3.1.2. Verify that pavement may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
3.2. INSTALLATION, GENERAL
3.2.1. SUBGRADE: Preparation of the subgrade is covered in the applicable provisions of Section 02220, EXCAVATION AND BACKFILL. Construct the subgrade to consist of compacted fill material specified in the referenced section.
3.2.2. LOOSE MATERIAL: Remove all loose material from the compacted subgrade surface immediately before placing bituminous materials.
3.2.3. PROOF–ROLL: Proof–roll prepared subgrade surface to check for unstable areas and the need for additional compaction. Notify the Engineer of unsatisfactory conditions. Do not begin paving work until such conditions have been corrected and are ready to receive paving.
3.2.4. THICKNESSES: Install thicknesses of base courses and surface courses as indicated on the Drawings for varying traffic and loading conditions. In–place compacted thickness' will not be acceptable if exceeding the following allowable variation from thickness' shown on the Drawings:
Base Course: 1/2", plus or minus
Surface Course: 1/4", plus or minus
3.3. SURFACE SMOOTHNESS:
3.3.1. Test the finished surface of each asphalt concrete course for smoothness, using a 10' straightedge applied parallel with, and at right angles to, centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:
Base Course Surface: 1/4"
Wearing Course Surface: 3/16"
3.3.2. Check surfaced areas at intervals as directed by the Engineer. Test crowned surfaces with a crown template, centered and at right angles to the crown. Surfaces will not be acceptable if the finished crown surfaces vary more than 1/4" from the crown template.
3.3.3. GRADE CONTROL: Establish and maintain the required lines and grades, including crown and cross–slope, for each course during construction operations.
3.4. FRAME ADJUSTMENTS:
3.4.1. Set frames for manholes and other such units, within areas to be paved, to final grade as part of this work. Include existing frames or new frames furnished in other sections of these Specifications.
3.4.2. Surround frames set to grade with a ring of compacted asphalt concrete base prior to paving. Place asphalt concrete mixture up to one inch below top of frame; slope to grade, and compact with hand tamp.
3.4.3. Adjust frames as required for paving. Provide temporary closures over openings until completion of rolling operations. Remove closures at completion of the work. Set cover frames to grade, flush with surface of adjacent pavement.
3.5. EQUIPMENT:
3.5.1. The method employed in performing the work and all equipment, plant, machinery and tools, used in handling the materials and performing any part of the work shall be subject to the approval of the Engineer before work is started, and when found unsatisfactory shall be changed and improved as required. All equipment, tools, machinery and plants used must be maintained in a satisfactory working condition.
3.5.2. Comply with the requirements of NCDOT Specifications.
3.6. CONSTRUCTION REQUIREMENTS:
3.6.1. Comply with the requirements of NCDOT Specifications.
3.7. GRADED AGGREGATE BASE COURSE
3.7.1. GENERAL: This work consists of a base course composed of course aggregate, together with fine aggregate or binder material with water which is mixed, compacted, and primed, all in accordance with these Specifications and in conformity with the lines, grades, and typical cross section shown on the Drawings or as otherwise specified.
3.7.2. INSTALLATION REQUIREMENTS: Comply with the requirements of NCDOT Specifications.
3.7.3. PRIME COAT: Comply with the requirements of NCDOT Specifications.
3.8. HOT MIX ASPHALT SURFACE COURSE
3.8.1. INSTALLATION REQUIREMENTS:
3.8.1.a. Comply with the requirements of NCDOT Specifications, Equipment Requirements, and Construction Requirements.
3.8.1.b. Conform to the lines, grades, and cross sections indicated on the Drawings with thickness shown after full compaction.
3.8.2. TYING TO EXISTING BITUMINOUS PAVEMENT: Where new pavement ties to existing pavement, cut the existing pavement to a straight line and completely remove all materials on the new pavement side of the cut and replace with new materials. Coat the cut line with a tack coat to furnish a bond between the existing surface course and the new surface course. Do not allow the new work to overlap the existing work. Notify the proper authorities at least 10 days before beginning the work of tying to the existing work.
3.8.3. DELAY OF SURFACE COURSE INSTALLATION: Install the base course during construction of the project. Immediately prior to the completion of the project, bring the base course to the specified thickness, true the edges, apply a tact coat, in accordance with the type of base course used, then apply the surface course.
3.8.4. DRAINAGE: Crown or slope all paved areas for complete water drainage under all weather conditions. If required by the Engineer, hose down the surface to demonstrate proper drainage at the preliminary review when the project is completed and again at the end of the one year guarantee period. Remove and replace any area that shows puddling 30 minutes after hosing, at no additional cost to the Owner.
3.8.5. REMEDIAL MEASURES: Upon direction of the engineer, cut out and/or rework all surfaces and subgrade areas which do not meet the requirements of this Section; perform all remedial measures at no additional cost to the Owner.
3.8.6. PARKING LINE PAINTING: Paint parking lines 4 inches wide and of lengths indicated on the Drawings. Paint with mechanical equipment providing uniform straight edges, applied in 2 coats at the manufacturer's recommended rates.
3.8.7. CLEAN UP: Upon completion of paving, remove all surplus materials, dunnage, cartons, and other debris resultant from work of this Section. Leave entire work in satisfactory, acceptable, broom–clean condition.
(End of Section 02612)

SECTION 02722 – EXTERIOR SANITARY SEWERS AND APPUTENANCES
PART 1 – GENERAL
1.1 GENERAL DESCRIPTION: This section covers the furnishing of supervision, materials, labor, equipment and miscellaneous items necessary to construct sewers and appurtenances as shown on the plans and as specified herein, complete, tested, and ready for service. All pipe and appurtenances shall be of the class and type as indicated on the plans and designated hereon.
1.2 GENERAL INTENTION: The work covered by this section consists of all supervision, excavation, bedding, laying pipe, jointing and coupling pipe sections, and backfilling necessary to install the various types of pipe required to complete the project.
PART 2 – MATERIALS
2.1 MATERIALS: All materials shall be first quality with smooth interior and exterior surfaces, free from cracks, blisters, honeycombs and other imperfections, and true to theoretical shapes and forms throughout. All materials shall be subject to the inspection of the Engineer at the plant, trench, or other point of delivery, for the purpose of culling and rejecting material that does not conform to the requirements of these specifications. Such material shall be marked by the Engineer and the Contractor shall remove it from the project site upon notice being received of its rejection. As particular specifications are cited, the designation shall be construed to refer to the latest revision under the same specification number, or to superseding specifications under a new number except provisions in revised specifications that are clearly inapplicable.
2.1.1 Handling and storing materials: The Contractor shall unload pipe so as to avoid deformation or other injury thereto. Pipe shall not be rolled or dragged over gravel or rock during handling. When any joint or section of pipe is damaged during transporting, unloading, handling, or storing, the undamaged portions of the joint or section may be used where partial lengths are needed, or, if damaged sufficiently, the Engineer will reject the joint or section as being unfit for installation. If any defective pipe is discovered after installation, it shall be removed and replaced with sound pipe or shall be repaired by the Contractor in an approved manner and at his own expense.
2.2 Pipe and Fittings:
2.2.2 Polyvinyl Chloride Pipe (PVC): Polyvinyl Chloride Pipe (PVC) pipe shall meet the requirements of ASTM D 3034, latest editions, and be suitable for use as a gravity sewer conduit. The pipe shall be SDR 35 unless otherwise specified. The pipe shall be supplied in standard laying lengths of 20 feet and 12.5 feet.
2.2.2.1 PVC Pipe Joints: All PVC pipe joints shall be of an integral bell and spigot of the same material as the pipe with a solid cross–section rubber "O" ring securely locked in place at the point of manufacture. Service saddles and other fittings shall be supplied by the pipe manufacturer and shall be of the same material and type of construction as the pipe material.
2.2.3 Ductile Iron Pipe (DIP): Ductile Iron Pipe shall be manufactured in accordance with ANSI Specification A 21.51. All ductile iron pipe shall be Class 50 unless other wise specified and shall be lined with cement mortar not less than 1/16"–inch thick conforming to ANSI Specification A 21.4.
2.2.3.1 DIP Joints: Slip or "push–on" joints shall be manufactured in accordance with ANSI Specification A 21.11. Bells of "slip" joint pipe shall be contoured to receive a bulbshaped, circular rubber gasket, and plain ends shall have a slight taper to facilitate installation. The pipe manufacturer shall furnish the lubricant used in making up the joints. The jointing shall be done by guiding the plain end into the bell until contact is made with the gasket and by exerting a sufficient compressive force to drive the joint home until plain end makes full contact with the base of the bell.
2.2.4 Reinforced Concrete Pipe: Reinforced concrete pipe shall be furnished in sizes and classes shown and specified on the Contract Drawings and the Bid Schedule. All pipes under this Section shall conform to the latest revisions of ASTM CC–76 – Reinforced Concrete Culvert, Storm and Sewer Pipe. The provisions of ASTM C–655 may also be utilized. Reinforced concrete pipe shall be anufactured by centrifugal or vertical casting methods. For vertical casting methods, mechanical vibration shall be provided to insure proper consolidation of concrete. Density of cured concrete shall be 150 lbs./ft. or greater.
2.2.4.1 Concrete Pipe Test: All shipments of pipe shall be tested at the Contractor's expense in accordance with ASTM C–76 Section 11 (2) except as modified. Preliminary testing for extended deliveries shall include 3–edge bearing tests to the .01–inch crack on three (3) sections of each size pipe. Testing shall be by an approved testing laboratory. Specimens up to 0.5 percent of the number of each size of pipe furnished shall be tested, except that in no case shall less than two specimens be tested. The laboratory making the tests shall furnish the Engineer with three (3) certified copies of these tests. No pipe shall be laid before the Engineer approves test reports.
2.2.4.2 Concrete pipe shall be manufactured in joint lengths of 8 feet or greater.
2.2.4.3 Results of absorption tests performed on the pipe shall not exceed 6.5 percent.
2.2.4.4 The alkalinity of the concrete cover over the inner reinforcing steel on the inside pipe wall at the crown shall be no less than 0.50 (50 percent) expressed as calcium carbonate equivalent. The manufacturer shall determine the alkalinity of the concrete cover at intervals determined by the Engineer. Samples for alkalinity determination shall be obtained by drilling one–inch diameter holes in the pipe interior to the reinforcing steel. The ground concrete from this drilling shall be the sample material used for the alkalinity determination. Core holed in test pipe may be suitably repaired by a method approved by the Engineer and used on the project. The laboratory making the test shall furnish the Engineer with three (3) certified copies of these tests. No pipe shall be laid before the Engineer approves these reports.
2.2.4.5 Bell and spigot reinforced concrete sewer pipe shall be joined with an O–ring rubber gasket type joint conforming to the applicable provisions of ASTM C–361, latest revisions. A groove shall be provided in the spigot end to receive the rubber gasket and it shall be so formed that when the joint is complete, the gasket will be deformed to a near rectangular shape and confined on all four sides. All inside surfaces of the bell and outside closure of the joint, and at any degree or partial closure shall be parallel within one degree and have an angle of not more than two degrees with the longitudinal axis of the pipe. The gasket shall be the sole element utilized in sealing the joint from either internal or external hydrostatic pressure. Gaskets shall be the product of a manufacturer having at least five years experience in the manufacturer of rubber gaskets for pipe joints. The gaskets shall have smooth surfaces free from blisters, porosity, and other imperfections. The joint shall be assembled in accordance with the standard directions of the gasket manufacturer.
2.2.4.6 The pipe manufacturer shall design walls to meet the following requirements.
2.2.4.6.1 Pipe wall sections shall meet the structural requirements for pipe classes stated in the Bid Schedule for each size pipe.
2.2.4.6.2 Concrete cover over the inner reinforcing cage shall be a minimum of 1 inch greater than that required to meet structural properties. This may be accomplished by moving the inner reinforcing cage towards the outside of the pipe, by adding concrete on the inside of the pipe, by adding concrete on the outside of the pipe, or both. Inside pipe diameter shall not be decreased.
2.2.4.6.3 Reinforcing shall be sufficiently strong so that the pipe, without the additional interior cover, will meet the 3–edge bearing test requirements of ASTM C–76 for the .01–inch crack.
2.2.5 Steel Sanitary Sewer Pipe: Steel sanitary sewer pipe shall conform to ASTM A–53 Grade B or ASTM A–139 Grade B standard specifications. Steel sewer pipe shall have minimum yield strength of 35,000 psi and a minimum tensile strength of 60,000 psi with a wall thickness of .375 inches. External and internal surfaces shall have protective coatings. Coating shall consist of a coal–tar primer followed by hot coal–tar enamel at least 1/16–inch thick, or approved equal.
2.2.6 Steel Casing Pipe: Steel casing shall conform to ASTM A–53 Grade B or ASTM A–139 Grade B Standard specifications. Casing pipe shall have a wall thickness as follows:
30" 0.312 inches wall thickness
26" 0.312 inches wall thickness
16" 0.250 inches wall thickness
External surfaces of steel casing pipe to have a protective coating. This coating shall consist of a coal–tar primer followed by hot coal–tar enamel at least 1/16–inch thick, or approved equal.
2.3 Manholes: See Section 02601 Manholes, Drop Manholes and Conflict Manholes
PART 3 – EXECUTION
3.1 Preparation of pipe foundation: The pipe foundation shall be prepared to be uniformly firm and shape be true to the lines and grades as shown on the Contract Drawings. Any deviation or field adjustment will require the approval of the Engineer. The Contractor shall be responsible for the finished work conforming to proper line and grade.
3.1.1 Bedding: Whenever the nature of the ground will permit, the excavations at the bottom of the trench shall have the shape and dimensions of the outside lower third of the circumference of the pipe, care being taken to secure a firm bearing support uniformly throughout the length of the pipe. A space shall be excavated under and around each bell to sufficient depth to relieve it of any load and to allow ample space for filling and finishing the joint. The pipe, when thus bedded firmly, shall be on the exact grade. In case the bed shape in the bottom of the trench is too low, the pipe shall be completely removed from position, and earth of suitable quality shall be placed and thoroughly tamped to prepare a new foundation for the In no case shall the pipe be brought to grade by blocking up under the barrel or bell of the same, but a new and uniform support must be provided for the full length of the pipe. Where rock or boulders are encountered in the bottom of the trench, the same shall be removed to such depth that no part of the pipe, when laid to grade, will be closer to the rock or boulders than 6 inches. A suitable tamped and shaped foundation of approved material shall be placed to bring the bottom of the trench to proper subgrade over rock or boulders. The preparation of the pipe bedding shall be in accordance with the typical trench cross sections as shown on the Contract Drawings for the type of pipe being installed. Crushed stone use for pipe bedding shall be shovel sliced so that the materiel fills and supports the haunch area and encases the pipe to the limits shown on the trench cross sections.
3.1.2 Bedding at creek crossing: Where it is necessary to cross a creek, the following requirements pertain.
1a) One foot of cover where the sewer is located in rock.
2a) Three feet of cover in other material unless ferrous pipe is specified. More cover in major streams.
3a) In paved stream channels, the top of the sewer line shall be placed below the bottom of the channel pavement. 3.1.3 Proper backfilling shall take place to prevent erosion or siltation.
b) If crossing above water, Ductile Iron Pipe shall be used and the bottom of the pipe shall be above the 25–year flood elevation and special care taken to ensure minimal erosion on the creek banks.
3.1.3 Poor foundation material: Where the foundation material is found to be of poor supporting value, the Engineer may make minor adjustment in the location of the pipe to provide a more suitable foundation. Where this is not practical, the foundation shall be conditioned by removing the existing foundation material by undercutting to the depth as directed by the Engineer and backfilling with foundation conditioning material consisting of crushed stone.
3.1.4 Crushed stone for pipe bedding: Crushed stone for pipe bedding and for foundation conditioning is to be size #67 in ASTM designation D 488, "Standard Sizes of Coarse Aggregate for Highway Construction: (AASHTO M–43, size #67) The sieve analysis of #67 stone is as follows:
100% passing 1"
90% – 100% passing ¾"
20% – 55% passing 3/8"
0% – 10% passing #4
0% – 5% passing #8

3.2 Water in pipe trench: The Contractor shall remove all water which may encountered or which may accumulate in the trenches by pumping or bailing and no pipes shall be laid until the water has been removed from the trench. Water so removed from the trench must be disposed of in such a manner as not to cause damage to work completed or in progress.
3.3 Laying Pipe:
3.3.1 Manufacturer's recommendations: All piping is to be installed in strict accordance with the manufacturer's recommendations and the contract material specifications.
3.3.2 Proper tools and equipment: Proper tools, implements, and facilities satisfactory to the Engineer shall be provided and used for the safe and convenient prosection of pipe laying. All pipe and other materials used in the laying of pipe will be lowered into the trench piece by piece by means of a suitable equipment in such a manner to prevent damage to the pipe, materials, to the protective coating on the pipe, materials, and to proved a safe working condition to all personnel in the trench. Each piece of pipe being lowered into the trench shall be clean, sound and free from defects. It shall be laid on the prepared foundation, as specified elsewhere to produce a straight line on a uniform grade, each pipe being laid so as to form a smooth and straight inside flow line. Pipe shall be removed at any time if broken, damaged or displaced in the process of laying same, or of backfilling the trench.
3.3.3 Cutting pipe: When cutting short lengths of pipe, a pipe cutter as approved by the Engineer will be used and care will be taken to make the cut at right angles to the center line of the pipe or on the exact skew as shown on the plans. In the case of push–on pipe, the cut ends shall be tapered with a portable grinder or coarse file to match the manufactured taper.
3.3.4 Location of groove or bell: All pipe shall be laid with the groove or bell end upgrade, and the spigot or tongue fully inserted. All pipe joints will be constructed in strict accordance with the pipe manufactures specifications and materials and any deviation must have prior approval of the Engineer.
3.3.5 Pipe deflection: All pipe installations shall be tested for deflection. No pipe shall exceed deflection of 5 percent. The maximum deflection per joint of flexible joint pipe shall be that deflection recommended by the manufacturer. A stopper or plug shall be installed in the pipe mouth when pipe laying is not in progress.
3.4 Minimum Separation
3.4.1 The following minimum separations must be maintained.
a) any private or public water supply source, including and WS–1 waters or class I or class II impounded reservoirs used as a source of drinking water. 100 ft.
b) waters classified WS–II, WS–III, B, SA, ORW, HQW, or SB 50 ft.
c) any other stream, lake or impoundment 10 ft.
d) any building foundation 5 ft.
e) any basement 10 ft.
f) top slope of embankment or cuts of 2 feet or more vertical height 10 ft.
g) interceptor drains 5 ft.
h) groundwater lowering and surface drainage ditches 10 ft.
i) any swimming pool 10 ft.
j) storm sewers (vert.) 12 in. (horz.) 12 ft.
k) water mains (vert.) 18 in. (horz.) 10 ft.
l) benched trenches (horz.) 18 in.

3.4.2 Where the required minimum separations cannot be maintained, ferrous sanitary sewer pipe with joints equivalent to water main standards must be used. However, the minimum separations shall not be less than 25 feet from a private well or 50 feet from a public water supply source.
3.5. N/A
3.6.1 Sanitary sewer lines shall be deep enough to serve all adjoining property and allow for sufficient slope in lateral lines. All sanitary sewer mains shall have the following minimum covers:
a) 4 ft. from top of pipe to finish subgrade when under a roadway.
b) 3 ft. from top of pipe to finished subgrade when outside a roadway.
3.6.2 The above requirements may be waved by authority of Director, in which case ductile iron pipe shall be used.
3.6.3 Sewer mains deeper than 12 feet require stone bedding.
3.6.4 Transitions between pipe materials shall occur at manholes.
3.6.5 Where sanitary sewer lines and water lines must cross, ductile iron pipe shall be used and pipes shall cross at near 90 degree angles with 18" minimum separation, as stated in the separation table.
3.6.6 Sewer mains shall be installed in dedicated public right of ways or in dedicated utility easements.
3.6.7 Sewer line easements shall be graded smooth, free from rocks, boulders, roots, stumps, and all other obstructions and seeded and mulched upon completion of construction.
3.6.8 Downstream manholes on sanitary sewer lines under construction shall be plugged and secured to prevent any seepage of water into or out of the line while under construction.
3.7.1 Initial backfill: The initial backfill for pipe shall be carefully placed to a level of 12 inches over the top of the pipe. This backfill shall be excavated soil free from debris, organic material and large rock and stones. Initial backfill shall be shovel sliced so that the material fills and supports the haunch area and encases the pipe to the limits shown on the trench cross sections on the Contract Drawings.
3.7.2 Final backfill: Final backfill for pipelines shall be defined as that portion of the trench from an imaginary line drawn 12 inches above the top of the pipe to the original ground surface. Final backfill will be done with suitable excavated material and tamped in 12 inch lifts. Debris, material not given to adequate compaction, and stone over one cubic foot will not be allowed within the trench limits. If material excavated is not suitable for backfilling, the Contractor shall, at no increased cost to the Owner, remove and dispose of such unsatisfactory material and shall backfill the trench with suitable material obtained elsewhere.
3.7.3 Steep Slope Protection: Sewers on 20 percent slopes or greater shall be anchored securely with concrete, or equal, with the anchors spaced as follows:
a) Not greater than 36 feet center to center on grades 21% to 35%
b) Not greater than 24 feet center to center on grades 35% to 50%
c) Not greater than 16 feet center to center on grades 50% and over
3.7.4 Compaction:
3.8.1 Within traffic areas: When pipelines installed within the ditch to ditch limits of any roadway, driveway or parking area etc., backfill shall be compacted to a minimum dry density of 95 percent of the maximum dry density in pounds per cubic foot as determined by the Standard Proctor Compaction Test. Backfill material shall be placed in 6 inch layers and thoroughly tamped or rolled to the required degree of compaction by sheepsfoot or pneumatic rollers, mechanical tampers, vibrators, etc. Successive layers shall not be placed until the layer under construction has been thoroughly compacted.
3.8.2 Outside Traffic Areas: In areas outside the ditch to ditch limits of a roadway, driveway, parking areas, etc., backfill shall be compacted to a minimum dry density of 90% of the maximum dry density in pounds per cubic foot as determined by the Standard Proctor Compaction Test. Any settlement shall be immediately corrected.
3.8.3 Equipment Traffic: Heavy equipment shall not be operated over any pipe until it has been properly backfilled and has a minimum cover of 24 inches. Where any part of the required cover is above the proposed finish grade, the Contractor shall place, maintain, and finally remove such material at no cost to the Owner. Pipe which becomes misaligned, shows excessive settlement, or has been otherwise damaged by the Contractor's operations shall be removed and replaced by the Contractor at no cost to the Owner.
3.8.4 Pipe maintenance: The Contractor shall maintain all pipes installed in a condition that they will function continuously from the time the pipe is installed until the project is accepted.
3.8 Manhole installation:
3.9.1 Precast concrete manhole: A precast concrete manhole shall be installed at each break in line or grade in each sanitary sewer as shown in detail on the Contract Drawings. Manhole sections shall be set plumb and on firm foundations. Each joint between sections and all wall openings shall be sealed with 2:1 sand–cement mortar mix and made watertight. An eccentric cone section and standard frame and cover is to be installed on each new manhole. Final adjustment to grade of all manholes shall be done with brick and mortar and each frame and cover shall be grouted firmly into place.
3.9.2 Manholes shall be spaced at a maximum distance of 400 feet apart for lines 12 inches in diameter or smaller and at a maximum of 500 feet apart for lines greater than 12 inches in diameter.
3.9.3 Manholes for sewers under 21 inches in diameter shall be a minimum of 4 feet in diameter. Manholes for sewer 21 inches in diameter or greater shall be 5 feet in diameter. All manholes requiring inside drops shall be a minimum of 5 feet in diameter. When two or more inside drops occur at one manhole, a minimum of 6 feet in diameter manhole shall be used. All manholes shall have a minimum access of 22 inches in diameter.
3.9.4 Manholes inverts: Manhole inverts shall be constructed of concrete or concrete and brick of semicircular section conforming to the inside diameter of the outlet sewer. Changes in size of pipe or grade shall be made gradually and changes in direction constructed by using true Each manhole shall be provided with such channels for all connecting sewer pipes. Drop manholes shall be provided where invert separations exceed 2.5 feet.
3.9.5 Manholes located within the 100 year flood plain or in areas of high ground water shall abide by the following when applicable:
3.9.5.1 Watertightness:
3.9.5.2 Manholes shall be pre–cast concrete or poured–in–place concrete. Manhole lift holes and grade adjustment rings shall be sealed with non–shrinking mortar or other material approved by the Division.
3.9.5.3 Inlet and outlet pipes shall be joined to the manhood with a gasketed flexible watertight connection or any watertight connection arrangement that allows differential settlement of the pipe and manhole wall to take place.
3.9.5.4 Watertight manhole covers are to be used wherever the manhole tops may be flooded by street runoff or high water. Locked manhole covers may be desirable in isolated easement locations or where vandalism may be a problem.
3.9.5.5 Manholes shall be designed for protection from the 100–year flood by either:
a) Manhole rims shall be 12 inches (1 foot) above the 100–year flood elevation or,
b) Manholes shall be watertight and vented 12 inches (1 foot) above the 100–year flood elevation. Manholes shall be vented every 1,000 feet or every other manhole, whichever is greater.
3.9.6 Corrosion Protection for Manholes:
3.9.6.1 Where corrosive conditions due to septicity or other causes are anticipated, consideration shall be given to providing corrosion protection on the interior of the manholes.
3.9.6.2 Where high flow velocities are anticipated, the manholes shall be protected against displacement by erosion and impact. High velocity is defined as 15 fps or greater.
3.10 TESTING: All pipe installations shall be tested as specified herein. Tests shall be performed by Contractor at his expense in the presence of the Engineer or his representative. Testing shall not be performed until such time that all work which may affect the results of the testing has been completed. Where a test section fails to meet test requirements, Contractor shall make corrections as specified herein and retest the section. The correct/retest procedure shall continue until such time as test requirements are met.
3.10.1 Air Test: All gravity sewer pipe.
3.10.1.1 Air test shall be conducted in strict accordance with the testing equipment manufacturer's instructions, including all recommended safety precautions. No one will be allowed in the manholes during testing. Equipment used for air testing shall be equipment specifically designed for this type of test, and is subject to approval of the Inspector.
3.10.1.2 The test shall be performed only on clean sewer mains after services are installed and the pipe is completely backfilled. Clean sewer mains by propelling snug fitting inflated rubber ball through the pipe with water. After completely cleaned, plug all pipe outlets with suitable test Brace each plug securely.
3.10.1.3 For pipe within test sections above the ground water table, add air slowly to the portion of the pipe installation under test unti lthe internal air pressure is raised to the starting pressure of 4 psig. After the starting pressure is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure. When pressure decreases to 3.5 psig. Start stopwatch. Determine the time that is required for the internal air pressure to reach 2.5 psig.
3.10.1.4 For pipe with test sections below the ground water table, determine the starting pressure for the test section, in psig, as follows:
1. Determine the maximum depth of pipe within the test section in feet.
2. Multiply this depth by 0.67 feet and add 9.3 feet.
3. Multiply the result in part 2 by 0.43 and round to the nearest 0.5 psig. After this starting pressure is obtained, continue the test in accordance with the procedure in the paragraph above.
3.10.2 Requirement: The test section shall be acceptable if the elapsed time for pressure drop of 1.0 psig is greater than the sum of the times shown below for all pipe sizes within the test section.

PIPE DIAMETER (INCHES)

PIPE LENGTH	4	6	8	10	12	15	18	21	24
25	0:04	0:10	0:18	0:28	0:40	1:02	1:29	2:01	2:38
50	0:09	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17
75	0:13	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55
100	0:18	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34
125	0:22	0:50	1:28	2:18	3:18	5:09	7:26	9"55	11"20
150	0:26	0:59	1:46	2:45	3:58	6:11	8:30	"	"
175	0:31	1:09	2:03	3:13	4:37	7:05	"	"	"
200	0:35	1:19	2:21	3:40	5:17	"	"	"	12:06
225	0:40	1:29	2:38	4:08	5:40	"	"	10:25	13:36
250	0:44	1:39	2:56	4:35	"	"	8:31	11:35	15:07
275	0:48	1:49	3:14	4:43	"	"	9:21	12:44	16:38
300	0:53	1:59	3:31	"	"	"	10:12	13:53	18:09
350	1:02	2:19	3:47	"	"	8:16	11:54	16:12	21:10
400	1:10	2:38	"	"	6:03	9:27	13:36	18:31	24:12
450	1:19	2:50	"	"	6:48	10:38	15:19	20;50	27:13
500	1:28	"	"	5:14	7:34	11:49	17:01	23:09	30:14

3.10.3 Corrective Measures: If elapsed time is less than the specified amount, Contractor shall locate and repair leaks and repeat the test until elapsed time exceeds the specified amount.
3.11 Infiltration/Ex–filtration Test (Use All manholes):
3.11.1 The use of this method for sewer pipe, in lieu of air tests may be used as an alternate test method.
3.11.2 Procedure:
1. Infiltration: Immediately following a period of heavy rain a test of work constructed up until the time shall be made. Three measurements shall be made at one (1) hour intervals to compute the amount of the infiltration. Test for manholes only shall be conducted on individual manholes. Tests for pipe and manholes shall be performed on test sections not exceeding 600 linear feet of collector sewer and shall include both pipe and manholes. The Engineer reserves the right to use his judgment as to whether the ground is sufficiently saturated and/or whether the fall of rain is adequate to permit making infiltration tests. In the event that sufficient rain does not occur before the date of completion, the Contractor shall be required to conduct the tests at any time during a 30–day period following this date. Should the Engineer determine that certain pipe of manholes couldn't be tested by infiltration methods, the Engineer may direct the filling of lines and the measurement of ex–filtration. The allowable rate of ex–filtration shall be the same as for infiltration.
2. Ex–filtration: Determine test sections as outlined for infiltrations tests. Install a temporary water plug at the inlet and outlet of the test section. Fill test section with clean water up to the bottom of the lowest manhole frame within the test section. Allow time for saturation of pipe and manholes refilling test section as required. Beginning with a full test section, allow at least eight (8) hours to elapse without adding water. Measure the water level at the beginning and end of the elapsed time above. Compute the volume of water lost in gallons per hour.
3.11.3 Test Requirements: The rate of water loss/gain shall be less than the rate, in gallons per hour, calculated for the test section using the following allowances:
1. Sewer main and manholes with or without service laterals; 100 gallons per 24 hours per inch of sewer main diameter per mile of sewer main (gpd/in–mil).
2. Manholes only; 1 gallon per 24 hours per vertical foot of manhole.
3.11.4 Corrective Measures: If actual leakage rate is greater than required leakage rate, Contractor shall locate and repair leaks and repeat the test until actual leakage is less than the required rate.

SECTION 03300 CAST–IN–PLACE CONCRETE
1. GENERAL
1.1 SECTION INCLUDES
A. Cast–in–place concrete
1.2 REFERENCES
A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced to in the text by basic designation only.
1. AMERICAN CONCRETE INSTITUTE (ACI)
a. ACI 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete
b. ACI 318/318R Building Code Requirements for Reinforced Concrete
2. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
a. ASTM A 615 Deformed and Plain Billet–Steel Bars for Concrete Reinforcement
b. ASTM C 94 Ready–Mixed Concrete
1.3 SUBMITTALS
A. SD–05, Design Data
1. Concrete mix designs.
1.4 QUALITY ASSURANCE
A. Perform Work in accordance with ACI 301.
PART 2 PRODUCCTS
2.1 CONCRETE
A. Concrete: ASTM C 94: 4500 psi at 28 days using Type I or Type II cement; air–entrained to produce 5– to 7–percent air content, 4–inch maximum slump.
1. Aggregate for concrete: ACI 318.
2. Bar reinforcement: ASTM A 615, Grade 60, deformed.
PART 3 EXECUTION
3.1 PLACEMENT
A. The Engineer shall be contacted prior to placing all concrete to allow time for inspection. Place concrete in accordance with ACI 304R. Protect concrete from premature drying and excessively hot and cold temperatures. Maintain minimal moisture loss at a relatively constant temperature for the time necessary for hydration of the cement and proper hardening of the concrete. Cure for a minimum period of 7 days.
3.2 FORMWORK
A. Provide formed surfaces with plywood finish. Use commercially manufactured metal ties and other form accessories. Leave no metal within 1 inch of surface in exposed work. Patch tie holes and repairable defective areas immediately after form removal. Remove honeycombed and defective concrete down to sound concrete. Use patching mortar consisting of one part cement to 2–1/2 parts sand with no more mixing water than necessary for handling and placing.

FOR AGENCY REVIEW

NORTH CAROLINA
CLAYTON ENGINEERING & DESIGN, PLLC.
No. P–1463
CERTIFICATE OF AUTHORIZATION

NORTH CAROLINA
PROFESSIONAL
SEAL
40758
ENGINEER
WILLIAM S. CLAYTON
06/22/26

CLAYTON
ENGINEERING & DESIGN
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CATAWBA COUNTY
CATTLEMAN'S ASSOCIATION
NEWTON, NORTH CAROLINA
OWNER

EDUCATION CENTER
PROJECT TITLE

CIVIL

PROJECT SPECIFICATIONS
DRAWING TITLE

JOB NUMBER: 24105
DATE: 06/22/26
DRAWN BY: WSC
CHECKED BY: WSC

REVISIONS

NO.	DESCRIPTION	DATE

SPC103
SHEET - OF -

CONSTRUCTION STANDARD SPECIFICATION

SECTION 02665

UNDERGROUND WATER LINES FOR DOMESTIC AND FIRE PROTECTION SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. This section shall apply to the materials and operations required for the installation of underground water distribution lines and underground fire protection lines. The scope for fire protection lines begins at the connection to the water supply main and ends at the base of the building fire riser. The scope for non–fire protection lines ends 5 feet from the building foundation.

B. The extent of the work is indicated on the contract drawings.

C. Related Work: Refer to the following sections for related work:

Section 02200, "Earthwork".

Section 03300, "Cast–in–Place Concrete".

Section 09900, "Painting".

Section 15310, "Automatic Sprinklers and Water Based Fire Protection Systems".

1.2 REFERENCES

A. American Society of Mechanical Engineers (ASME)

B1.20.1	Pipe Threads, General Purpose (Inch)
B16.1	Cast Iron Pipe Flanges and Flanged Fittings
B16.3	Malleable Iron Threaded Fittings
B16.4	Gray Iron Threaded Fittings

B. American Society of Testing Materials (ASTM)

A48	Specification for Gray Iron Castings
A53	Standard Specification for Pipe, Steel, Black and Hot–Dipped Zinc – Coated Welded and Seamless (Replaces A120)
A536	Specification for Ductile Iron Castings
B62	Specification for Composition Bronze or Ounce Metal Castings
B88	Specification for Seamless Copper Water Tubes
D2000	Standard Classification System for Rubber Products in Automotive Applications
D2774	Standard Practice for Underground Installation of Thermoplastic Pressure Piping
F477	Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

C. American Water Works Association (AWWA)

C104	Cement–Mortar Lining for Ductile–Iron Pipe and Fittings for Water
C105	Polyethylene Encasement for Ductile–Iron Piping for Water and Other Liquids
C110	Ductile–Iron and Gray–Iron Fittings, 3 in. Through 48 in., for Water and Other Liquids
C111/A21.11	Rubber–Gasket Joints for Ductile–Iron Pressure Pipe and Fittings
C115	Standard for Flanged Ductile–Iron Pipe with Ductile–Iron or Gray–Iron Threaded Flanges
C116	Standard for Protective Fusion–Bonded Epoxy Coating for the Interior and Exterior Surfaces of Ductile–Iron and Gray–Iron Fittings for Water Supply Service
C151	Ductile–Iron Pipe, Centrifugally Cast, for Water and Other Liquids
C153/A21.53	Ductile–Iron Compact Fittings, 3 in. Through 16 in., for Water and Other Liquids
C207	Steel Pipe Flanges for Waterworks Service—Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm)
C213	Fusion–Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines
C500	Metal–Seated Gate Valves for Water Supply Service
C502	Dry–Barrel Fire Hydrants
C504	Rubber–Seated Butterfly Valves
C509	Resilient–Seated Gate Valves for Water Supply Service
C512	Air–Release, Air/Vacuum, and Combination Air Valves for Waterworks Service
C515	Reduced–Wall, Resilient–Seated Gate Valves for Water Supply Service
C550	Protective Epoxy Interior Coating for Valves and Hydrants
C600	Standard for Installation of Ductile–Iron Water Mains and Their Appurtenances
C605	Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
C651	Disinfecting Water Mains
C800	Underground Service Line Valves and Fittings
C900	Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. Through 12 in., for Water Distribution

D. Copper Development Association (CDA)

E. Copper Tube Handbook International Conference of Building Officials (ICBO)

F. Code Council (ICC) – International Plumbing Code (IPC)

G. National Fire Protection Association (NFPA) 24 – Standard for the Installation of Private Fire Service Mains and Their Appurtenances

1.3 SUBMITTALS

A. General: Submit the following in accordance with conditions of Contract and Division 1, Section "Descriptive Submittals".

B. Product Data: Submit product data, or manufacturer's specifications including laboratory test reports and other data to show compliance with specifications (including specified standards).

C. All pipe materials, valves, fittings, equipment, and accessories shall be submitted for approval. Product data shall indicate the maximum allowable operating pressure of each component and any related manufacturing standard as appropriate. Product data and certification for mechanical joint t–bolts is required.

D. Test Reports: Submit test reports conducted on shop– and field–bolted and welded connections. Include data on type(s) of tests conducted and test results.

1.4 QUALITY ASSURANCE

A. Codes and Standards: All work shall comply with the applicable portions of the most current edition of the AWWA Standards referenced is Section 1.03, and the most current edition of the Code Council (ICC) – International Plumbing Code (IPC).

B. The materials and practices comprising the work shall conform to this and other referenced specifications. Where this specification conflicts with the requirements of another referenced specification, this specification shall prevail.

C. All materials used shall not contain any asbestos fibers.

D. All persons performing or supervising testing shall be qualified by either training or experience to perform such tests.

E. Soldering shall conform to ASME B31.3, Process Piping and Copper Development Association recommended practices.

F. Brazing: Certify brazing procedures, brazers, and operators in accordance with ASME B31.3, Process Piping, for shop and jobsite brazing of piping work.

PART 2 – PRODUCTS

2.1 PIPE AND JOINTS

A. Lines 4" and larger shall be ductile iron pipe (DIP). All pipes shall be permanently marked to allow identification of type and class and Underwriters Laboratories (UL) listed or Factory Mutual (FM) approved if used for fire protection and shall conform to the following material requirements:

Ductile Iron Pipe (DIP) 4" and larger shall be as noted on the drawings but not less than pressure class 350, conforming to AWWA C151, with rubber–gasket joints conforming to AWWA C111, and cement–mortar lining conforming to AWWA C104. The pipe exterior shall have a bituminous outside coating conforming to AWWA C151.

Flanged Ductile Iron Pipe shall conform to AWWA C115.

B. Service Lines 3" and smaller shall conform to the applicable provisions of AWWA C800, and shall conform to the material requirements for one of the following piping materials:

Copper Tubing: Type K, hard drawn or annealed, conforming to ASTM B88. Joints shall be AWS A5.8, BCuP silver braze.

Ductile Iron Pipe: Conforming to the requirements of article 2.01A for ductile iron pipe.

2.2 FITTINGS

A. Fittings for mainlines 4" and larger shall be ductile iron, Class 350 pressure rating minimum, mechanical joint conforming to AWWA C153 Ductile Iron Compact Fittings, or Class 250 ductile iron flange joint / Class 350 mechanical joint conformingto AWWA C110 Ductile Iron or Grey Iron Fittings, with cement–mortar lining conforming to AWWA C104. Mechanical joint fittings, with rubber–gasket joints conforming to AWWA C111 shall be used in all buried installations. Flanged fittings shall be used in aboveground installations, and inside underground structures, such as valve pits and vaults.

1. All hardware shall be in full compliance with the requirements of AWWA C111 / ANSI A21.11. The bolts shall be manufactured from corrosion resistant low alloy steel, and shall comply fully with Public Law 1001–592, the "Fastener Quality Act".

B. Fittings for service lines 3" and smaller shall conform to the applicable requirements of AWWA C800 and the following requirements:

1. Copper fittings shall conform to the following requirements: brass or bronze body with compression connections or flared compression joints at transition points or points of connection. Wrought copper solder type fittings conforming to ANSI B16.22, or cast copper alloy solder joint fittings conforming to ANSI B16.18.
2. Fittings for ductile iron pipe shall be cast or ductile iron in accordance with AWWA C800.

C. Special fittings, reducers, flares, saddles, rings, caps, wyes or other as specified on the drawings shall be ductile iron unless otherwise specified or shown, with a 350 psi minimum pressure rating, mechanical joints conforming to AWWA C153 or flange joints conforming to AWWA C110, and shall be coated with 2 coat fusion bonded epoxy coating per AWWA C–116.

2.3 COUPLINGS

Couplings 4" and larger shall only be used to join asbestos cement pipe to approved piping materials. The coupling shall have a 200–psi minimum working pressure rating; the body (middle ring) and followers shall be made from steel or ductile iron. The bolts and nuts shall be ANSI 304/303 Stainless Steel, or corrosion–resistant alloy bolts and nuts. The coupling shall have an NSF–61–registered fusion bonded powder epoxy coating, and shall meet all applicable requirements of AWWA C–219. The coupling shall be Dresser Style 253 Modular Cast Coupling, Total Piping Solutions – Hymax 2000, Smith Blair 413, or approved equal.

2.4 VALVES

Distribution, fire, and service line valves shall conform to the following requirements:

A. Resilient seat gate valves 2" – 12" conforming to AWWA C509. The valve shall open when turning counterclockwise. The stem shall be the non–rising type with inside screw and shall contain "O"–ring seals. All valve end joints shall be mechanically connected and O–ring retainer shall be secured with nuts and bolts. Brass and bronze parts shall conform to AWWA C509. The resilient seat shall be mechanically retained or bonded to the gate or wedge. All Valves shall be UL listed in accordance with NFPA 24, and FM approved. Resilient seat gate valves shall be Mueller A–2360, Kennedy KEN–SEAL II Resilient–Wedge Valves, M&H C509 Style 4067, or approved equal.

B. Resilient seat gate valves 2" – 12" conforming to AWWA C515. The valve shall open when turning counterclockwise. The stem shall be the non–rising type with inside screw and shall contain "O"–ring seals. All valve end joints shall be mechanically connected and O–ring retainer shall be secured with nuts and bolts. Brass and bronze parts shall conform to AWWA C515. The resilient seat shall be mechanically retained or bonded to the gate or wedge. All Valves shall be UL listed in accordance with NFPA 24, and FM approved. Resilient seat gate valves shall be American Flow Control Series 2500 or M&H Style 7571.

C. Resilient wedge tapping valves sizes 3" through 12" shall conform to AWWA C509. The valve shall be UL listed in accordance with NFPA 24 and FM approved. The stem shall be the non–rising type with inside screw and shall contain "O"–ring seals. The inlet flange shall comply with ANSI B16.1, Class 125, and the outlet shall be mechanical joint in compliance with AWWA C111. Valve shall be fully compatible with approved tapping sleeve. The resilient wedge tapping valves shall be Mueller T–2360 or approved equal.

D. All valves smaller than 2" shall be of "O"–ring sealed ball or gate–operating, full–opening port type design. The valve shall have a cast bronze body, as per ASTM B62. The plug or key shall be cast bronze, as per ASTM B62, machined and/or deburred to create a smooth, true surface and assure a positive, durable seal. Valves shall be Mueller, Ford Meter Box Co. Inc, or approved equal.

1. The inlet and outlet connections shall be tightened by a one–way gripper band or a compression nut. A positive seal shall be obtained by a replaceable "O"–ring for use with the gripper band system or a beveled Buna–N gasket, as per ASTM D2000, for use with the compression nut system.
2. Curb boxes shall be installed with all valves smaller than 2" and shall be Mueller H–10306, Ford EA 2–25–50, or approved equal. Curb boxes shall be telescopic type with heavy cast–iron arch pattern base, steel upper section, and heavy cast–iron lid with a bronze bushed, bronze standard waterworks counter–sunk pentagon nut and shall be installed with a 12" x 12" x 4" concrete collar. Curb boxes shall be adjustable from 18" to 30" and held at the desired depth by a strong phosphor bronze opening. Upper sections of these boxes must be at least 1–1/4" to accept a shut–off rod. Boxes shall be coated inside and out with a tar–based enamel for corrosion resistance.

E. Indicator posts shall have a cast–iron body, 1–1/4" square operating nut, lockable operating wrench, with "OPEN" and "SHUT" targets appearing in full view when the valve is fully open or closed. Base shall be flanged and shall bolt onto the indicator post flange provided on top of the valve. The indicator post shall be fully compatible with the approved valve, capable of accepting a tamper switch, and the bury depth shall govern post dimensions. The Indicator posts shall be UL listed in accordance with NFPA 24 and FM approved. Indicator Posts shall be Mueller, No. A–20806, Kennedy Style 2945 or 2945A, American Flow Control IP–71, or approved equal.

F. Butterfly valves 14" and larger shall be rubber–seated, iron body, short body flanged, Class 150B, conforming to AWWA C504 for valves 14" and larger. Valves shall be installed so that the disc rotates about a horizontal axis. Operator shall be manual, side–mounted, with standard 2" square operating nut, opening counterclockwise. Butterfly valves shall be Mueller Lineseal III, Keystone Figure 47 or 504, McWane M&H450, American Darling, Pratt, Kennedy or approved equal. Butterfly valves shall not be used on fire protection lines.

G. Valve boxes shall have a gray cast–iron ring and cover with 5 1/4 inch shaft, screw type as designated on the standard drawing conforming to ASTM A48, Class 25C. The word "WATER" shall be cast onto the top of the cover in raised letters. Valve Boxes shall be installed with a concrete collar as shown in the drawings.

2.5 FIRE HYDRANTS

Fire hydrants shall have a cast or ductile iron body, traffic, dry barrel, post type, 150 psi working pressure, with two drain outlets constructed of bronze, conforming to AWWA C502. Main valve shall be compression type, 5–1/4" diameter. Hydrants shall have one 4–1/2" pumper connection and two 2–1/2" hose connections, with national standard fire hose coupling screw threads. Operating nut shall be pentagonal, 1–1/2" point to flat, opening counterclockwise. Indicate connection is 6" mechanical joint. Hydrants shall be capable of being field lubricated. Fire hydrants shall be Mueller A–423 Centurion, Kennedy Guardian K–81D, McWane M&H129T Model, or approved equal.

2.6 PRESSURE REDUCING VALVES

Pressure reducing valves (PRV) shall be cast–iron body, flanged end connections, globe pattern, single–seated, pilot–controlled, psi diaphragm type, Class 125 pressure rating, adjustable from 15 to 75 psi and shall operate hydraulically. PRV shall be a CLA–VAL Clayton Model 90–01 Series, size as designated on the contract drawings, or approved equal.

2.7 AIR AND VACUUM VALVES

Air and vacuum valves shall have a cast–iron body, stainless steel float, with baffle, sizes 1/2" through 3", as designated on the contract drawings. Valves shall be APCO Model Series 140, with NPT threaded outlet, or approved equal. Ring and cover for valve pit shall be gray cast–iron conforming to ASTM A48, Class 30 minimum, and shall be a NEENAH No. R–1910–A or an approved equal. Cover shall have the word "WATER" cast onto it in raised letters.

2.8 CONCRETE

Cast–in–place concrete for use in concrete thrust blocks, valve box and indicator post collars, and other concrete structures required by the contract drawings, shall conform to the requirements of Division 3, Section "Cast–in–Place Concrete".

2.9 TAPPING

A. Direct Tapping

Direct tapping is not allowed.

B. Tapping Saddles

Tapping saddles shall be used only when shown on the drawings and shall have a cast–iron, ductile iron, or bronze body with stainless steel or bronze straps, nuts, bolts and washers. Tapping Saddles shall be manufactured in conformance with AWWA C800. Gaskets shall be vulcanized elastomeric rubber or synthetic rubber compound. Saddles shall be compatible with Mueller threaded inlet or approved equal. Saddles used on PVC pipe shall be double–strap type. The tapping saddle model shall be rated for use on type specific piping material. Unless shown otherwise on the drawings the maximum allowable saddle tap shall be 2". Tapping Saddles shall be manufactured by the Ford Meter Box Company, Inc., the Mueller Co, or approved equal.

C. Tapping Sleeves

Tapping sleeves shall be used only when shown on the drawings and shall not exceed one–half the diameter of the line being tapped.

Heavy welded steel tapping sleeves shall be epoxy coated with stainless steel bolts and nuts, Buna–N rubber gaskets, flat face steel flange per AWWA C207 Class D, ANSI class150–outlet flange, and minimum150 psi working pressure rating. Tapping Sleeves shall be Ford FTSC, Smith–Blair 622, or Romac Industries, No. FTS 419.

Cast iron tapping sleeves shall be mechanical joint type with a working pressure of 200 psi, outlet flange to be Class 125, ASME B16.1, sleeves to include side and endgaskets of Buna–N rubber, eight high strength steel bolts and nuts to secure the halves of the sleeve to the pipe. Cast iron tapping sleeves shall be Mueller H–615.

2.10 CORPORATION STOPS

Corporation stops shall not be used directly on PVC pipe or Ductile Iron. Corporation stops shall have a bronze body, Mueller thread inlet by compression or flared outlet, 3/4" to 2", conforming to the applicable requirements of AWWA C800. Compression connection outlets shall be provided with a stainless steel liner.

2.11 THRUST RESTRAINTS

A. Cast–in–place concrete blocking, clamps and tie rods, shall conform to the requirements of Section 03300, "Cast–in–Place Concrete", SNL Standard Drawings, and construction drawings. Steel or cast–iron hardware shall be fully coated with asphalt or plastic varnish. A polyethylene liner, minimum thickness of 8 mils, shall be installed between the fitting and any concrete.

B. Mechanical joint restraint, for ductile iron pipe shall be the Series 1100 Megalug restraint as produced by EBAA Iron, Inc. or approved equal. The restraint shall be incorporated into the design of the follower gland. The restraining mechanism shall consist of individually actuated wedges that increase their resistance to pull–out as pressure or external forces increase. The device shall be capable of full mechanical joint deflection during assembly and the flexibility of the joint shall be maintained after burial. The joint restraint ring and its wedging components shall be made of grade 60–42–10 ductile iron conforming to ASTM A536. The wedges shall be ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of the latest revision. Torque limiting twist–off nuts shall be used to insure proper actuation of the restraining wedges. They shall have a rated working pressure of 350 psi in sizes sixteen inch and smaller and 250 psi in sizes eighteen inch through forty–eight inch. The devices shall be listed by Underwriters Laboratories up through the twenty–four inch size and approved by FM up through the twelve–inch size.

C. Mechanical joint restraint, for PVC pipe, shall be incorporated into the design of the follower gland. The restraint mechanism shall consist of a plurality of individually–actuated gripping surfaces to maximize restraint capability. Glands shall be manufactured of ductile iron conforming to ASTM A536. The gland shall be such that it can replace the standardized mechanical joint gland and can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of latest revision. Twist off nuts, sized same as tee–head bolts, shall be used to insure proper actuating of restraining devices. The restraining gland shall have a pressure rating equal to that of the pipe on which it is used. The restraining glands shall be listed by UL, and be approved by Factory Mutual. The restraint shall be the EBAA Iron Series 2000PV.

D. Restraint Harness for Ductile Iron Pipe push on bells size 4" and greater shall be made of ductile iron components. All ductile iron shall conform to ASTM A536. A split ring shall be used behind the bell and restraining ring shall have actuated wedges provide increased resistance to pull–out as pressure of external forces increase. The connecting tie rods that join the two rings shall be made of low alloy steel that conforms to ANSI/AWWA C111/A21.11. The assembly shall have a rated pressure of 350 psi for size sixteen inch and smaller and a rated pressure of 250 psi in sizes eighteen inch through thirty–six inch. The restraint shall be the Series 1700 Megalug Restraint Harness as produced by EBAA Iron, Inc or approved equal.

E. Restraint for existing Ductile Iron Pipe push on bells shall be made of ductile iron components conforming to ASTM A536. The split rings shall incorporate individually actuated gripping surfaces on the pipe ring opposite of the bell. A sufficient number of bolts shall be used to connect the bell ring and the pipe ring. The combination shall have a minimum working pressure rating of 350 psi for sizes eight inches and less, 300 psi for sizes ten inches through 16 inches, and 200 psi sizes 18 inches through 36 inches. The restraint shall be the Series 1100HD Restraint for Existing Push–on Joints for Ductile Iron Pipe as manufactured by EBAA Iron, Inc or approved Equal.

F. Restraint Harness for C900 PVC pipe bells size 4" – 12" shall be made of ductile iron components. All ductile iron shall conform to ASTM A536. A split ring shall be used behind the bell and a serrated restraint ring shall be used to grip the pipe. A sufficient number of bolts shall be used to connect the bell ring and the pipe ring. The combination shall have a minimum working pressure rating of 150 psi. The restraint shall be the Series 1600 as produced by the EBAA Iron, Inc.

G. Restrained flange adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSIAWWA C115/A21.15. Restraint for the flange adapter shall consist of a plurality of individually actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of the gripping wedges. The flange adapters shall be capable of deflection during assembly or permit lengths of pipe to be field cut to allow a minimum 0.6 in. gap between the end of the pipe and the mating flange without affecting the integrity of the seal. For PVC pipe, the flange adapters will have a pressure rating equal to the pipe. For Ductile Iron Pipe, the flange adapter shall have a safety factor of 2:1 minimum. The use of flange adapters must be approved by SNL System Engineering. The flange adapter shall be the Series 2100 Megaflange adapter as produced by EBAA Iron, Inc.

PART 3 – EXECUTION

3.1 PIPE LAYING

A. General: Provide water pipe of the size, type and class specified and install at the locations and to the elevations and grades indicated on the contract drawings.

B. Pipe installation shall be in accordance with the applicable provisions or requirements of the following specifications, drawings and references:

Section 02200, "Earthwork".

Ductile iron pipe installation shall conform to AWWA C600. Where indicated on the contract drawings, pipe shall be encased in polyethylene film according to AWWA C105.

Plastic pipe installation shall conform to AWWA C605 "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water"

Install detectable warning tape that can be detected by a standard metal pipe locator on all water line per Section 02200, "Earthwork".

Copper tubing service lines shall conform to AWWA C800 and the CDA "Copper Tube Handbook".

C. The installation of the fire protection line shall conform to NFPA 24, NFPA 13, and SNL Standard Drawing FX5003STD. Fire protection lines shall terminate inside the building with a flange and spigot piece. The spigot piece shall be plumb with the flange installed level, and set not less than 4" above the finished floor. A blank flange shall be temporarily installed on top of the flange and spigot piece to prevent the entrance of foreign matter into the supply line. Upon arrival at the job site, each section of pipe shall be inspected for damage and defects, and for compliance with the applicable piping materials products requirements listed in Part 2 of this specification. Defective sections of pipe may be marked by the Sandia Delegated Representative (SDR). Any sections of pipe found to be defective shall be immediately removed from the job site and shall be replaced by the Contractor.

D. Immediately prior to laying, each pipe section shall be visually inspected for defects or damage. Any damaged or defective pipe section shall not be used. Each pipe section shall be cleaned so that the interior and joining surfaces of the pipe are free of soil and debris.

E. Pipe shall be laid on a smoothly graded prepared subgrade soil foundation true to alignment and grade as indicated on the contract drawings. The allowable vertical and horizontal tolerance from drawing elevations and alignment shall be 2" . Bell holes shall be hand–excavated so that the bottom of the pipe is in continuous contact with the surface of the prepared subgrade material. Any pipe that has its grade or joints disturbed after laying shall be taken up and the pipe laid back in the trench. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug. Pipe shall not be laid in standing water or when trench or weather conditions are deemed unsuitable by the SDR. If conditions warrant, the inspector may require that the pipe be anchored to prevent floating.

F. Trenching and Backfill

1. Trench Type 4: Unless otherwise shown on the drawings the trench for pipe installation shall be Type 4 as defined by AWWA C600. Pipe bedded in 4" of sand, gravel, or crushed stone. Maximum size of pipe bedding material shall not exceed 1/2" particle size and material shall be uniformly–graded, Backfill compacted to top of pipe to 80 percent.
2. Ductile Iron Pipe (DIP): The trench width from the bottom of pipe to 12" above top of pipe shall not exceed the outside diameter plus 24". The pipe haunch shall be backfilled so no voids exist and than backfilled in 8" maximum lifts. Unless otherwise specified, continue 8" lifts and 90 percent compaction in areas under roadways and paving. Compact to normal soil density in areas not supporting roadways or paving unless noted otherwise.
3. Polyvinyl Chloride Pipe (PVC): Proper placement of soils around existing PVC pipe is extremely important. Only hand tampers shall be used to compact backfill around the pipe. Care shall be taken not to damage or misalign the pipe during compaction. The trench width from the bottom of pipe to 12" above top of pipe shall not exceed the outside diameter plus 24". If trench width exceeds the maximum allowed or PVC pipe is placed in compacted backfill than the pipe embedment shall be compacted to 2.5 diameters on each side of the pipe. The pipe haunch shall be backfilled so no voids exist and than backfilled in 8" maximum lifts compacted to 90 percent density to the centerline of pipe. Unless otherwise specified continue 8" lifts and 90 percent compaction in areas under roadways and paving. Compact to normal soil density in areas not supporting roadways or paving unless noted otherwise.
4. Minimum depth of cover for water lines shall be 3 feet from the top of pipe to finished grade. Unless otherwise indicated on the contract drawings.
5. When it is necessary to deflect ductile iron pipe for changes in horizontal or vertical alignment, the amount of deflection shall not exceed 2/3 of the manufacturer's recommended maximum deflection. A fitting or several shorter lengths of pipe shall be used when necessary. PVC pipe shall not be deflected at the joints.

G. Joints

1. Push–on–Joints: Immediately prior to making the joint, the rubber gasket shall be removed and cleaned, the groove cleaned, the gasket replaced, and the bell and spigot ends thoroughly cleaned and lubricated with a suitable sterile soft vegetable soap compound. Field–cut plastic pipe sections shall be beveled for joining as recommended by the pipe manufacturer.
2. Mechanical Joints: The socket and plain ends shall be thoroughly cleaned immediately prior to making the joint. Wash the seating surfaces and the rubber gasket with a soapy solution. Seat the plain end fully in the socket before slipping the gasket into the socket. The joint shall be kept straight during assembly. If a joint deflection is required, make the deflection after assembly, but before tightening bolts, tighten nuts 180 degrees apart in pairs. Alternate pairs until all nuts are within the manufacturer's recommended range of torque. The Contractor shall have a torque wrench on hand at the work site so that the Sandia National Laboratories (SNL) Inspector may verify tightening torque on any joint.
3. Flanged Joints: Clean the flanged ends to be joined immediately prior to joining. Only one gasket shall be permitted in a flange joint. Nuts shall be tightened similar to mechanical joints to within the torque range recommended by the pipe manufacturer.
4. Hardware: All nuts and bolts utilized in underground pipe connections shall be stainless steel, high–strength, cast–iron or high–strength, high–grade steel and shall be of the proper size and type for the application in which they are utilized. All iron or high–strength steel bolts shall be cadmium–zinc plated or coated with bituminous material prior to backfilling. Additionally, all other hardware shall be fully coated with an asphalt or plastic varnish prior to backfilling.

3.2 LOCATION OF WATER AND SEWER LINES

A. Mains: Water and sewer mains running parallel shall be laid at least 10 feet apart horizontally, with the water main at a higher elevation than the top of the sewer line. Water and sewer mains shall be laid in separate trenches in all cases. Where water and sewer mains are laid closer than 10 feet or where they are crossing, the bottom of the water main shall be at least 12" higher than the top of the sewer line, otherwise, the sewer line shall be of pressure class pipe, or shall be encased in concrete, within 10 feet either side of the water main.

B. Service Lines: Water and sewer service lines shall not be laid in the same trench, unless the bottom of the water line, at all points, is at least 12" above the top of the sewer line, and the water line shall be laid on a solid shelf excavated at one side of the common trench. Where water and sewer service lines cross, the water line shall be at least 12" higher than the sewer.

3.3 THRUST RESTRAINT

All thrust restraint shall be accomplished by mechanical means unless shown otherwise on the contract drawings. Provide mechanical joint restraints at all tees, plugs, caps, bends, reducers, valves, and other mechanical joint fittings. Concrete blocking shown at a point of connection to an existing does eliminate the requirement for restrained joints at the fitting in question unless specifically stated in the contract drawings. Restrained joints will be subject to the hydrostatic test pressure as specified under hydrostatic testing. Restrained lengths shall be in accordance with the contract documents or applicable SNL Standard Drawings.

C. Mechanical joint restraints shall be installed as shown in the contract drawings and per AWWA C600. The use of mechanical joint restraints for modifications to existing piping shall not constitute proper thrust restraint unless verification is made that the uncovered adjacent joints are properly restrained. Concrete blocking may be used in addition to required mechanical joint restraints as alternative to verification of existing joints. Prior to pressure testing the system shall be adequately sections of pipe between joints shall be backfilled and compacted to prevent separation of the joints.

D. Concrete blocking shall be installed in accordance to the requirements of Section 03300, "Cast–in–Place Concrete". Blocks shall be placed in the general shape and to the minimum dimensions indicated on the standard drawings, and shall be placed between the fitting and the undisturbed wall of the trench. Concrete shall be placed so that it does not make contact with any bolts or nuts on the fittings. A polyethylene film shall be placed between the fitting or valve and the thrust block. Pipe shall not be flushed, pressurized, or otherwise disturbed, until the new concrete blocking has reached its initial set and developed adequate strength. The pipe must be properly restrained against movement, backfilled, and compacted between joints. All hardware shall be fully coated with asphalt or plastic varnish.

E. Installation of Mechanical Joints per AWWA C600

5. Clean the socket and plain end. Lubrication and additional cleaning should be provided by brushing both the gasket and plain end with soapy water or an approved pipe lubricant meeting the requirements of ANSI/AWWA C111/A21.11, just prior to slipping the gasket onto the plain end for joint assembly. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end.
6. Insert the pipe into the socket and press the gasket firmly into the gasket recess. Keep the joint straight during assembly.
7. Push the gland toward the socket and center it around the pipe with the lip against the gasket. Insert bolts and hand tighten nuts. Make deflection after joint assembly but before tightening.
8. Tighten the bolts to the normal range of bolt torque as indicated in the table below while at all times maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, finally the remaining bolts. Repeat the process until all bolts are within the appropriate range of torque.

Pipe SizeTorque3"45–60 ft–lbs4"–24"75–90 ft–lbs30"–36"100–120 ft–lbs 3.4 VALVES

Gate and butterfly valves shall be installed at the locations indicated and as detailed on the contract drawings, and in accordance with AWWA C600. No change in the vertical or horizontal alignment of the pipe shall be allowed at connections to the valve. Valves shall be INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

3.5 VALVE BOXES

Install valve boxes over all gate and butterfly valves as detailed on the contract drawings, and in accordance with AWWA C600. Boxes shall be installed plumb and true, and shall be centered on the valve operating nut. The weight of the valve box shall not bear upon the control valve or pipeline. The valve box shall be accompanied by an 18" X 18" X 6" concrete collar as detailed on the contract drawings or SNL Standard Drawing WW3001STD.

3.6 VALVE STEM EXTENSIONS

Where the valve operating nut is at a depth greater than 2 feet below the valve box cover, an extension stem shall be installed in the box with the required size square wrench nut. Extension stems shall be equipped with a minimum of one stem guide or stem guides at intervals not exceeding 10 feet, and shall be affixed to the interior of the valve box.

3.7 FIRE HYDRANTS

A. Install fire hydrants at the locations indicated and as detailed on the contract drawing, and in accordance with AWWA C600. Hydrants shall be set plumb and true to the elevations indicated, with the center of the lowest nozzle at least 16" above surrounding finished grade. The traffic flange shall be a minimum of 2" above finished grade and maximum of 8". The 4–1/2" pumper nozzle shall face toward the nearest street, road, drive or parking area or as directed by the SDR. Not less than 8 cubic feet of crushed rock or gravel, 1/2" mean particle size, well–graded, not more than 5% by weight passing #100 sieve, shall be placed around the shoe of the hydrant so that drainage from the hydrant shall run readily from the drain ports and into the rock. The concrete thrust block at the hydrant shall not block the flow of drainage water from the drain ports. Each hydrant shall be connected to the main by a 6" lateral pipe controlled by a 6" gate valve as indicated on the contract drawings. A concrete collar shall be placed around the hydrant barrel at ground level as indicated in the contract documents or the referenced SNL standard drawing. Hydrants shall be painted per SNL specification division 9 "Painting".

B. Bollards shall be installed around fire hydrants as required by the construction drawings or per the SNL standard drawings referenced in the contract documents.

3.8 INDICATOR POSTS

A. Install indicator posts over valves on fire protection lines and on non fire protection lines in remote areas. Posts shall be bolted to the flange at the top of the valve and shall be installed plumb and true to the elevations indicated. The bury line on the indicator post shall match the final grade at the location of the indicator post. Paint indicator posts per SNL specification division 9 "Painting". Indicator posts installed on fire protection mains shall be painted red, and on non fire protection lines shall be painted yellow. Indicator posts shall be installed such that grade mark is level with the finish grade. Indicator posts installed on fire protection mains shall be installed with the following provisions: a ¾" inch rigid metal conduit stubbed up through the concrete collar to facilitate the installation of an electric valve supervision switch in accordance with the contract documents. Refer to SNL Standard Drawing WW3002.

B. Bollards shall be installed around post indicator valves as required by the construction drawings or per the SNL standard drawings referenced in the contract documents.

3.9 PRESSURE REDUCING VALVES

Install pressure–reducing valves in valve vaults at locations and elevations indicated and as detailed on the contract drawings.

3.10 AIR AND VACUUM VALVES

Install air and vacuum (A/V) valves at high points on the water line where indicated and as detailed on the contract drawings. A/V valves shall be installed in precast reinforced concrete pipe vaults with appurtenant piping, fittings and valves as detailed in the drawings. Provide water meter type cover with vent and concrete collar as detailed.

3.11 CONNECTIONS TO SUPPLY MAINS

A. Service connections to existing or new mains shall be made with fittings suitable for the particular conditions encountered and in a manner acceptable to the SDR. Connections shall be made by cutting the supply main and inserting a standard tee, by pressure–tapping using a tapping sleeve and valve, or by saddle and corporation stop. Provide non–conducting dielectric connections wherever jointing dissimilar metals on service lines.

B. All equipment used for drilling, tapping and the installation of tapping saddles and tapping sleeves shall be subject to approval by the SDR.

C. Direct–taps and multiple service saddle taps staggered around the circumference of the pipe or in a straight line are not allowed on the water main.

D. Pipe coupons shall not be left inside the water main when the tapping method is used. All pipe coupons removed shall be turned over to the SDR.

E. Connections 3"or larger to existing mains that are made with a tapping sleeve require the appropriate size thrust block behind the tapping sleeve.

F. Connections to existing lines made with standard fittings shall require a thrust block at the fitting in locations where mechanical joint restraint requirements can not be confirmed.

3.12 SERVICE LINES

A. Install service lines at the locations designated on the contract drawings. The installation of the plumbing systems shall conform to the International Plumbing Code (IPC) and this specification.

B. Copper tubing shall be cut by using cutters designed for that purpose. Bends in copper tubing shall be made using fittings or by using proper tubing benders. Bends in polyethylene tubing shall be made only with the appropriate fittings, and shall not be made by deflecting the tubing.

C. Brazed Joints:

1. All underground joints shall be brazed.
2. Cut tube ends square. Ream, remove burrs, and size.
3. Brazed copper–to–copper joints shall be made with a silver–brazing alloy conforming to AWS A5.8, BCuP–5 (15% silver). Joints shall comply with ANSI/ASME B31.3 Process Piping.
4. Brazed copper to brass joints shall be made with a silver–brazing alloy conforming to AWS A5.8, BAg–7 (45% silver). Joints shall comply with ANSI/ASME B31.3 Process Piping.
5. Use sand cloth or a steel wire brush to clean surfaces to be joined. Steel wool is not permitted.

3.13 FLUSHING

Flushing shall be performed in accordance with SNL Specification 02516 Flushing and Disinfection.

3.14 HYDROSTATIC TESTING

A. WARNING: The testing methods described in this section are specifically for water pressure testing. These procedures are not permitted for air pressure testing due to the serious safety hazards involved.

B. New water line installations shall be hydrostatically tested in accordance with AWWA C600 for ductile–iron pipe. The SDR shall be present at all times for the duration of the test.

C. All temporary plugs, taps, thrust restraints, gauges, and other necessary testing equipment must meet the same nationally recognized standards as listed in Part 2 – Products. They shall be provided by the Contractor and shall be subject to approval by SNL, except that SNL may elect to provide the gauges used in the test.

D. New lines shall be tested without being connected to existing lines.

E. Hydrostatic test pressure for new lines (excluding the section of fire protection line which runs from the Post Indicator Valve (PIV) to the sprinkler riser), shall be 150 psi or 1.5 times the normal working pressure of the line, whichever is greater. In addition, test pressure for new fire lines, as defined above, shall be a minimum of 200 psi or 50 psi in excess of static pressures greater than 150 psi, per NFPA 24. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged or left in place at the discretion of the SDR. Test duration shall be not less than 2 hours. During the test, the test pressure shall not drop for lines less than 1000 feet long. For lines greater than 1000 feet long, see article 3.14 F. Each section of the new line between valves shall be tested individually to demonstrate that each valve will hold the test pressure. In cases where a new main is being connected to an existing main without the installation of a new valve, the end of the new main shall be temporarily capped and restrained, and the test shall be performed on the new line. Tests shall not be made with an existing main included in the test section.

F. The allowable leakage rate for lines greater than 1000 feet long shall be 11.65 gpd, per mile, per inch nominal diameter while maintaining the test pressure. The new waterline may be accepted if the total test leakage is less than the calculated allowable leakage. If the actual leakage is greater than the allowable leakage, the Contractor shall locate the leakage and make repairs as necessary at no additional cost to SNL. The Contractor shall repeat the test until the leakage is within the specified allowance. All visible leaks, regardless of the amount of leakage, shall be repaired.

G. The Contractor shall submit a calculation and the data sheet to SNL for each test, showing all data and measured quantities, including the actual leakage, the location of each test section, and a calculation of the allowable leakage for the test section. The test sheet shall be signed and dated by the Contractor's representative. For dedicated Fire Protection lines, complete and submit a Contractor's Material and Test Certificate for Underground Piping in accordance with the current NFPA 24.

3.15 DISINFECTING

Disinfection of the water system shall be performed in accordance with SNL Construction Standard Specification 02516, Flushing and Disinfection of Underground Water Lines for Domestic and Fire Protection Systems.

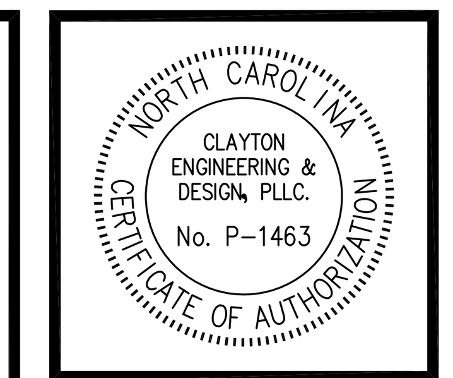
3.16 STORAGE

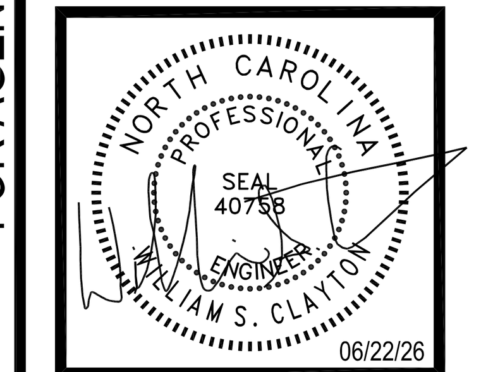
A. All plastic pipe shall be protected from sunlight for long–term storage. Any plastic pipe showing discoloration shall be rejected.

B. Joint materials for pipe shall be stored in as cool and shaded a place as practicable, preferably at 70 degrees F or less.

END OF SECTION

FOR AGENCY REVIEW





CLAYTON
ENGINEERING & DESIGN
1209 9TH AVE NE; PO BOX 2351 HICKORY, NC 28601

CATAWBA COUNTY
CATTLEMAN'S ASSOCIATION
NEWTON, NORTH CAROLINA\
OWNER

EDUCATION CENTER
PROJECT TITLE

CIVIL

PROJECT SPECIFICATIONS
DRAWING TITLE

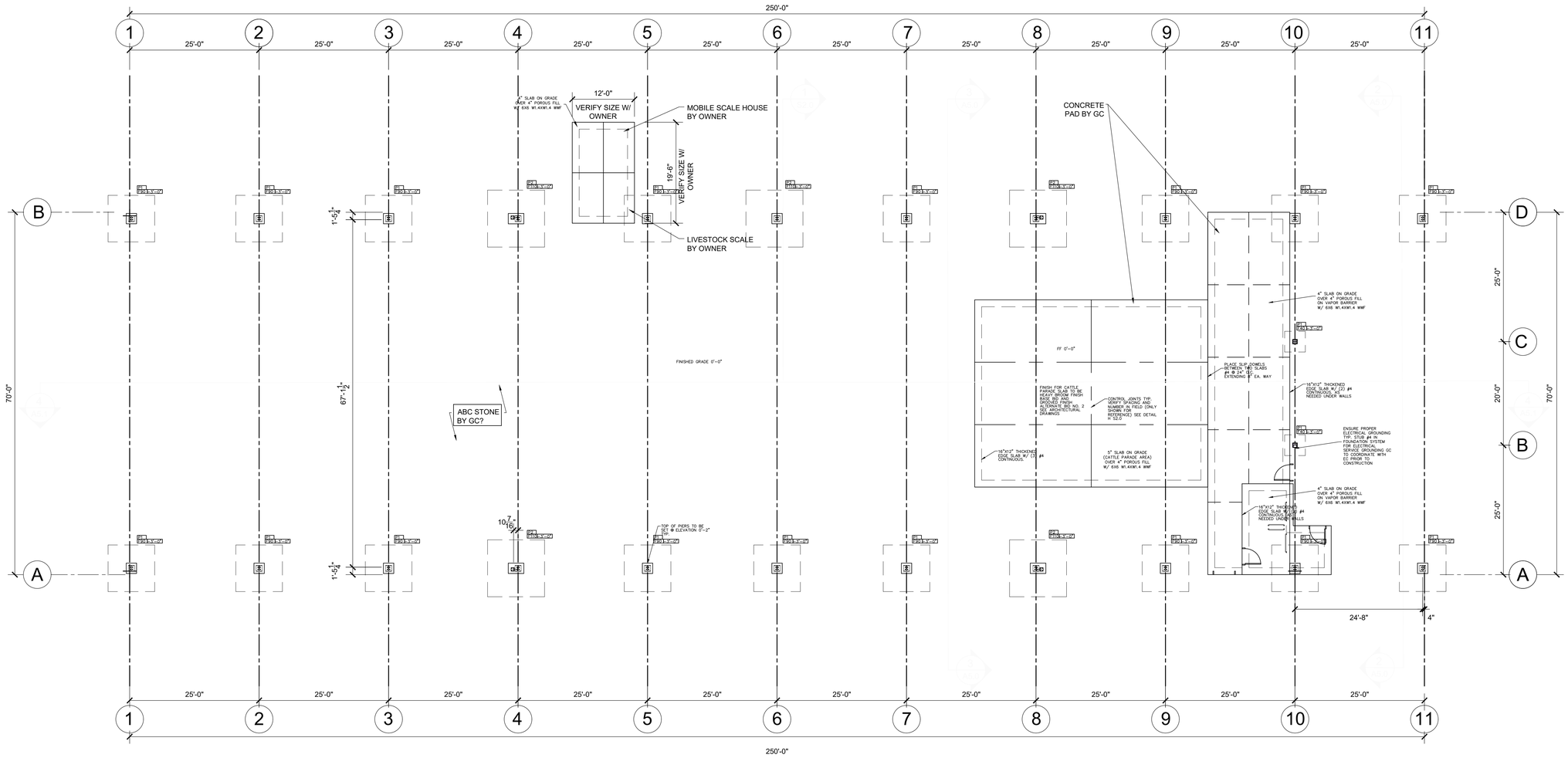
JOB NUMBER:	24105
DATE:	06/22/26
DRAWN BY:	WSC
CHECKED BY:	WSC

REVISIONS

NO.	DESCRIPTION	DATE

SPC104

SHEET - OF -



1 FOUNDATION PLAN
S1.0 SCALE: 3/32" = 1'-0"

XX
Fxx | T/FTG.

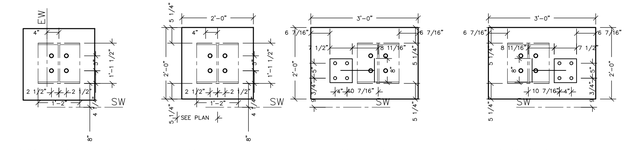
XX = PIER MARK PER SCHEDULE
Fxx = FOOTING MARK PER SCHEDULE
T/FTG. = TOP OF FOOTING FROM DATUM

FOOTING SCHEDULE

Fp = 2000 psf

FOOTING ID	FOOTING L x W x D	FOOTING REINFORCEMENT	REMARKS
F40	4'–0"x4'–0"x2'–0"	5– #5 E.W.	SEE DETAIL FOOTING & BASE PLATE DETAILS
F90	9'–0"x9'–0"x2'–0"	26– #6 E.W.	SEE DETAIL FOOTING & BASE PLATE DETAILS
F110	11'–0"x11'–0"x2'–0"	24– #7 E.W.	SEE DETAIL FOOTING & BASE PLATE DETAILS

NOTE: METAL BUILDING MANUFACTURER TO DESIGN COLUMNS AND BASEPLATES. FINAL METAL BUILDING PLANS TO BE PROVIDED TO VERIFY ADEQUATE FOUNDATION AND PIER DESIGNS THIS PLAN IS FOR PERMITTING PURPOSES ONLY AND WILL REQUIRE REVIEW UPON STAMPED FINAL METAL BUILDING PLAN RECEIPT



PIER 1A,1B,11A,11B

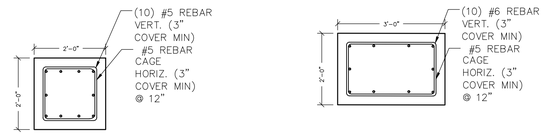
PIER 2A,2B,3A,3B, 5A,5B,6A,6B,7A,7B, 9A,9B,10A,10B,11A,11B

PIER 4A,4B

PIER 8A,8B

PIER NOTES:
1. GC TO REVIEW PRE ENGINEERED METAL BUILDING PLANS AND CONFIRM ANCHOR BOLT / PLATE LOCATIONS WITH THIS PLAN.

PIER DETAILS W/ BASE PLATES (B / S1.A)



TYPICAL PIER (P1) REINFORCMENT LAYOUT

TYPICAL PIER (P2) REINFORCMENT LAYOUT

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7/30/26

SEAL

MARTY ALLEN BEAL REGISTERED ARCHITECT 5409 NORTH CAROLINA NEWTON, N.C.
06/22/2026

PROJECT

CATAWBA COUNTY CATTLEMEN'S ASSOCIATION Education Center

2894 MT. OLIVE CHURCH ROAD
NEWTON, NORTH CAROLINA 28658

DISTRIBUTION

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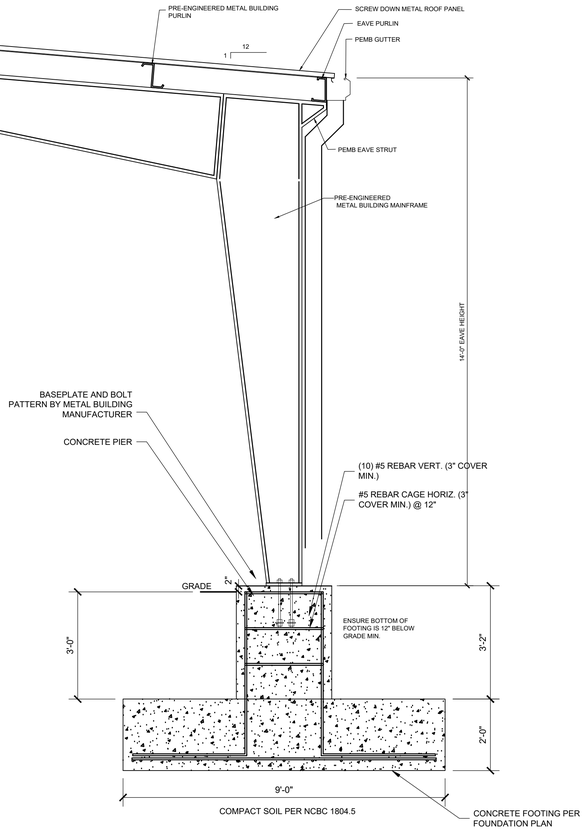
DRAWN BY:	MVS
CHECKED BY:	MAB

SHEET TITLE

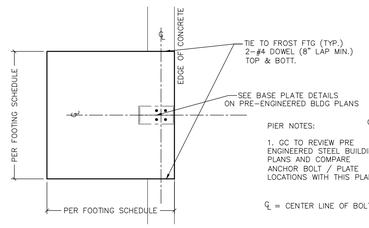
FOUNDATION PLAN

S1.0

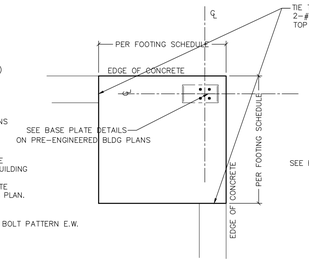
NOTE: METAL BUILDING MANUFACTURER TO DESIGN COLUMNS AND BASEPLATES. FINAL METAL BUILDING PLANS TO BE PROVIDED TO VERIFY ADEQUATE FOUNDATION AND PIER DESIGNS THIS PLAN IS FOR PERMITTING PURPOSES ONLY AND WILL REQUIRE REVIEW UPON STAMPED FINAL METAL BUILDING PLAN RECEIPT



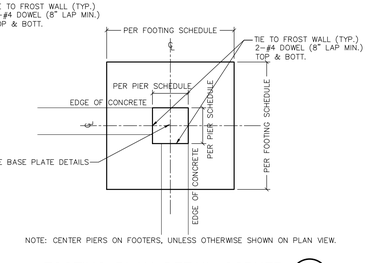
1 TYPICAL FOOTING SECTION
S2.0 SCALE: 1/2" = 1'-0"



FOOTING PLAN DETAIL SIDE A S2
3/8" = 1'-0"

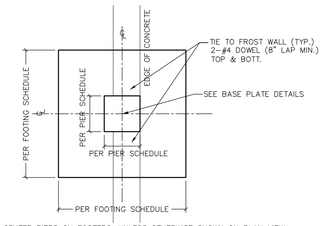


FOOTING PLAN DETAIL CORNER B S2
3/8" = 1'-0"



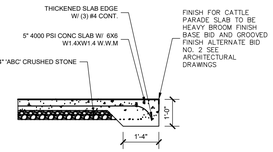
NOTE: CENTER PIERS ON FOOTERS, UNLESS OTHERWISE SHOWN ON PLAN VIEW.

FOOTING PLAN DETAIL CORNER C S2
3/8" = 1'-0"

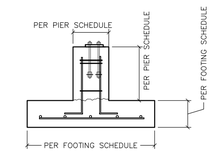


NOTE: CENTER PIERS ON FOOTERS, UNLESS OTHERWISE SHOWN ON PLAN VIEW.

FOOTING PLAN DETAIL SIDE D S2
3/8" = 1'-0"



CATTLE PARADE SLAB DETAIL E S2
3/8" = 1'-0"



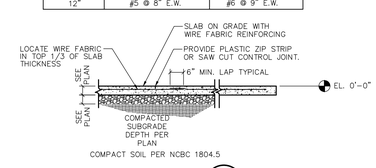
TYPICAL SECTION F S2
3/8" = 1'-0"

NCBC 1804.5 COMPACTED FILL MATERIAL: WHERE SHALLOW FOUNDATIONS WILL BEAR ON COMPACTED FILL MATERIAL, THE COMPACTED FILL SHALL COMPLY WITH THE PROVISIONS OF AN APPROVED GEOTECHNICAL REPORT, AS SET FORTH IN SECTION 1803.

EXCEPTION: COMPACTED FILL MATERIAL 12 INCHES (305 MM) IN DEPTH OR LESS NEED NOT COMPLY WITH AN APPROVED REPORT, PROVIDED THE IN-PLACE DRY DENSITY IS NOT LESS THAN 90 PERCENT OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT DETERMINED IN ACCORDANCE WITH ASTM D 1557. THE COMPACTION SHALL BE VERIFIED BY SPECIAL INSPECTION IN ACCORDANCE WITH SECTION 1704.7.

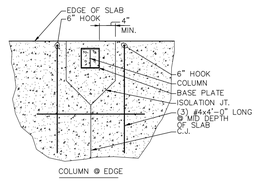
SLAB DEPTH	JOINT DOWELS
5 TO 6"	#6 X 14" @ 12" O.C.
7 TO 8"	#8 X 16" @ 12" O.C.
9 TO 11"	#10 X 18" @ 12" O.C.

SLAB DEPTH	CONTROL JOINT SPACING	
	10'-20'	20'-30'
	ALTERNATE SLAB REINFORCEMENT	
6"	#4 @ 11" E.W.	#4 @ 8" E.W.
7"	#4 @ 9" E.W.	#5 @ 11" E.W.
8"	#4 @ 8" E.W.	#5 @ 9" E.W.
10"	#5 @ 10" E.W.	#6 @ 11" E.W.
12"	#5 @ 8" E.W.	#6 @ 9" E.W.



PERIMETER WALL SLAB EDGE G S2
3/8" = 1'-0"

JOINT CONTROL H S2
3/8" = 1'-0"



TYPICAL COLUMN ISOLATION JOINTS
NO SCALE

GENERAL NOTES

DESIGN LOADS:
- CLASSIFICATION OF BUILDING: CATEGORY / USE GROUP _I_
- ROOF LIVE LOAD: 20 PSF
- FLOOR: 100 PSF OFFICE, 250 PSF WAREHOUSE
- WIND: 115 MPH ULTIMATE (89 MPH ASD)
- IMPORTANCE FACTOR: WIND 1.0; SEISMIC 1.0; SNOW 1.0
- EXPOSURE: B
- GROUND SNOW: 15 PSF
- LATERAL DESIGN CONTROL:
  - EARTHQUAKE: ____
  - WIND: _X_

- CALCULATED WIND BASE SHEARS (FOR MWFRS):
  - Vx = 14.2 KIPS
  - Vy = 9.3 KIPS

SEISMIC DESIGN PARAMETERS:
- SPECTRAL RESPONSE ACCELERATION: Ss = 0.26
  S1 = 0.086 SEISMIC USE GROUP: I
- SITE CLASSIFICATION: D
- SEISMIC DESIGN CATEGORY: C

BASIC STRUCTURAL SYSTEM:
- _X_ MOMENT FRAME
- RESPONSE MODIFICATION FACTOR: R=3.0
- SEISMIC RESPONSE COEFFICIENT: Cs=0.10
- BUILDING HEIGHT LIMIT, FEET: H=SEE SHEET B1.0
- SEISMIC BASE SHEAR: V=2.8 KIPS

FOUNDATIONS

1. PRESUMED SOIL BEARING CAPACITY IS 2000 PSF ON FIRM VIRGIN SOIL OR COMPACTED FILL. IT IS THE RESPONSIBILITY OF THE OWNER / CONTRACTOR TO VERIFY AND OR OBTAIN SOIL BEARING CAPACITY FROM A GEOTECHNICAL ENGINEER PRIOR TO PLACING FOOTING CONCRETE.

2. FILL MATERIAL SHALL BE FREE OF ROOTS, WOOD OR OTHER ORGANIC MATERIAL. IT IS THE RESPONSIBILITY OF THE OWNER / CONTRACTOR TO VERIFY AND OR OBTAIN TESTING IF FILL MATERIALS USED FOR FILL UNDER FOOTINGS AND WITHIN BUILDING LIMITS BY AN APPROVED TESTING AGENCY.

3. FILL SHALL BE PLACED IN 6 INCH LIFTS AND COMPACTED TO 95 PERCENT OF THE OPTIMUM DENSITY AS DEFINED BY ASTM D-698.

4. PROOF ROLLING SHALL BE CONDUCTED FOR BUILDING SUBGRADE USING A FULLY LOADED DUMP TRUCK OR OTHER EQUIPMENT. PROOF ROLLING SHALL BE DONE AFTER A SUITABLE PERIOD OF DRY WEATHER TO AVOID DEGRADING AN OTHERWISE ACCEPTABLE SUBGRADE.

5. UTILITY LINES SHALL NOT BE PLACED THROUGH FOUNDATIONS WITHOUT STRUCTURAL ENGINEERS APPROVAL.

CONCRETE

1. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT ACI BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318-08).

2. ALL CONCRETE SHALL HAVE ASTM C-33 AGGREGATE WITH MAXIMUM UNIT WEIGHT OF 150 PCF. CONCRETE COMPRESSIVE STRENGTH SHALL BE 4000 PSI AT 28 DAYS, MINIMUM.

3. ALL EXTERIOR PAVING SHALL BE NORMAL WEIGHT CONCRETE WITH COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, MINIMUM. PROVIDED 4.5 TO 7.5 PERCENT AIR ENTRAINMENT FOR ALL CONCRETE EXPOSED TO THE WEATHER.

REINFORCING STEEL

1. REINFORCING STEEL SHALL BE NEW BILLET STEEL, DEFORMED BARS CONFORMING TO ASTM A-615, GRADE 60.

2. CONCRETE COVERAGE OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH THE FOLLOWING SCHEDULE UNLESS NOTED OTHERWISE.
   - A. FOOTINGS AND GRADE BEAMS: 3 INCHES
   - B. SLABS ON GRADE: 1 1/2 INCHES

3. PROVIDE LAP SPLICE IN ALL BARS AS NOTED HEREIN
   - #4 1'-8" LAP
   - #5 2'-6" LAP

   BOTTOM BARS SHALL BE SPLICED AT CENTER LINE OF COLUMNS.
   TOP BARS SHALL BE SPLICED AT MIDSPAN BETWEEN COLUMNS.

NOTES

1. FINISHED FLOOR ELEV. IS AT 0'-0" UNLESS OTHERWISE NOTED.

2. SLAB ON GRADE IS AS SHOWN ON THE PLAN ON 4 INCHES OF POROUS GRAVEL AND 15 MIL. VAPOR BARRIER. OWNER / CONTRACTOR MAY INSTALL THICKER SLAB AS DESIRED.

3. CONTROL JOINTS IN SLABS ON GRADE SHALL BE SAW CUT. CONSTRUCTION JOINTS SHALL BE FORMED WITH KEYED METAL EDGE FORM MATERIAL OR EQUIVALENT, SEE TYPICAL DETAILS.

4. CONCRETE STRENGTH FOR SLABS AND FOOTINGS SHALL BE 4000 PSI MINIMUM AT 28 DAYS.

5. ANCHOR BOLTS SIZE ARE SHOWN ON PREFAB METAL BUILDING PLANS. ANCHOR BOLT LENGTH AND EMBEDMENT IS SHOWN ON THE PREFAB METAL BUILDING PLANS. ALL ANCHOR BOLTS SHALL MEET OR EXCEED ASTM F1554 GRADE 36. NO J-BOLT OR L-BOLT ANCHOR BOLTS ARE PERMITTED.

6. THIS DRAWING SHOWS MAIN BUILDING COLUMNS AS PLACEHOLDERS, SEE ANCHOR BOLT PLAN FROM PREFAB METAL BUILDING PLANS FOR ADDITIONAL DETAILS AT DOOR FRAMES.

7. ANY VARIATIONS FROM THESE PLANS SHALL BE SUBMITTED TO SWARTZ DESIGN & ENGINEERING, PLLC, IN WRITING AND APPROVED BY THE OWNER BEFORE IMPLEMENTING IN THE FIELD. FAILURE TO REPORT VARIATIONS SHALL RELIEVE SWARTZ DESIGN & ENGINEERING, PLLC, OF ANY AND ALL LIABILITY THEREFROM.

8. THESE FOUNDATION DRAWINGS WERE PREPARED BY SWARTZ DESIGN & ENGINEERING, PLLC WITH THE ASSUMPTION THAT FINAL PREENGINEERED METAL BUILDING PLANS WILL BE PROVIDED FOR REVIEW TO ENSURE THE FOUNDATION SYSTEM IS SUITABLE FOR THE WORK. SWARTZ DESIGN & ENGINEERING, PLLC, ASSUMES RESPONSIBILITY FOR THE FOUNDATION DESIGN ONLY AND IS NOT THE ENGINEER OF RECORD FOR THE ACTUAL STEEL BUILDING SYSTEM.

9. FOUNDATION PLANS ARE BASED ON PRE-ENGINEERED METAL BUILDING PLANS PROVIDED BY CHAMPION BUILDINGS, INC. THE JOB NUMBER IS NOTED AS BRIAN_MORALES AND THE DATE IS NOTED AS 06/03/2026.

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NORTH CAROLINA PROFESSIONAL ENGINEER JEFFREY JOHN SWARTZ SEAL 033411 7/30/26

SEAL

MARTY ALLEN BEAL REGISTERED ARCHITECT 5409 NORTH CAROLINA NEWTON, N.C.
06/22/2026

PROJECT

CATAWBA COUNTY CATTLEMEN'S ASSOCIATION Education Center

2894 MT. OLIVE CHURCH ROAD
NEWTON, NORTH CAROLINA 28658

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SD	10-23-2025	SCHEMATIC DESIGN
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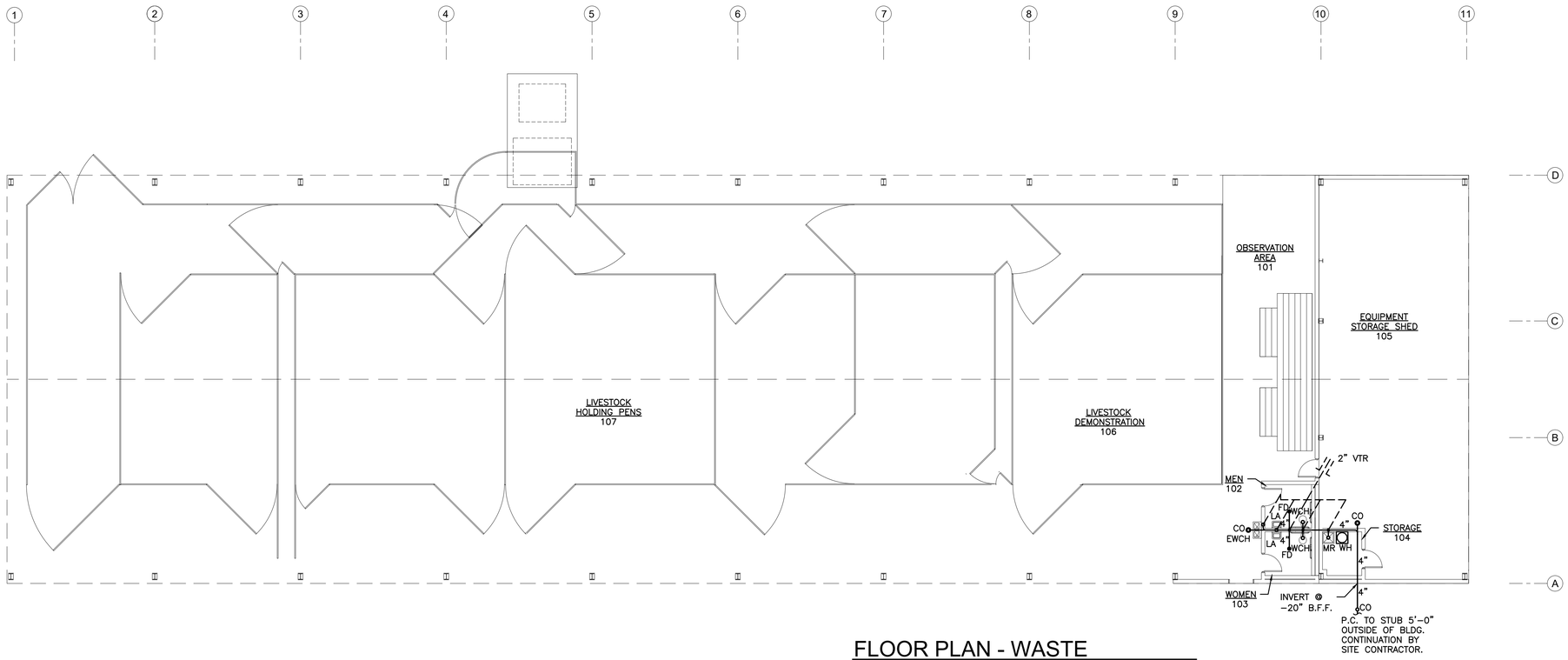
CD	06-22-2026	CONSTRUCTION DOCUMENTS

PROJECT NUMBER: 2024.008
CAD DWG FILE:
DRAWN BY: MVS
CHECKED BY: MAB

SHEET TITLE

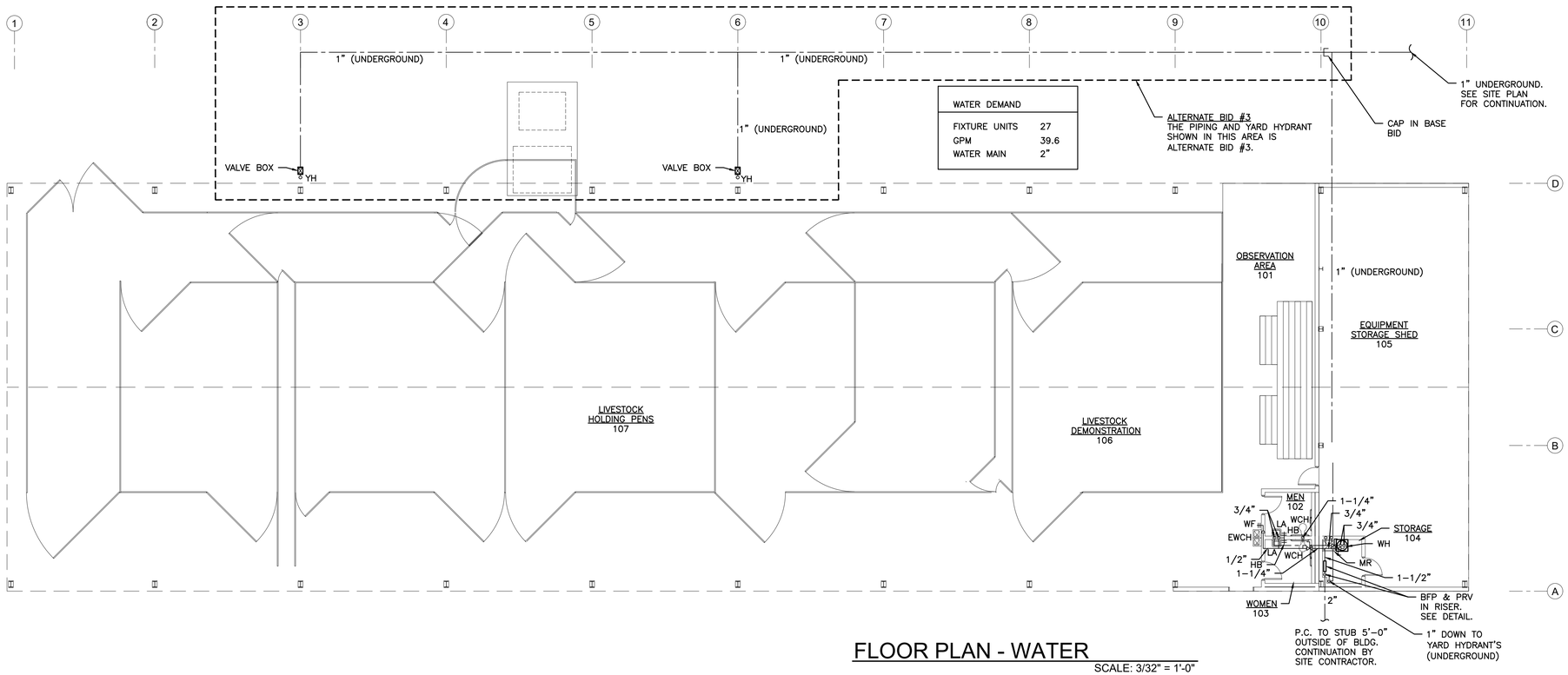
FOUNDATION DETAILS

S2.0



FLOOR PLAN - WASTE

SCALE: 3/32" = 1'-0"



FLOOR PLAN - WATER

SCALE: 3/32" = 1'-0"

071626DR217100

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SEAL

NORTH CAROLINA PROFESSIONAL SEAL 7883 ENGINEER DONALD R BRITTAIN
06/22/26

PROJECT

CATAWBA COUNTY CATTLEMEN'S ASSOCIATION EDUCATION CENTER

2894 MT. OLIVE CHURCH ROAD
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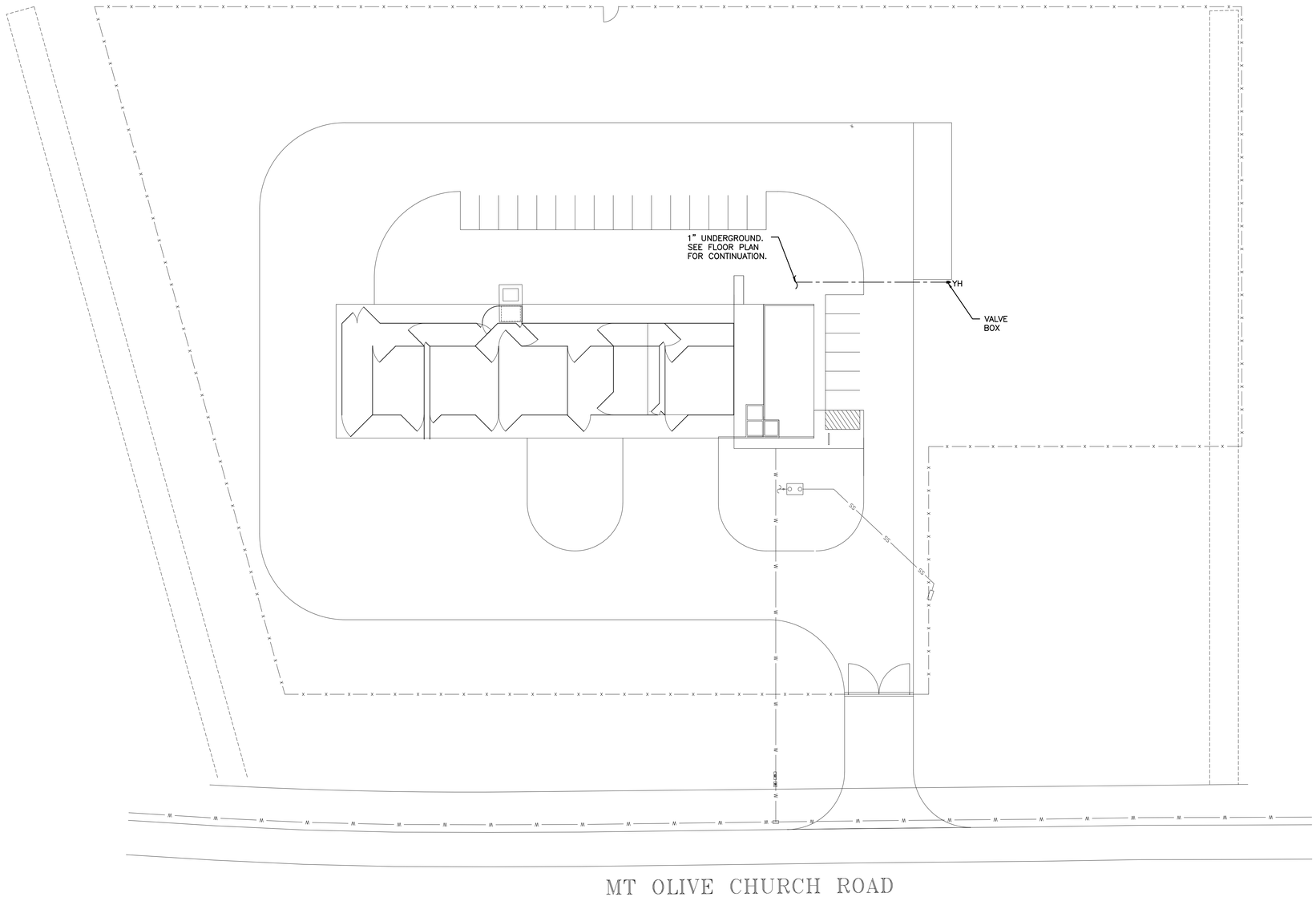
CAD DWG FILE:	
DRAWN BY:	DGR
CHECKED BY:	DRB

SHEET TITLE

Floor Plan
Waste

P1



SITE PLAN - WATER

SCALE: 1" = 30'-0"

061826EHC217100

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SEAL

NORTH CAROLINA PROFESSIONAL SEAL 7883 ENGINEER DONALD R BRITTAIN
2/26/26

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CHECKED BY:	DRB

SHEET TITLE

Site Plan
Water

P2

PLUMBING LEGEND

SYMBOL	DESCRIPTION
———	SANITARY WASTE
— — — —	SANITARY VENT
—— - ——	DOMESTIC COLD WATER
—— - - ——	DOMESTIC HOT WATER
—— - - - ——	DOMESTIC HOT WATER RECIRC.
——⋈——	SHUT–OFF VALVE
——⋈——	COMBINATION FLOW CONTROL/ BALL VALVE
——⊳——	CUT–OFF VALVE IN RISER
——○ ○——	RISER UP AND RISER DOWN
——o ——	CLEANOUT (CO)
——○——	HOSE BIBB (HB) OR WALL HYDRANT (WF)
VTR	VENT THRU ROOF
SA	SHOCK ABSORBER "WATER HAMMER"
E.C.	ELECTRICAL CONTRACTOR
M.C.	MECHANICAL CONTRACTOR

GENERAL PLUMBING SPECIFICATIONS

CAST IRON SOIL, WASTE AND VENT PIPING: WASTE PIPING 2 INCH AND LARGER AND VENT PIPING 3 INCH AND LARGER SHALL BE STANDARD WEIGHT GASKETED CAST IRON, SMALLER SHALL BE HOT DIPPED GALVANIZED STEEL. WASTE AND VENT PIPING BELOW GRADE OR EMBEDDED IN CONCRETE SHALL BE CAST IRON. THE CONTRACTOR MAY AT HIS DISCRETION USE P.V.C. – D.W.V. SCHEDULE 40 SOLID CORE PIPE IF APPROVED BY LOCAL AUTHORITY/OWNER.

GASKETED AND/OR "NO HUB" JOINTS: THE CONTRACTOR MAY, AT HIS DISCRETION, USE ABOVE GRADE POSITIVE DOUBLE SEAL ELASTOMERIC COMPRESSION TYPE GASKETS WITH BELL AND SPIGOT PIPE ENDS, "NO–HUB" PIPE ENDS WITH RESILIENT SLEEVES AND METAL CLAMPS EQUAL TO TYLER'S "TY–SEAL" AND TYLER'S "NO–HUB" MAY BE USED ABOVE FLOOR. GASKETS AND RESILIENT SLEEVES SHALL BE VIRGIN RUBBER OR NEOPRENE. OUTSIDE METAL CLAMPS ON "NO–HUB" JOINTS SHALL BE STAINLESS STEEL.

GRADE WASTE PIPING 1/4 INCH PER FOOT (MIN) FOR PIPIE SIZES 2–1/2" OR LESS. FOR PIPE SIZES 3" TO 6", GRADE 1/8 INCH PER FOOT (MIN), 8" OR LARGER PIPE, GRADE MIN 1/16 INCH PER FOOT. ALL VENT PIPING SHALL BE GRADED AS TO DRAIN BACK TO THE DRAINAGE PIPE BY GRAVITY. REFER TO TABLE 704.1 OF THE NC PLUMBING FOR MINIMUM SLOPE REQUIRED.

WATER PIPING: ALL WATER PIPING 3" AND SMALLER SHALL BE TYPE "K" (UNDER GROUND) OR TYPE "L" (ABOVE GROUND) COPPER TUBING WITH FORGED FITTINGS AND SWEAT CONNECTIONS. DIELECTRIC UNIONS, EPCO SALES, INC., SERIES FX SHALL BE INSTALLED BETWEEN COPPER PIPE AND WATER HEATER. ALL FITTINGS SHALL BE SWEAT TYPE WROUGHT COPPER WITH WALL THICKNESS EQUAL TO PIPE WALL THICKNESS. ALL JOINTS SHALL BE MADE WITH 95–5 SOLDER OR SILVABRITE 100. NO SOLDER W/LEAD SHALL BE PERMITTED.

ALL ROUGHING–IN PIPING SHALL BE RUN CONCEALED. ALL EXPOSED WATER LINES, STOPS, TRAP AND WASTE PIPE AT THE FIXTURES SHALL BE CHROME PLATED BRASS, WHICH FOR THE MOST PART WILL BE FURNISHED WITH THE FIXTURES. CHROME PLATED ESCUTCHEON RINGS SHALL BE USED AT EACH POINT OF ENTRANCE OF CHROME PIPING INTO WALLS, FLOORS, OR CEILINGS. EXPOSED WORK SHALL BE UNIFORM IN HEIGHT AND LOCATION FOR EACH TYPE FIXTURE.

WATER PIPING UNDER GROUND OUTSIDE OF BUILDING SHALL BE AT LEAST 36 INCHES BELOW THE FINISHED GRADE SURFACE.

THERMAL INSULATION: ALL HOT AND COLD WATER PIPING INSIDE BUILDING AND IN CRAWL SPACE, ALL HOT WATER PIPING BELOW GRADE, AND COLD WATER PIPING BELOW GRADE WITHIN 3'–0" OF OUTSIDE SHALL BE INSULATED WITH 1" THICK "ARMAFLEX" OR IMCOA WITH SEALED JOINTS OR PREMOLDED FIBERGLASS WITH VAPOR BARRIER JACKET.

SUBMITTAL: THE CONTRACTOR SHALL WITHIN (15) DAYS OF RECEIPT OF PROPERLY SIGNED CONTRACT SUBMIT TO THE ARCHITECT/ENGINEER FOR APPROVAL (5) COPIES OF A LIST OF SUPPLIES AND MANUFACTURER'S MATERIAL AND EQUIPMENT TO BE USED ON THIS PROJECT.

SUBSTITUTION OF MATERIALS AND/OR EQUIPMENT FOR THAT SPECIFIED WILL NOT BE ACCEPTED WITHOUT PRIOR WRITTEN APPROVAL BY THE ARCHITECT/ENGINEER PRIOR TO RECEIPT OF BIDS.

GENERAL: THE ENTIRE PLUMBING SYSTEM SHALL BE IN ACCORDANCE WITH THE 2018 N.C. STATE PLUMBING CODE. SUBMIT THREE (3) COPIES OF PLUMBING INSPECTION CERTIFICATES TO OWNER. PLUMBING CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS REQUIRED BY GOVERNING AUTHORITIES FOR WORK DONE UNDER THIS CONTRACT. PROVIDE AND INSTALL ALL SUPPORTS, BRACKETS, MATERIALS AND LABOR AS REQUIRED FOR A COMPLETE AND ACCEPTABLE PLUMBING SYSTEM. PLUMBING CONTRACTOR SHALL CLEAN ALL PLUMBING FIXTURES AFTER ALL CONSTRUCTION IS COMPLETE.

GUARANTEE: THE PLUMBING CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP FOR A PERIOD OF NOT LESS THAN ONE (1) YEAR FROM DATE OF FINAL ACCEPTANCE BY OWNER STATING THE DAY THE GUARANTEE BEGINS AND ENDS.

WATER HAMMER CONTROL: ARRESTORS SHALL BE SIZED AND APPLIED IN ACCORDANCE WITH THE PLUMBING AND DRAINAGE INSTITUTE STANDARD PDI–WH–201.
EQUIPMENT EQUAL TO JOSAM #75000 OR EQUAL BY AMTROL, WADE, SIOUX CHIEF OR SMITH IS ACCEPTABLE.
PROVIDE "KARP" ACCESS COVER IN WALL TO SERVICE WATER HAMMER ARRESTORS.

FIXTURE SCHEDULE:

SEE DRAWINGS.

CLEANOUTS: <S>

CLEANOUTS SHALL BE AS FOLLOWS:

FLOOR CLEANOUTS – IN FINISHED AREAS – JOSAM #5500–1–SQ WITH SQARE NICKEL BRONZE TOP

- IN TILE FLOORS –JOSAM #5500–1–SQ
- IN CARPETED FLOORS –JOSAM #5#5500–1–SQ

WALL CLEANOUTS – JOSAM #58710 WITH STAINLESS STEEL COVERPLATE

CLEANOUTS IN EXPOSED PIPING – JOSAM #58900

EXTERIOR CLEANOUTS – JOAM # 56050 W/ROUND NICKEL BRONZE TOP

CLEANOUTS IN WATERPROOF FLOOR SHALL HAVE FLASHING FLANGE AND CLAMPING DEVICE.

CLEANOUTS IN CARPETED AREAS SHALL BE PROVIDED WITH CARPET MARKERS.

DOMESTIC WATER HEATERS: <S>

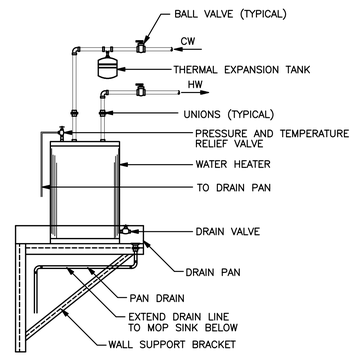
ELECTRIC WATER HEATERS SHALL BE UL LISTED AND COMPLETE WITH ALL STANDARD FEATURES, FIVE (5) YEAR TANK WARRANTY, GLASS–LINED TANK, FOAM INSULATION ON THE TANK, ANODE ROD, AUTOMATIC TEMPERATURE CONTROL, AND AUTOMATIC HIGH–LIMIT SAFETY CUTOFF.

EACH WATER HEATER SHALL BE PROVIDED WITH AN ASME AND NORTH CAROLINA APPROVED PRESSURE AND TEMPERATURE RELIEF VALVE. UNITS NOT INSTALLED WITH VACUUM BREAKER ON COLD WATER SUPPLY LINE SHALL BE PROVIDED WITH AGA CERTIFIED VACUUM RELIEF VALVE PER ANSI Z21.22. A GATE VALVE SHALL BE INSTALLED ON SAME FLOOR AS UNIT AND NO FURTHER THAN 5 FEET ON THE COLD WATER SUPPLY.

EACH WATER HEATER AND ITS INSTALLATION SHALL COMPLY WITH THE LATEST ISSUE AND ALL ADDENDA THERETO OF THE N. C. STATE BOILER INSPECTION LAWS AND REGULATIONS. ALL WIRING AND CONTROLS ASSOCIATED WITH THE HEATERS SHALL BE U.L. APPROVED AND IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE.

EACH HEATER TANK SHALL BE FITTED WITH NORTH CAROLINA APPROVED "DIP" TUBE AND LABELED TO SHOW APPROVAL FOR INSTALLATION IN THE STATE OF NORTH CAROLINA.

FLOOR OVER A FLOOR DRAIN, DRIP PAN OR OTHER SAFE LOCATION. DISCHARGE PIPE SHALL BE SUPPORTED AND ANCHORED SO THAT IT WILL NOT PUT UNDUE STRAIN ON THE RELIEF VALVE BODY OR MOUNTING COUPLING.



A ELECTRIC WATER HEATER
NTS

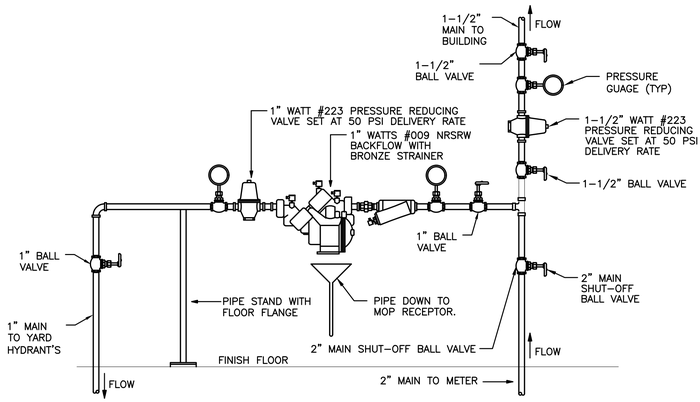
PLUMBING FIXTURE SCHEDULE

NOTE: ALL FIXTURE APPURTENANCES SHALL BE SUPPLIED BY FIXTURE MANUFACTURER.

FIXTURE SYMBOL	FIXTURE TYPE	FIXTURE DESCRIPTION	CONNECTION SIZES W	V	CW	HW
WCH	WATER CLOSET (HANDICAPPED)	KOHLER HIGHCLIFF K–96057–0 VITREOUS CHINA, FLUSH VALVE, FLOOR MOUNTED, SIPHON JET, ELONGATED BOWL. PROVIDE BEMIS #1655–C OPEN FRONT WHITE SEAT, LESS COVER. WATER CLOSET SHALL BE FURNISHED WITH SLOAN REGAL #111–1.6–XL–YO FLUSH VALVE.	4"	2"	1"	
LA	WALL MOUNTED LAVATORY	KOHLER #K–2867/SLOAN OPTIMA EBF–650–BAT–BDT–CP–0.5GPM–MLM–IR–FCT BATTERY OPERATED SENSOR FAUCET AND PERFORATED DRAIN #8872–C–F, "P" TRAP, MATCHING ZURN CONCEALED FLOOR MOUNTED CARRIER, TRUEBRO WASTE AND WATER GUARD #102, MOUNT RIM 34" A.F.F. SLOAN MODEL EFP100A THERMOSTATIC MIXING VALVE TO MEET 2018 NCPC 416.5.	2"	1 1/2"	1/2"	1/2"
MR	MOP RECEPTOR	FIAT #MSB–2424 "MOLDED STONE" 24" X 24" X 10" MOP SERVICE SINK WITH INTEGRAL CAST BRASS DRAIN/ DELTA 28T9 FAUCET/BUCKET HOOK 3/4" HOSE THREAD END/VACUUM BREAKER AND ADJUSTABLE TOP BRACE, DELTA 28T910 MOP HANGER AND DELTA 28T911 HOSE AND WALL HOOK, MODEL E–88–AA BUMPERGUARD, MSG2424 WALL GUARDS.	3"	2"	1/2"	1/2"
YH	YARD HYDRANT	WOODFORD MODEL S3 FREEZELESS SANITARY YARD HYDRANT/ 34HF VACUUM BREAKER BACKFLOW PREVENTER.			1"	
WF	WALL FAUCET	WOODFORD MODEL 67 FREEZELESS WALL HYDRANT/VACUUM BREAKER BACKFLOW PREVENTER, MOUNT 24" A.F. GRADE.			3/4"	
HB	HOSE BIBB	WOODFORD MODEL 24P–1/2 WALL FAUCET WITH WHEEL HANDLE AND VACUUM BREAKER BACKFLOW PREVENTER, MOUNT 18" A.F.F.			1/2"	
WH	WATER HEATER	LOCHINVAR MODEL #LDT–30T, 30 GALLON ELECTRIC WATER HEATER WITH TWO (2) 4500 WATT ELEMENTS, 208 VOLT, SINGLE PHASE, NON–SIMULTANEOUS WIRING WITH 3 YEAR WARRANTY. FURNISH WITH A.S.M.E. APPROVED RELIEF VALVE & PROPER SIZED EXPANSION TANK.			3/4"	3/4"
EWCH	ELECTRIC WATER COOLER HANDICAP	OASIS PG8FEBFSL WALL HUNG BI–LEVEL ELECTRIC WATER COOLER, 8.0 GPH, 1/4 HP., 115V., 460W., ROUGH STOP SUPPLY, STANDARD FINISH CABINET, C.P.B. "P" TRAP, MOUNT RIM 40" A.F.F., PROVIDE CANE APRON AS REQUIRED. VERSAFILTER & VERSAFILLER BOTTLE FILLER.	2"	1 1/2"	1/2"	
FD	FLOOR DRAIN	SIOUX CHIEF MODEL# 832–4PNR FINISHLINE PVC ADJUSTABLE FLOOR DRAIN WITH ROUND NICKEL BRONZE RING AND STRAINER AS REQUIRED.	4"	2"	1/2"	

ACCEPTABLE MANUFACTURERS:

WATER CLOSETS, URINALS, LAVATORIES – SLOAN, KOHLER, AMERICAN STANDARD, TOTO, ZURN, GERBER,
CARRIERS – WADE, SMITH, ZURN, MIFAB.
SINKS – KOHLER, AMERICAN STANDARD, JUST, ELKAY, AMERICAN STANDARD, ZURN, CECO, SLOAN.
WATER HEATERS – STATE, BOCK, LOCHINVAR, BRADFORD WHITE, A.O. SMITH, RHEEM.
HOSE BIBBS – ZURN, WOODFORD, NIBCO, PRIER.
WALL FAUCETS – WOODFORD, ZURN, WADE, SMITH, MIFAB, PRIER.
FLOOR DRAINS, ROOF DRAINS, FLOOR SINKS – WADE, SMITH, ZURN, JOSAM, SIOUX CHIEF, WATTS DRAINAGE, MIFAB.
FLUSH VALVES – SLOAN, ZURN, HYDROTEK, TOTO.
MOP RECEPTOR – FIAT, FLORSTONE, WILLIAMS, AMERICAN STANDARD.
FAUCETS – DELTA, SLOAN, SYMMONS, T&S, AMERICAN STANDARD, MOEN, CHICAGO FAUCETS, ZURN.
MIXING VALVES – SYMMONS, LAWLER, WATTS, BRADLEY, POWERS.
WATER COOLERS – ELKAY, OASIS, HALSEY TAYLOR, ACORN AQUA, MURDOCK MFG.



B WATER PRESSURE REDUCING VALVE AND BACKFLOW PREVENTER STATION
NTS

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SEAL

NORTH CAROLINA PROFESSIONAL SEAL 7883 ENGINEER DONALD R BRITTAIN
2/6/22/26

PROJECT

CATAWBA COUNTY CATTLEMEN'S ASSOCIATION EDUCATION CENTER

2894 MT. OLIVE CHURCH ROAD
NEWTON, NORTH CAROLINA 28658

DISTRIBUTION

MARK	DATE	DESCRIPTION
SD	10-23-2025	SCHEMATIC DESIGN
DD	11-10-2025	DESIGN DEVELOPMENT
CD	06-22-2026	CONSTRUCTION DOCUMENTS

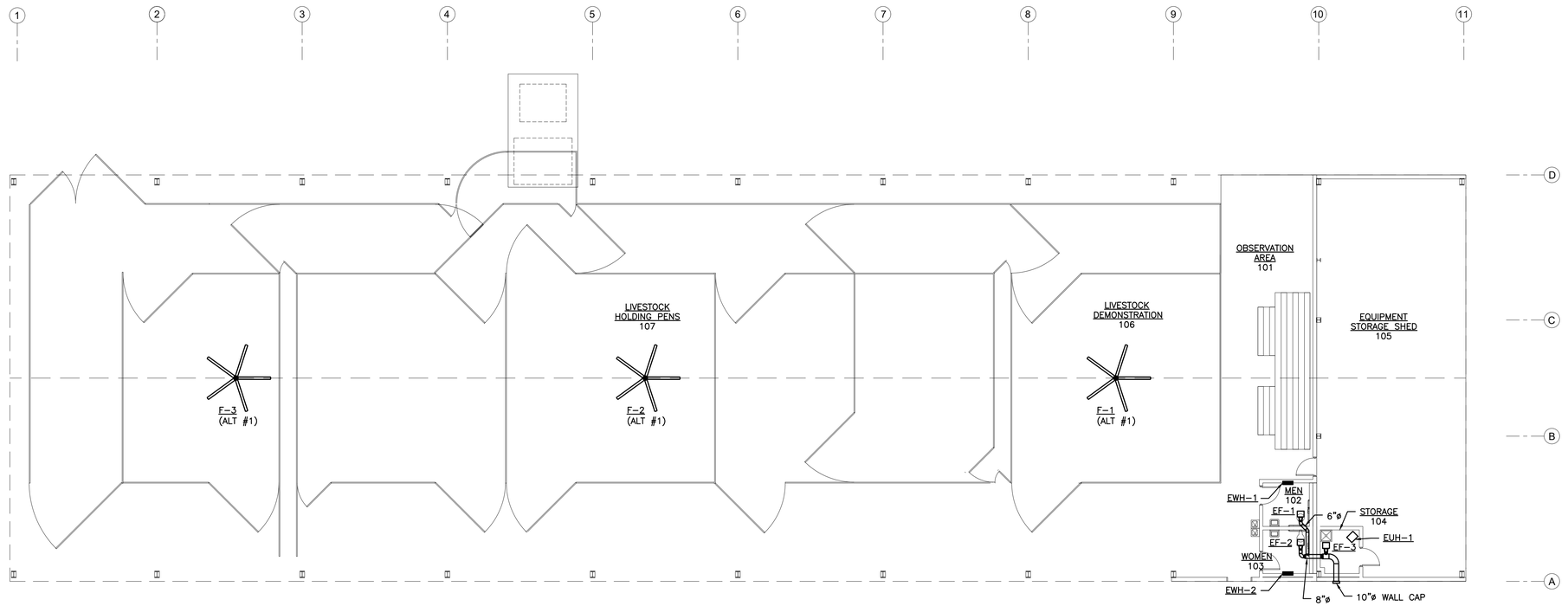
PROJECT NUMBER:	2024.008
CAD DWG FILE:	
DRAWN BY:	DGR
CHECKED BY:	DRB

SHEET TITLE

Schedules
Specs
Plumbing

P3

061926EHC217100



FLOOR PLAN - HVAC

SCALE: 3/32" = 1'-0"

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SHEET TITLE

Floor Plan
HVAC

M1

061826EHC217100

MECHANICAL SPECIFICATIONS

ALL MECHANICAL WORK SHALL BE PERFORMED IN COMPLIANCE WITH 2018 NORTH CAROLINA MECHANICAL CODE.

GENERAL CONDITIONS: THE GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT AND SUPPLEMENTAL GENERAL CONDITIONS BOUND WITH THE ADVERTISEMENT FOR BIDS, INSTRUCTIONS TO BIDDERS AND BID FORMS APPLY TO ALL CONTRACTS AND ARE HEREBY MADE A PART OF THE MECHANICAL CONTRACT SPECIFICATIONS.

DESCRIPTION OF WORK: FURNISH ALL LABOR, SUPERVISION, MATERIALS, EQUIPMENT AND TOOLS NECESSARY TO INSTALL COMPLETE AIR CONDITIONING SYSTEMS IN THE BUILDING.

DRAWINGS: THE CONTRACTOR SHALL FURNISH AND INSTALL ALL EQUIPMENT AND MATERIALS SHOWN IN THESE DRAWINGS AND DESCRIBED IN THESE SPECIFICATIONS. ALL MISCELLANEOUS MATERIAL AND HARDWARE NECESSARY FOR COMPLETE OPERATING SYSTEMS IN ACCORDANCE WITH GOOD TRADE PRACTICE AS IS OBVIOUSLY INTENDED SHALL BE FURNISHED AND INSTALLED AS THOUGH IT WERE SPECIFICALLY LISTED.

ELECTRICAL WORK: THE ELECTRICAL CONTRACTOR SHALL TAKE POWER FROM THE SOURCE AS CALLED FOR ON THE ACCOMPANYING DRAWINGS AND EXTEND THROUGH ELECTRICAL AND NECESSARY CONTROLS TO THE EQUIPMENT FURNISHED AND INSTALLED UNDER THIS CONTRACT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL WIRING FROM THE LOAD SIDE OF THE DISCONNECT THROUGH THE STARTER TO THE EQUIPMENT.

SEE ELECTRICAL PLANS FOR DEFINITION OF WIRING AND ELECTRICAL FACILITIES TO BE INSTALLED UNDER THE ELECTRICAL CONTRACT.

ALL ELECTRICAL WORK SHALL BE DONE BY OR UNDER THE DIRECT SUPERVISION OF A LICENSED ELECTRICIAN, LICENSED IN THE STATE WHERE THE WORK WILL BE PERFORMED. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AND ALL ADDENDA THERETO.

ALL CONTROL VOLTAGE SHALL BE SINGLE PHASE, 120 VOLTS OR LESS AND SHALL FEED FROM ONE (1) THERMAL OVERLOAD TYPE TOGGLE BREAKER.

ALL CONTROL WIRING SHALL BE RUN IN CONDUIT OR EXTEND TO MATCH EXISTING.

ALL STARTERS SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONTROL AND INTERLOCK WIRING 120 VOLTS AND LESS.

SHEET METAL WORK: THIS CONTRACTOR SHALL FURNISH ALL DUCTWORK AND ASSOCIATED SHEET METAL WORK AS CALLED FOR ON THE DRAWINGS AND REQUIRED FOR A COMPLETE DUCTED AIR DISTRIBUTION SYSTEM.

DUCTWORK SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH BEST PRACTICES OF SHEET METAL WORK AND SMACNA STANDARDS.

ALL DUCTWORK SHALL BE GALVANIZED SHEET IRON THROUGHOUT EXCEPT WHERE OTHERWISE SHOWN AND FABRICATED IN ACCORDANCE WITH THE FOLLOWING TABLE (ALL DUCT SIZES ON CONTRACT DRAWINGS ARE SHEET METAL FABRICATION SIZES EXCEPT WHERE LINER IS REQUIRED):

THE FOLLOWING CHART IS BASED ON 1" W.G. (MAXIMUM) STATIC, POSITIVE OR NEGATIVE PRESSURE. SEE SMACNA MANUAL FOR DUCT CONSTRUCTION FOR HIGHER STATIC PRESSURES.

MAXIMUM DIMENSION OF DUCT	GAUGE U.S. STD.	TRANSVERSE JOINT	BRACING
UP TO 12"	26	DRIVE SLIPS 7'–10" CENTERS	NONE
13" TO 30"	24	DRIVE SLIPS 7'–10" CENTERS	1"X1"X1/8" ANGLES 4 FEET FROM JOINT
31" TO 40"	22	DRIVE SLIPS 7'–10" CENTERS	1"X1"X1/8" ANGLES 4 FEET FROM JOINT
41" TO 60" ANGLES	20	STANDING SEAM	1–1/2"X1–1/2"X1/8"
		4'–0" CENTERS	4'–0" CENTER/CENTER
61" TO 84" ANGLES	20	1–1/2" STANDING	1–1/2"X1–1/2"X1/8"
		S–CLEAT DRIVE SLIPS 4'–0" CENTERS	2 FEET FROM JOINT

DUCTMATE INDUSTRIES, INC. SYSTEMS MAY BE USED FOR TRANSVERSE JOINTS WITH THE FOLLOWING LIMITATIONS:
SYSTEM "25" – SHEETMETAL GAUGES 22 THROUGH 26
SYSTEM "35" – SHEETMETAL GAUGES 18 THROUGH 24
SYSTEM "45" – SHEETMETAL GAUGES 14 THROUGH 20
MANUFACTURER'S RECOMMENDATIONS SHALL BE FOLLOWED WITHOUT EXCEPTION.

ALL DUCTS SHALL HAVE FLAT LOCK TYPE LONGITUDINAL SEAMS CONFORMING TO SMACNA STANDARDS.
ALL DUCTS SHALL HAVE SECTIONS "CROSS–BROKEN" AND SHALL BE INSTALLED WITH NECESSARY STIFFENERS TO INSURE DUCTS AGAINST VIBRATING OR BREATHING.

ROOF CURBS:
ANY AND ALL REQUIRED ROOF CURBS SHALL BE INSTALLED WITH EQUIPMENT MATING SURFACE LEVEL. M.C. SHALL PROVIDE SLOPED ROOF CURBS WHERE REQUIRED FOR SLOPED ROOF INSTALLATIONS. M.C. SHALL INSTALL AND LEVEL CURBS PRIOR TO FINAL ROOF INSTALLATION TO ALLOW ROOFING CONTRACTOR TO FLASH AND SEAL CURB TO ROOF.

DUCT SUPPORTS
ROUND DUCTS – DUCTS UP TO 26" IN DIAMETER – ONE (1) STRAP AND BAND 1" WIDE BY 18 GAUGE, MAXIMUM SPACING 8'–0". DUCTS OVER 26" IN DIAMETER– A 1 ½ " WIDE BY 16 GAUGE BAND AND TWO 3/8" HANGER RODS, MAXIMUM SPACING 8'–0".
RECTANGULAR DUCTS – DUCTS UP TO 24" WIDE – TWO (2) STRAPS, 1" WIDE BY 18 GAUGE, MAXIMUM SPACING 8'–0". DUCTS OVER 24" WIDE – TRAPEZE TYPE HANGER WITH ANGLE IRON AND TWO (2) RODS PER SMACNA MANUAL. DO NOT USE ANGLE LESS THAN 1 ½"x 1 ½"x 1/8" OR RODS LESS THAN 3/8", EVEN THOUGH SMALLER SIZES MAY BE ALLOWED IN THE SMACNA TABLES. SIZES GIVEN ABOVE DO NOT ALLOW FOR EXTERNAL LOADS OTHER THAN INSULATION, NORMAL REINFORCEMENT & TRAPEZE WEIGHT. SMACNA TABLES SHALL BE USED WHEREVER SMACNA REQUIREMENTS ARE MORE STRINGENT THAN LISTED ABOVE. ALL STRAP AND ROD FASTENERS SHALL BE LOAD RATED. ALL HANGERS SHALL BE PROPERLY SECURED TO THE BUILDING STRUCTURE AS DETAILED IN THE SMACNA MANUAL.

UNLESS OTHERWISE SPECIFIED, FURNISH AND INSTALL ALL NECESSARY LINTELS, PROPERLY SIZED, SHEET METAL SLEEVES AND ESCUTCHEON COLLARS WHERE DUCTWORK RISES THROUGH FLOORS OR PASSES THROUGH WALLS OR CEILINGS.

MANUAL VOLUME CONTROL DAMPERS IN ROUND BRANCH DUCTS TO DIFFUSERS OR GRILLES SHALL BE FACTORY FABRICATED AND EQUAL TO YOUNG REGULATOR CO. SERIES 5020 WITH MODEL 403 LOCKING LEVER REGULATOR FOR UN–INSULATED DUCT, AND MODEL 443B FOR INSULATED DUCT.

MANUAL VOLUME CONTROL DAMPERS IN RECTANGULAR BRANCH DUCTS SHALL BE FACTORY FABRICATED AND EQUAL TO YOUNG REGULATOR CO. SERIES 820 WITH MODEL 403 LOCKING LEVER REGULATOR FOR UN–INSULATED DUCT, AND MODEL 443B FOR INSULATED DUCT.

VOLUME EXTRACTORS EQUAL TO TUTTLE & BAILEY, MODEL AVLR, SHALL BE USED AT BRANCH DUCTS WHERE RADIUS TAKEOFFS AND SPLITTER DAMPERS ARE NOT USED.

FURNISH AND INSTALL FLEXIBLE COLLARS IN THE DUCTWORK CONNECTIONS TO AIR HANDLING FANS TO PREVENT NOISE TRANSMISSION BETWEEN SECTIONS. FABRIC SHALL BE VENTGLAS AS MANUFACTURED BY VENTFABRICS.

CHANGES IN DUCT DIRECTION SHALL BE ACCOMPLISHED BY LONG RADIUS ELBOWS. MITERED ELBOWS SHALL HAVE AIRFOIL TURNING VANES EQUAL TO TUTTLE & BAILEY "DUCTURNS".

ALL JOINTS SHALL BE SEALED PER 603.9 (NORTH CAROLINA 2018 MECHANICAL CODE) AND 803.2.8 (NORTH CAROLINA ENERGY CODE). HOWEVER, PRESSURE SENSITIVE TAPE SHALL NOT BE THE ONLY METHOD OF SEALANT.

DUCT INSULATION:

DUCT WRAP – WRAP SHALL BE APPLIED TO ALL OVAL, ROUND, SQUARE AND RECTANGULAR SUPPLY, RETURN AND OUTSIDE AIR SHEET METAL DUCTWORK, INCLUDING LINED DUCT, UNLESS OTHERWISE NOTED.

WRAP SHALL BE MANUFACTURED BY CERTAINTEED, KNAUF FIBER GLASS OR JOHNS MANVILLE, HAVE AN ALUMINUM FOIL–SCRIM VAPOR BARRIER JACKET, AND BE THE FOLLOWING THICKNESSES AND INSTALLED "R" FACTORS AT 25% COMPRESSION:

DUCTS LOCATED IN CEILING RETURN PLENUMS: 1 ½" THICK, 0.75 PCF, MIN. 4.2 "R" IF AMBIENT AND DUCT TEMPERATURE DIFFERENCE DOES NOT EXCEED 15 DEGREES F. OTHERWISE 2" THICK, 0.75 PCF, MIN. 5.0 "R".

DUCTS LOCATED IN UNCONDITIONED SPACES BUT WITHIN THE INSULATED THERMAL ENVELOPE OF THE BUILDING: 2" THICK, 0.75 PCF, MIN. 5.0 "R".

DUCTS LOCATED OUTSIDE THE INSULATED THERMAL ENVELOPE OF THE BUILDING: 3" THICK, 0.75 PCF, MIN. 8.0 "R".

EDGES OF INSULATION SHALL BE CUT STRAIGHT AND TRUE AND SHALL BE TIGHTLY BUTTED. THE VAPOR BARRIER JACKET SHALL OVERLAP THE BLANKET JOINT A MINIMUM OF THREE INCHES (3"). THE JACKET LAP SHALL BE FASTENED WITH MOISTURE RESISTANT ADHESIVE AND ALSO OUTWARD CLINCHING STAPLES SPACED TEN INCHES (10") C/C. THE VAPOR BARRIER EDGE AND STAPLES SHALL THEN BE COVERED WITH A THREE INCH (3") WIDE TAPE OF THE SAME MATERIAL AS THE JACKET AND SHALL BE FASTENED WITH MOISTURE RESISTANT ADHESIVE.

ALL CUTS, TEARS AND PENETRATIONS IN THE VAPOR BARRIER JACKET SHALL BE SEALED WITH JOINT TAPE. ALL EDGES OF INSULATING BLANKET SHALL BE SEALED FROM THE JACKET TO DUCT SURFACE WITH TAPE.

INSULATING BLANKET ON THE BOTTOM OF SURFACES IN EXCESS OF 24 INCHES WIDE SHALL BE SECURED AGAINST THE DUCT WITH ADHESIVE OVER THE ENTIRE AREA, MECHANICAL CLIPS ON 24 INCH CENTER OR BY WIRE TIES AROUND THE DUCT SPACED 24 INCHES C/C.

CONTRACTOR MAY USE FLEXIBLE DUCTWORK (MAXIMUM LENGTHS 5'–0") AT CONNECTIONS TO DIFFUSERS/GRILLES. FLEXIBLE DUCTWORK SHALL BE CERTAFLEX 25 AS MANUFACTURED BY THE CERTAINTEED CORPORATION.

APPLICATION:
ENGAGE THE SERVICES OF A QUALIFIED INSULATION APPLICATOR TO FURNISH AND INSTALL ALL THE INSULATION REQUIRED FOR THE MECHANICAL EQUIPMENT, PIPING, ETC., SPECIFIED HEREIN.

REGISTERS AND GRILLES: ALL REGISTERS AND GRILLES SHALL BE OF SIZE, STYLE AND CAPACITY CALLED FOR ON PLANS AND IN THE GRILLE SCHEDULE. PROVIDE RUBBER OR EXPANDED FOAM GASKETS COMPLETELY AROUND ALL REGISTER AND GRILLE FRAMES TO PREVENT AIR LEAKAGE BETWEEN GRILLE FRAME AND DUCT OR BETWEEN GRILLE FRAME AND SURROUNDING FINISHED SURFACE.

ALL REGISTERS AND GRILLES LOCATED IN CEILINGS SHALL HAVE A FACTORY APPLIED FLAT "OFF" WHITE FINISH. ALL OTHERS SHALL HAVE FACTORY APPLIED PRIMER SUITABLE FOR FIELD FINISH PAINTING UNLESS OTHERWISE SHOWN IN THE AIR DISTRIBUTION DEVICE SCHEDULE.

EACH AIR DISTRIBUTION DEVICE LOCATED BELOW AN UNCONDITIONED SPACE SHALL BE PROVIDED WITH A 3" THICK, 3/4 POUND DENSITY INSULATION BLANKET FOR CONDENSATION CONTROL. ALL CEILING DEVICES SHALL BE FURNISHED TO BE COMPATIBLE WITH THE TYPE CEILING IN WHICH THE ARE INSTALLED.

TEST & BALANCING: TEST & BALANCING COVERS THE TESTING, BALANCING AND ADJUSTING OF ENVIRONMENTAL SYSTEMS INCLUDING BUT NOT LIMITED TO: HEATING, COOLING AND VENTILATION DISTRIBUTION SYSTEMS, HYDRONIC SYSTEMS, AND THE EQUIPMENT AND APPARATUS CONNECTED THERETO. THE WORK REQUIRED HEREIN SHALL CONSIST OF SETTING VOLUME (FLOW) AND SPEED ADJUSTING FACILITIES PROVIDED OR SPECIFIED FOR THE SYSTEM, RECORDING DATA, MAKING TESTS AND PREPARING REPORTS. APPARATUS AND DISTRIBUTION SYSTEMS SHALL BE TESTED AND BALANCED IN ACCORDANCE WITH THE LATEST EDITION OF NEBB PROCEDURAL STANDARDS FOR TESTING – BALANCING AND ADJUSTING OF ENVIRONMENTAL SYSTEMS PUBLISHED BY NEBB. TESTING AND BALANCING SHALL BE DONE BY AN INDEPENDENT TESTING AND BALANCING FIRM WITH AT LEAST TWO (2) YEARS VERIFIABLE EXPERIENCE. THE TESTING AND BALANCING FIRM SHALL BE CERTIFIED BY THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). CONTRACTOR SHALL FURNISH TO THE ENGINEER A COPY OF ALL DATA OBTAINED ON THE PROJECT.

OPERATING INSTRUCTIONS, CERTIFICATES AND WARRANTIES: THE ORIGINAL OF ALL INSPECTION CERTIFICATES SHALL BE DELIVERED TO THE OWNER AND ONE (1) COPY EACH TO THE ENGINEER PRIOR TO REQUEST FOR FINAL PAYMENT.

THREE (3) COPIES OF OPERATING AND MAINTENANCE INSTRUCTIONS AND MANUFACTURER'S WARRANTIES FOR ALL EQUIPMENT PROVIDED UNDER THIS CONTRACT SHALL BE PROVIDED TO THE OWNER PRIOR TO SUBMITTING REQUEST FOR FINAL PAYMENT.

PRIOR TO FINAL PAYMENT TO THE CONTRACT, THE CONTRACTOR SHALL BE RESPONSIBLE TO TRAIN THE AUTHORIZED PERSONNEL ON HOW TO SERVICE, START–UP AND SHUT–DOWN THE VARIOUS SECTIONS OF THE SYSTEM. UPON COMPLETION OF THIS PHASE OF THE CONTRACT, THE CONTRACTOR SHALL SECURE A LETTER OF ACCEPTANCE FROM THE OWNER THAT HE IS SATISFIED WITH THE CONDITIONS STIPULATED HEREIN. UPON ACCEPTANCE OF THIS LETTER AND AT THE DISCRETION OF THE ENGINEER, THE FINAL PAYMENT WILL BE MADE.

THE CONTRACTOR SHALL PROVIDE A WRITTEN GUARANTEE OF ALL MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM DATE OF SYSTEM ACCEPTANCE.

THE WORK UNDER THIS CONTRACT WILL BE ACCEPTED ONLY AS AN ENTIRE SYSTEM UPON SATISFACTORY COMPLETION OF THE REQUIRED TESTS. NO PARTIAL ACCEPTANCE OF ANY PART OR PORTION OF APPARATUS WILL BE MADE.

INSTALL AND CONNECT ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND DO ALL WORK IN A NEAT AND WORKMANLIKE MANNER AND IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE AS JUDGED BY THE ENGINEER.

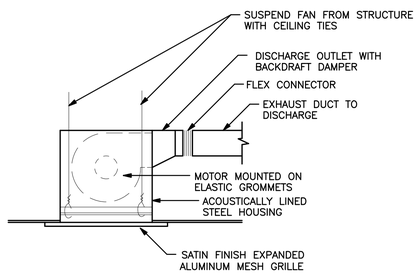
ALL EQUIPMENT AND PIPING SHALL BE SO INSTALLED THAT NO OBJECTIONABLE NOISES FROM EQUIPMENT, PIPING OR AIR DISTRIBUTION ARE AUDIBLE IN THE FINISHED AREAS.

GUARANTEE: THIS CONTRACTOR SHALL GUARANTEE ALL MATERIALS, EQUIPMENT AND WORKMANSHIP FOR ONE (1) YEAR FOLLOWING FINAL INSPECTION AND ACCEPTANCE OF THE BUILDING BY THE ENGINEER AND OWNER. THIS APPLIES TO ALL MATERIALS AND EQUIPMENT INSTALLED UNDER THIS CONTRACT, REGARDLESS OF SOURCE.

THE ONE (1) YEAR GUARANTEE PERIOD WILL START ON THE DAY OF FINAL INSPECTION AND ACCEPTANCE BY THE OWNER. THE CONTRACTOR SHALL PROVIDE THE ENGINEER A LETTER WITH TWO (2) COPIES STATING THE BEGINNING AND ENDING DATES OF THE GUARANTEE BASED ON THE AFOREMENTIONED STARTING DATES.

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
	SUPPLY AIR DIFFUSER
	RETURN AIR GRILLE OR REGISTER
	EXHAUST AIR GRILLE OR REGISTER
	DUCTWORK
	LINED DUCT
	FLEXIBLE DUCT
	MANUAL VOLUME DAMPER
	TRANSITION RECTANGULAR TO RECTANGULAR
	TRANSITION RECTANGULAR TO ROUND
	ELBOW W/DOUBLE THICKNESS VANES
	ELBOW W/DOUBLE THICKNESS VANES
	ADJUSTABLE SPLITTER TEE WITH TURNING VANES (SUPPLY AIR ONLY)
T	THERMOSTAT, HUMIDISTAT, CO2 SENSOR
	PIPE RISER
	PIPE DROP
	CONNECTION TO EXISTING



A CEILING MOUNTED EXHAUST FAN
SCALE: NTS

FAN SCHEDULE

DESIG.	SERVES MOUNT	CFM	EXT. S.P.	RPM	WATTS H.P.	VOLTS PHASE	MFG./PART NO. GREENHECK	SONES	DRIVE	REMARKS
EF-1	TOILET	70	0.25	895	74 W	120V/1ø	SP–A110	0.8	DIRECT	10"ø WALL CAP, BACKDRAFT DAMPER, DISCONNECT SWITCH, BIRDSCREEN, FACTORY MTD FSC
EF-2	TOILET	70	0.25	895	74 W	120V/1ø	SP–A110	0.8	DIRECT	TIE INTO EF–1 WALL CAP, BACKDRAFT DAMPER, DISCONNECT SWITCH, BIRDSCREEN, FACTORY MTD FSC
EF-3	STORAGE	100	0.25	1083	53 W	120V/1ø	SP–A125	1.2	DIRECT	TIE INTO EF–1 WALL CAP, BACKDRAFT DAMPER, DISCONNECT SWITCH, BIRDSCREEN, FACTORY MTD FSC
F-1* (ALT. 1)	LIVESTOCK DEMO 106	–	–	76	10 AMP	120V/1ø	BIG ASS FANS ESSENCE 12' DIA.	–	DIRECT	WALL MTD WIRED CONTROL, COLOR BY ARCH., BRACKET FOR STRUCTURE TYPE W/ STEEL SUPPORT FOR MOUNTING BETWEEN PURLINS, GUY SAFETY WIRES
F-2* (ALT. 1)	HOLDING 107	–	–	76	10 AMP	120V/1ø	BIG ASS FANS ESSENCE 12' DIA.	–	DIRECT	WALL MTD WIRED CONTROL, COLOR BY ARCH., BRACKET FOR STRUCTURE TYPE W/ STEEL SUPPORT FOR MOUNTING BETWEEN PURLINS, GUY SAFETY WIRES
F-3* (ALT. 1)	HOLDING 107	–	–	76	10 AMP	120V/1ø	BIG ASS FANS ESSENCE 12' DIA.	–	DIRECT	WALL MTD WIRED CONTROL, COLOR BY ARCH., BRACKET FOR STRUCTURE TYPE W/ STEEL SUPPORT FOR MOUNTING BETWEEN PURLINS, GUY SAFETY WIRES

APPROVED MANUFACTURER'S: GREENHECK, LOREN COOK, AMERICAN COOLAIR, BIG ASS FANS.

NOTE: FAN SPEED SHALL NOT EXCEED RPM ON SCHEDULE.

* PER NEC 549.9 – MOTORS AND OTHER ROTATING ELECTRICAL MACHINERY SHALL BE TOTALLY ENCLOSED OR DESIGNED SO AS TO MINIMIZE ENTRANCE OF DUST, MOISTURE, OR CORROSIVE PARTICLES.

ELECTRIC UNIT HEATER SCHEDULE

DESIG.	SERVES	CFM	RISE ΔT(°F)	KW	BTU/HR	VOLTS PHASE	AMPS	MOP	MFG./PART NO. TRANE	REMARKS
EUH-1	STORAGE 104	400	26	3.3	11,200	240V/1ø	13.7	20	UHEC 031B0C0	

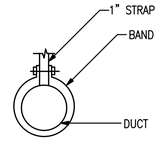
ACCEPTABLE MANUFACTURERS: TRANE, MODINE, REZNOR, MARLEY OR EQUAL

NOTES: UNIT TO BE HUNG FROM CEILING, WALL MOUNTED THERMOSTAT, UNIT CIRCUIT BREAKER.

ELECTRIC WALL HEATER SCHEDULE

UNIT NO.	SERVICE	CFM	△T °F	STAGES	KW	POWER	MANUFACTURER CATALOG NO.
EWH-1	MEN 102	400	41	1	3.0	240V, 1PH	TRANE UHWA–031B5
EWH-2	WOMEN 103	400	41	1	3.0	240V, 1PH	TRANE UHWA–031B5

(1) BUILT–IN CIRCUIT BREAKER, TAMPER RESISTANT THERMOSTAT COVER PLATE, VERIFY WITH G.C. FOR SURFACE OR RECESSED MOUNTED AND EXACT LOCATION.



ROUND

LOW PRESSURE DUCTWORK

B DUCTWORK HANGERS
OR PROVIDE SUPPORTS PER SMACNA TABLES 4–1 AND 7–2, HVAC DUCT CONSTRUCTION STANDARDS
SCALE: NTS

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT
METHOD OF COMPLIANCE
Prescriptive ● Energy Cost Budget

Climate Zone 4A
Exterior design conditions
winter dry bulb 22.9° F
summer dry bulb 90.3° F DB/75.2° F WB
Interior design conditions
winter dry bulb 72° F
summer dry bulb 75° F
relative humidity 50%
Building heating load 11,124 BTUH
Building cooling load N/A
Mechanical Spacing Conditioning System
Unitary
description of unit ELECTRIC WALL HEATERS
heating efficiency SEE SCHEDULES
cooling efficiency SEE SCHEDULES
heat output of unit SEE SCHEDULES
cooling output of unit SEE SCHEDULES
boiler
total boiler output. If oversized, state reason. N/A
chiller
total chiller capacity. If oversized, state reason. N/A
List equipment efficiencies SEE SCHEDULES

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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 7883 ENGINEER DONALD R BRITTAIN
2/6/22/26

PROJECT

CATAWBA COUNTY CATTLEMEN'S ASSOCIATION EDUCATION CENTER

2894 MT. OLIVE CHURCH ROAD
NEWTON, NORTH CAROLINA 28658

DISTRIBUTION

MARK	DATE	DESCRIPTION
SD	10-23-2025	SCHEMATIC DESIGN
DD	11-10-2025	DESIGN DEVELOPMENT
CD	06-22-2026	CONSTRUCTION DOCUMENTS

PROJECT NUMBER: 2024.008
CAD DWG FILE:
DRAWN BY: DGR
CHECKED BY: DRB

SHEET TITLE
Schedules
Specs
HVAC

M2

061826EHC217100

DETAILED ELECTRICAL SPECIFICATIONS

SCOPE: FURNISH ALL MATERIALS, LABOR, TOOLS, EQUIPMENT AND SUPERVISION NECESSARY TO INSTALL COMPLETE ELECTRICAL POWER AND LIGHTING SYSTEM IN THE BUILDING AS FURTHER DESCRIBED ON THE ELECTRICAL CONTRACT DRAWINGS.
SUPPLY ALL MATERIALS, FITTINGS AND HARDWARE NECESSARY FOR COMPLETE OPERATING SYSTEMS WITHIN THE OBVIOUS INTENT OF THE DRAWINGS. NO ATTEMPT HAS BEEN MADE TO DETAIL OR LIST EACH AND EVERY ITEM OF MATERIAL. THE ELECTRICAL CONTRACTOR IS CAUTIONED TO READ THE ENTIRE PROJECT DRAWINGS AND SPECIFICATIONS TO ASSURE HIMSELF OF A THOROUGH KNOWLEDGE OF BUILDING CONSTRUCTION, STRUCTURAL RESTRICTIONS TO ELECTRICAL CONTRACT WORK AND TO ASSURE THAT NO REFERENCE ANYWHERE IN THE PROJECT DRAWINGS AND SPECIFICATIONS TO WORK BY THE ELECTRICAL CONTRACTOR IS OVERLOOKED.

CODES, PERMITS AND INSPECTIONS: THE LATEST EDITION OF THE STATE OF NORTH CAROLINA BUILDING CODE WHICH INCLUDES THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE IS HEREBY MADE A PART OF THIS SPECIFICATION. CODE REQUIREMENTS SHALL TAKE PRECEDENCE OVER THESE SPECIFICATIONS WHERE THE CODE REQUIREMENTS EXCEED THAT OF THE SPECIFICATIONS. HOWEVER, THE SPECIFICATIONS SHALL BE FOLLOWED WHERE THEY EXCEED CODE REQUIREMENTS. THE ELECTRICAL CONTRACTOR SHALL, AT NO ADDITIONAL COST TO THE OWNER, OBTAIN THE SERVICES OF THE LOCAL ELECTRICAL INSPECTOR TO MAKE ALL REQUIRED DURING CONSTRUCTION AND COMPLETED ELECTRICAL SYSTEM INSPECTIONS.

MATERIALS AND WORKMANSHIP: ALL MATERIAL BUILT INTO THIS PROJECT SHALL BE NEW OF EQUIVALENT OR BETTER QUALITY THAN THAT SPECIFIED. SPECIFIC NAMES AND CATALOG NUMBERS USED HEREIN ARE TO ESTABLISH THE ITEM FUNCTION, ARRANGEMENT AND QUALITY REQUIRED AND IS IN NO WAY TO RESTRICT COMPETITION. ALL MATERIALS SHALL BE UL APPROVED/LABELED AND/OR BE APPROVED BY A THIRD PARTY TESTING AGENCY IN THE STATE OF NORTH CAROLINA FOR THE PARTICULAR APPLICATION AS USED ON THIS PROJECT.

CONDUCTORS: ALL CONDUCTORS SHALL BE COPPER (#10 AWG AND SMALLER SHALL BE SOLID, AND #8 AWG AND LARGER STRANDED) WITH THHN/THWN INSULATION, INSTALLED IN CONDUIT. CONDUCTORS SHALL BE #12 AWG MINIMUM EXCEPT WITHIN LIGHT FIXTURES, LOW VOLTAGE CONTROLS OR COMMUNICATION/FIRE ALARM EQUIPMENT. CONDUCTOR COLOR CODE SHALL CONFORM TO THE NEC. CONDUCTORS SHALL BE CONTINUOUS FROM TERMINAL TO TERMINAL OR PULL BOX TO PULL BOX. JOINTS SHALL BE MADE WITH IDEAL "WIRENUTS." WIRING TERMINATIONS FOR ALL ELECTRICAL EQUIPMENT SHALL BE TESTED AND APPROVED FOR USE WITH 75°C RATED CONDUCTORS.

RACEWAYS: RACEWAYS SHALL BE UL APPROVED RIGID GALVANIZED STEEL WITH THREADED JOINTS OR METALLIC TUBING (EMT) WITH THREADED STEEL HEXAGONAL COMPRESSION FITTINGS – NEITHER INDENTOR TYPE OR DIE METAL FITTING WILL BE ACCEPTED. CONDUIT UNDER THE FLOOR SLAB AND UNDER GROUND OUTSIDE THE BUILDING MAY BE PVC. FITTINGS IN EMT SHALL BE WEATHER TIGHT (THOMAS AND BETTS SERIES #5123 WITH NYLON INSULATED THROATS), BENDS SHALL BE FACTORY FABRICATED OR MADE "COLD" WITH BENDING TOOL, FREE OF KINKS OR RESTRICTIONS. NO SINGLE BEND SHALL BE IN EXCESS OF 90 DEGREES. THERE SHALL BE NO MORE THAN THE EQUIVALENT OF THREE (3) 90 DEGREE BENDS IN A GIVEN RACEWAY FROM PULL BOX TO PULL BOX. RIGID RACEWAY THREADS SHALL BE CUT STRAIGHT AND TRUE – PIPE ENDS SHALL BE REAMED AND SMOOTHED INSIDE AND OUT. SUPPORT 1–1/2 INCH AND LARGER CONDUIT 10 FEET O/C OR LESS, AND 1 INCH AND SMALLER 6 FEET O/C MAXIMUM. RACEWAYS SHALL BE SUPPORTED DIRECTLY FROM BUILDING STRUCTURE WITH BOLTS, SCREWS, STRAPS, HANGER RODS AND BRACKETS. ALL METALLIC HARDWARE SHALL BE GALVANIZED OR CADMIUM PLATED. NAILS, WIRE AND/OR PERFORATED STRAPS WILL NOT BE ACCEPTED. USE THREADED LOCKNUTS OUTSIDE AND THREADED LOCKNUT AND BUSHING INSIDE ALL RACEWAY CONNECTIONS TO BOXES, DEVICES, PANELS AND GUTTERS. USE NON–METALLIC BUSHINGS ON ALL 1–1/4 INCH AND LARGER CONDUIT. EXPOSED CONDUIT SHALL BE RUN STRAIGHT AND TRUE PARALLEL AND PERPENDICULAR TO PRIMARY BUILDING LINES.

BOXES AND DEVICES: ALL BOXES, PANELS AND EQUIPMENT SHALL BE SUPPORTED DIRECTLY FROM THE BUILDING STRUCTURE AND SHALL NOT DEPEND ON THE FEEDER RACEWAYS FOR SUPPORT. ALL ITEMS SHALL BE CAREFULLY ALIGNED SO THAT COVERS WILL FINISH FLUSH AND STRAIGHT. ALL UNUSED KNOCKOUTS SHALL BE CLOSED WITH BLANKING DEVICES. BOXES IN CONCRETE OR MASONRY SHALL BE 3–1/2 INCH DEEP (MINIMUM) SQUARE 16 GAUGE GALVANIZED STEEL – STEEL CITY SERIES GW. BOXES INSTALLED IN WOOD PARTITIONS SHALL BE STEEL CITY 3–1/2 INCH DEEP GANGABLE SQUARE CORNER TYPE. SURFACE MOUNTED BOXES SHALL BE STEEL CITY #52151 AND/OR #52171 OR EQUAL. RECEPTACLES SHALL BE PASS & SEYMOUR 5362 SERIES OR EQUAL. SWITCHES SHALL BE PASS & SEYMOUR CBS20AC SERIES OR EQUAL. COVER PLATES SHALL BE STAINLESS STEEL (COORDINATE W/ OWNER). PULL BOXES SHALL BE 14 GAUGE GALVANIZED STEEL WITH BLANK COVER SIZED AS REQUIRED BY NATIONAL ELECTRICAL CODE. LOCATE DEVICES AND EQUIPMENT ABOVE FINISHED FLOOR AS FOLLOWS UNLESS OTHERWISE SPECIFICALLY NOTED ON PLANS:

WALL SWITCHES – 4'–0" OR TO NEAREST MASONRY COURSE JOINT.
RECEPTACLES – 1'–6" OR TO NEAREST MASONRY COURSE JOINT.
LIGHT FIXTURES – AS NOTED ON FIXTURE SCHEDULE.

GROUNDING: THE ELECTRICAL SYSTEM AND ALL ELECTRICAL EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH ARTICLE 250 OF THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE. GREEN EQUIPMENT GROUND WIRE SHALL BE INSTALLED WITH ALL FEEDERS AND BRANCH CIRCUITS AND IT SHALL BE SIZED PER NEC 250.122. WHERE ONLY ONE GROUND ROD IS DRIVEN AS ALLOWED BY THE EXCEPTION IN NEC ARTICLE 250.53(A)(2), THE CONTRACTOR SHALL SUBMIT A TESTING REPORT SHOWING THE ROD PROVIDES A RESISTANCE OF 25 OHMS OR LESS TO THE ENGINEER.

LIGHTING FIXTURES: LIGHTING FIXTURES AND LAMPS SHALL BE PROVIDED AND INSTALLED AS PER SCHEDULE. CATALOG NUMBERS GIVEN IN THE FIXTURE SCHEDULE INDICATE THE MINIMUM QUALITY AND PERFORMANCE REQUIRED. EQUAL FIXTURES WILL BE ALLOWED ONLY UPON APPROVAL BY ENGINEER; EQUAL FIXTURES SHALL MEET THE MINIMUM QUALITY AND PERFORMANCE OF THE SPECIFIED FIXTURE. EQUAL FIXTURES BY HUBBELL, COOPER, PHILIPS OR ACUITY SHALL BE ALLOWED. ALL FIXTURES SHALL BE CLEANED ON COMPLETION OF INSTALLATION. BALLASTS AND/OR THE FIXTURE UNIT IN WHICH THEY ARE INSTALLED SHALL HAVE UL APPROVAL FOR DIRECT CONTACT MOUNTING TO COMBUSTIBLE CEILING MATERIAL. ALL FLUORESCENT FIXTURES SHALL BE SUPPLIED WITH ELECTRONIC BALLASTS AND LED FIXTURES SHALL BE SUPPLIED WITH DIMMABLE LED DRIVERS. THE FIXTURES SHALL BE COMPLETE IN ALL RESPECTS INCLUDING PLASTER RINGS WHERE REQUIRED, END PLATES AND OTHER APPURTENANCES NECESSARY FOR THE COMPLETE INSTALLATION. ALL LIGHTING FIXTURES SHALL BE SECURED TO THE CEILING STRUCTURE PER THE NEC. ADDITIONAL SUPPORT WIRES (TIE WIRES) SHALL BE INSTALLED FOR EACH LAY–IN TYPE FIXTURE. THERE SHALL BE TWO STEEL WIRES OF THE SAME TYPE AS USED TO SUPPORT THE LAY–IN CEILING TRACK. ONE WIRE AT EACH OPPOSITE CORNER OF THE FIXTURE. THE WIRES SHALL BE FASTENED TO THE BUILDING STRUCTURE. FOR FIRE RATED CEILING, FIXTURE SHALL BE SUPPORTED ON ALL FOUR CORNERS AND AS PER THE CEILING DESIGN CRITERIA, TO THE BUILDING STRUCTURE.

TESTING: CABLE INSULATION TESTING: THE CONTRACTOR SHALL MEGGER ALL BUSWAYS, CABLES AND CONTROL CONNECTIONS TO PROVE INSULATION RESISTANCE IS OF ACCEPTABLE VALUE.
EMERGENCY LIGHT TESTING: CONTRACTOR SHALL PERFORM A TEST ON EACH UNIT AFTER IT IS PERMANENTLY INSTALLED AND CHARGED FOR A MINIMUM OF 24 HOURS. BATTERY SHALL BE TESTED FOR 90 MINUTES AND IT SHALL MEET THE REQUIREMENTS OF NEC 700.12 (A). ANY UNIT WHICH FAILS THE TEST MUST BE REPAIRED OR REPLACED, AND TESTED AGAIN. A COPY OF THE TEST REPORT SHALL BE PRESENTED TO THE ENGINEER PRIOR TO FINAL INSPECTION.
TESTING DOCUMENTATION: ALL TESTS SPECIFIED SHALL BE COMPLETELY DOCUMENTED AND TURNED OVER TO THE ENGINEER WHERE REQUIRED IN THESE SPECIFICATIONS. THE TEST CERTIFICATIONS SHALL IDENTIFY THE TEST VALUES, EQUIPMENT TESTED, TIME OF DAY AND DATE OF TESTING, TEMPERATURE AT TIME OF TESTING, THE NAME OF THE ELECTRICIAN THAT CONDUCTED THE TEST, AND SIGNATURE OF PERSON RESPONSIBLE FOR THE TEST.

PANELBOARDS: PROVIDE PANELBOARDS RATED AND SIZED AS INDICATED IN THE SCHEDULE AND SHOWN ON THE PLANS EQUAL TO SQUARE D COMPANY MODEL NQ FOR SERVICES UP TO 240 VOLTS; MODEL NF FOR SERVICES UP TO 480 VOLTS; AND "I–LINE" FOR POWER DISTRIBUTION PANELS. ALL PANELBOARDS SHALL BE SUPPLIED WITH A COPPER EQUIPMENT GROUNDING BUS. CONSTRUCTION FEATURES SHALL INCLUDE MINIMUM 5" WIDE GUTTERS, DEAD FRONT CONSTRUCTION, ELECTROPLATED COPPER CURRENT CARRYING PARTS; UL LISTED TERMINALS SUITABLE FOR CONDUCTORS SPECIFIED; FLUSH FRONT HINGED "DOOR IN DOOR" WITH CYLINDER TUMBLER TYPE LOCKS (ALL KEYS ALIKE); CIRCUIT DIRECTORY AND FRAME, CODE GAUGE STEEL, GALVANIZED AND BAKED ENAMEL FINISHED. CIRCUIT BREAKERS SHALL BE BOLT–ON TYPE QOB (NQ PANELBOARDS), TYPE EDB (NF PANELBOARDS), AND TYPE FA AND FH (I–LINE PANELBOARDS). BREAKERS SHALL BE TOGGLE ACTION WITH QUICK–MAKE, QUICK–BREAK MECHANISM. TRIP INDICATION SHALL BE BY BREAKER HANDLE TAKING A POSITION BETWEEN ON AND OFF. ALL MULTI–POLE BREAKERS SHALL BE COMMON TRIP WITH A SINGLE HANDLE. ACCEPTABLE MANUFACTURERS: SQUARE D, GENERAL ELECTRIC, SIEMENS, CUTLER–HAMMER

SAFETY SWITCHES: SWITCHES SHALL BE EQUAL TO SQUARE D TYPE HD WITH RATINGS AND FUSING PROVISIONS AS INDICATED.

IDENTIFICATION AND NAMEPLATES: PROVIDE ENGRAVED, LAMINATED BAKELITE (WHITE LETTERS ON BLACK SURFACE) NAMEPLATES SCREWED TO EACH PIECE OF ELECTRICAL DISTRIBUTION EQUIPMENT AS FOLLOWS:
A. PANELBOARDS, SWITCHBOARDS – DESIGNATION L1, P1, ETC.,VOLTAGE, PHASE NUMBER OF WIRES, ETC.; WORDING EXAMPLE: PANEL L1–208V–3 PHASE, 4 WIRE.
B. MOTOR STARTERS, DISCONNECT SWITCHES – UNLESS MOUNTED DIRECTLY ON OR ADJACENT TO IDENTIFY EQUIPMENT: WORDING EXAMPLE: EXHAUST FAN 1, MAKE–UP AIR UNIT.
PROVIDE TYPED DIRECTORIES FOR PANELBOARD BRANCH CIRCUIT IDENTIFICATION. IDENTIFY EACH CIRCUIT BREAKER AS TO THE EXACT ROOM NUMBERS OR AREA SERVED AND THE TYPE OF CIRCUIT, I.E. "ROOMS 101–104 LIGHTS" OR "CAFETERIA EXHAUST FAN". PROVIDE ALL ADDITIONAL LABELING AS REQUIRED BY NEC ARTICLES 110.16 (ARC FLASH HAZARD) & 110.24 (AVAILABLE FAULT CURRENT).

EQUIPMENT CONNECTIONS: THIS CONTRACTOR SHALL BRING ALL REQUIRED ELECTRICAL SERVICE TO ALL EQUIPMENT ITEMS FURNISHED UNDER OTHER SECTIONS OF THESE SPECIFICATIONS OR BY THE OWNER, MAKE FINAL CONNECTIONS, AND LEAVE EQUIPMENT READY FOR OPERATION. THIS CONTRACTOR SHALL COORDINATE WITH ANY AFFECTED TRADE TO ASSURE CORRECT OPERATION OF THE EQUIPMENT ITEM.

CONTROL AND INTERLOCK WIRING: EXCEPT AS OTHERWISE INDICATED ON THE DRAWINGS, ALL CONTROL AND INTERLOCK WIRING SHALL BE PERFORMED BY THE RESPECTIVE CONTRACTORS. THE ELECTRICAL SUBCONTRACTOR SHALL INSTALL ALL STARTERS, PILOT SWITCHES, CONTROL DEVICES AND MISCELLANEOUS ITEMS OF ELECTRICAL EQUIPMENT FURNISHED UNDER OTHER SECTIONS OF THESE SPECIFICATIONS THAT ARE NOT INTEGRALLY MOUNTED WITH THEIR ASSOCIATED EQUIPMENT.

SERVICE: THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING SERVICE WITH THE UTILITY COMPANY. ALL CHARGES ASSOCIATED WITH SERVICE SHALL BE PAID BY THE E.C. PROVIDE UTILITY REQUIRED METERING PROVISIONS. PROVIDE CT CAN OR CONCRETE PAD FOR TRANSFORMER AS REQUIRED. PROVIDE CONDUIT FOR UTILITY PRIMARY IF REQUIRED. EC SHALL WORK DIRECTLY WITH THE UTILITY AND SHALL COMPLETE AND SUBMIT ALL LOAD DATA SHEETS REQUIRED FOR SERVICE APPLICATION. WHERE A NEW SERVICE IS NOT REQUIRED, BUT LOADS ARE ADDED TO AN EXISTING SERVICE, E.C. SHALL NOTIFY UTILITY OF ADDITIONAL LOADS E.C. SHALL PROVIDE THIS INFORMATION AT BEGINNING OF PROJECT TO ALLOW TIME FOR A TRANSFORMER CHANGE OUT IF NECESSARY.

VIBRATION ISOLATION AND SEISMIC RESTRAINT: ALL EQUIPMENT AND CONDUIT FURNISHED AND INSTALLED UNDER THIS CONTRACT SHALL BE SEISMICALLY RESTRAINED BY CHAPTER 16 OF THE INTERNATIONAL BUILDING CODE, VOL. 1 – GENERAL CONSTRUCTION.

SUBMITTALS: SHOP DRAWING SUBMITTALS WILL BE REQUIRED FOR THIS PROJECT. SUBMIT ELECTRONIC COPIES OF ALL LIGHT FIXTURES AND MAJOR SPECIFIED EQUIPMENT TO THE ENGINEER FOR APPROVAL. THE ELECTRICAL CONTRACTOR SHALL REVIEW ALL SUBMITTALS AND MAKE CORRECTIONS AS REQUIRED PRIOR TO SUBMITTING TO ENGINEER FOR APPROVAL. THE CONTRACTOR SHALL ALSO AFFIX HIS STAMP TO THE SUBMITTALS INDICATING THAT HIS REVIEW HAS BEEN COMPLETED. IT IS UNDERSTOOD THAT PROOF OF EQUALITY IS THE RESPONSIBILITY OF THE CONTRACTOR AND/OR SUPPLIER AND THAT IT IS NOT THE RESPONSIBILITY OF THE ENGINEER TO PROVE THE INEQUALITY OF THE PROPOSED SUBSTITUTIONS. FURTHERMORE THE DECISION OF THE ENGINEER IS FINAL. SHOULD ANY SUBSTITUTE ITEMS BE SUBMITTED AND DISAPPROVED, THEN THOSE ITEMS MUST BE FURNISHED EXACTLY AS DESCRIBED HEREIN. THE ENGINEER'S REVIEW OF SHOP DRAWINGS AND/OR SUBMITTAL DATA SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR DEVIATIONS FROM THE CONTRACT DRAWINGS OR SPECIFICATIONS.

PROJECT CLOSE–OUT: DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS: AFTER INSTALLATION HAS BEEN COMPLETED, EQUIPMENT HAS BEEN TESTED, SYSTEMS PLACED IN PERMANENT OPERATION, AND ALL ADJUSTMENTS MADE, THIS CONTRACTOR SHALL DEMONSTRATE THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT HE HAS INSTALLED TO THE OWNER'S REPRESENTATIVE.

OPERATING AND MAINTENANCE MANUALS: THIS CONTRACTOR SHALL PROVIDE THE OWNER WITH A SET OF OPERATION AND MAINTENANCE MANUALS FOR THE EQUIPMENT HE HAS PROVIDED AND INSTALLED ON THE PROJECT. THE FIRST PAGE OF THE MANUALS SHALL IDENTIFY PROJECT AND GIVE NAME, ADDRESS AND PHONE NUMBER OF ARCHITECT, ENGINEER, MECHANICAL AND ELECTRICAL SUB–CONTRACTORS AND ANY SERVICE COMPANIES INVOLVED AND GIVE NAME AND NIGHT PHONE NUMBERS OF EACH PARTY REPRESENTING THE ELECTRICAL CONTRACTOR RESPONSIBLE FOR SERVICE DURING WARRANTY PERIOD.

WARRANTIES – GUARANTEE: THIS CONTRACTOR SHALL DELIVER TO THE OWNER ALL WARRANTIES FOR EQUIPMENT HE HAS PURCHASED AND INSTALLED. THIS CONTRACTOR SHALL ALSO GUARANTEE THAT ALL WORK PERFORMED AND/OR MATERIALS INSTALLED UNDER HIS CONTRACT IS OF THE QUALITY THAT COMPLIES WITH ALL SPECIFIC REQUIREMENTS OF THE PROJECT DOCUMENTS AND INSURES THE OWNER AGAINST ALL DEFECTS OF MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE.

FINAL CLEAN UP: DURING CONSTRUCTION THIS CONTRACTOR SHALL KEEP THE SITE CLEAR OF DEBRIS AND UPON COMPLETION OF CONSTRUCTION HE SHALL CLEAN UP THE PREMISES AND REMOVE ALL EVIDENCE OF HIS WORK.

RECORD DRAWINGS: AT THE END OF THE PROJECT, THE CONTRACTOR SHALL SUBMIT ONE SET OF THE ELECTRICAL DRAWINGS, UPDATED TO REFLECT CHANGES THAT HAVE TAKEN PLACE DURING THE CONSTRUCTION PERIOD, TO THE OWNER FOR THEIR USE. THE CORRECTED PLANS SHALL INDICATE ALL CHANGES AND DEVIATIONS FROM THE ORIGINAL CONTRACT DOCUMENTS.

ELECTRICAL SYSTEM AND EQUIPMENT

METHOD OF COMPLIANCE:

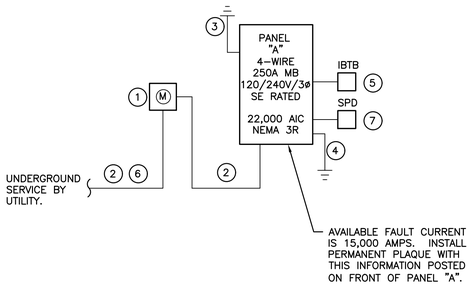
Energy Code: Prescriptive ● Performance ____
ASHRAE 90.1: Prescriptive ____ Performance ____

Lighting schedule

lamp type required in fixture	See Fixture Schedule
number of lamps in fixture	See Fixture Schedule
ballast type used in the fixture	See Fixture Schedule
number of ballasts in fixture	See Fixture Schedule
total wattage per fixture	See Fixture Schedule
total interior wattage specified vs allowed	4,000/10,550
total exterior wattage specified vs allowed	1,128/16,200

Additional Prescriptive Compliance

C406.2 More Efficient Mechanical Equipment	
C406.3 Reduced Lighting Power Density	●
C406.4 Enhanced Lighting Controls	
C406.5 On–Site Supply of Renewable Energy	
C406.6 Dedicated Outdoor Air System	
C406.7 High–Efficiency Service Water Heating	



POWER RISER

NTS

POWER RISER NOTES:

1. 250A, 120/240V, 3ø, 4–WIRE METER BASE.
2. 4 #250 KCMIL, 3"C UNDERGROUND.
3. #2 GND, 1"C PER NEC 250.50 & 250.52. REFER ALSO TO "SERVICE EQUIPMENT GROUNDING DETAIL".
4. #6 GND, ½"C TO GND RODS (MIN OF 2).
5. INTERSYSTEM BONDING TERMINAL BOX IN CABINET. REFER TO DETAIL.
6. COORDINATE ELECTRIC SERVICE INSTALLATION W/ UTILITY. PROVIDE CONDUCTORS AND CONDUITS AS REQUIRED. INCLUDE ALL INSTALLATION COSTS IN BID.
7. SURGE PROTECTION DEVICE (SPD) RATED FOR 80KA PER PHASE.

LIGHTING FIXTURE SCHEDULE

MARK	TYPE	MOUNTING	MANUFACTURER CATALOG NO.	LAMPS QTY/TYPE	TOTAL WATTS	VOLTAGE	REMARKS
A	4' LED ENCLOSED & GASKETED	STRUCTURE	LITHONIA FEM L48 10000 LP4FL MD GZ10 40K 80CRI WLF4X ST5L	LED 10,223 LM 4000K	63W	MVOLT 240V	
B	4' LED STRIP LIGHT	STRUCTURE	LITHONIA CLX LED L48 7000 SEF FDL MVOLT GZ1 40K 80CRI WH W/ WIREGUARD WGCLX48	LED 6865 LM 4000K	47W	MVOLT	
E	INDOOR EMERGENCY	WALL MOUNT	LITHONIA ELM 4L	LED 640 LM 5000K	2W	UVOLT	90 MINUTE BATTERY BACKUP, DAMP LOCATION
EH	HIGH OUTPUT EMERGENCY	WALL MOUNT	LITHONIA ELM 6L	LED 1100 LM 5000K	3W	UVOLT	90 MINUTE BATTERY BACKUP, WET LOCATION, CORROSION RESISTANT
J	3' LED VANITY LIGHT	SURFACE	LITHONIA FMVTSL 36" MVOLT 30K 90 CRI BN	LED 2009 LM 3000K	25W	120V	
K	2' STRIP LIGHT	SURFACE	LITHONIA CLX L24 2500LM SEF RDL MVOLT GZ10 40K 80CRI WH	LED 2500 LM 4000K	19W	120V	DIMMABLE
XE	EXIT/EGRESS COMBINATION	WALL MOUNT ABOVE DOOR	LITHONIA LHOM LP06YS S W 3 R HO M (W/TWIN GRAY EGRESS LGHTS) ELA T SD QWP L0309	EXIT) LED (CGRESS) 2–3W LED LAMPS	4W	MVOLT	PROVIDE 90 MINUTE BATTERY BACKUP
W	EXTERIOR WALL PACK	EXTERIOR WALL MOUNTED AT 12" ABOVE DOOR	LITHONIA WPX2 LED 40K MVOLT DDBXD	LED 5896 LM 4000K	47W	MVOLT	WET LOCATION RATED, DARK BRONZE

NOTES: ACCEPTABLE MANUFACTURERS OF COMPARABLE LIGHTING FIXTURES EQUAL TO FIXTURES SPECIFIED IN THIS LIGHTING FIXTURE SCHEDULE ARE ACUITY, EATON, HLI CURRENT, SIGNIFY AND WILLIAMS. ACUITY MODEL NUMBERS ARE USED ONLY AS A BASIS FOR DESIGN WHICH IS NOT RESTRICTIVE TO ANY PARTICULAR BRAND OF PRODUCT AS LONG AS THE PRODUCTS USED ARE EQUAL IN FORM, FIT AND FUNCTION TO THOSE SPECIFIED.

ESTIMATED LOAD TABULATION FOR POWER CO.

LOADS IN KVA	EXISTING DEMAND SINGLE PHASE	EXISTING DEMAND THREE PHASE	NEW CONNECTED SINGLE PHASE	NEW CONNECTED THREE PHASE	DIVERSITY FACTOR	NEW DEMAND SINGLE PHASE	NEW DEMAND THREE PHASE	TOTAL KVA EXISTING & NEW DEMAND
LIGHTING	–	–	7.3	–	125%	9.1	–	9.1
RECEPTACLES	–	–	2.3	–	100%	2.3	–	2.3
FANS & HEATERS	–	–	13.1	–	80%	10.5	–	10.5
WATER HEATER	–	–	4.5	–	90%	4.1	–	4.1
FUTURE WELDER	–	–	–	14.4	90%	–	13.0	13.0
TOTAL	–	–	27.2	14.4		26.0	13.0	39.0

TOTAL ESTIMATED PEAK LOAD OF 39.0 KW = 110.0 AMPS AT 208V/3ø, WITHIN THE CAPACITY OF PANEL "A" OF 250A AT 208V/3ø.

PANEL A — 22,000 AMPS RMS. SYM. I.C. INTEGRATED EQUIPMENT RATING — SURFACE MOUNTED SE RATED

120/208 VOLTS, 3 PHASE, 4 WIRE, 250 AMP MAIN BREAKER

SERVES	CIR LOAD	CIR NO.	CIR NO.	CIR LOAD	SERVES
BIG FANS F1	1.20	1	2	0.46	WATER COOLER ①
F2	1.20	3	4	0.36	RECEPTACLES
F3	1.20	5	6	0.18	
LIGHTING PLUS EF–1, 2 & 3	0.27	7	8	0.18	
EQUIPMENT STORAGE	0.47	9	10	0.18	
DEMONSTRATION	1.20	11	12	0.18	
HOLDING PENS	1.26	13	14	0.36	
HOLDING PENS	1.00	15	16	0.18	AT PANEL "A"
OUTSIDE	1.13	17	18	0.18	WP JUNCTION BOXFOR SCALE
RECEPTACLE MASTER GARDNER	0.18	19	20	2.25	WATER HEATER
HOT BOX	0.18	21	22	2.25	
EWH–1	1.50	23	24	1.65	EUH–1
	1.50	25	26	1.65	
EWH–2	1.50	27	28	0.50	TELEPHONE BOARD
	1.50	29	30		SPARE
SPARE		31	32		
		33	34		
		35	36		
		37	38		
SPACE FOR FUTURE WELDER		39	40		SURGE PROTECTION DEVICE
		41	42		

TOTAL CONNECTED LOAD: 26 KVA (72A) EST. ALL BREAKERS ARE 1P–20A UNLESS OTHERWISE NOTED

PANEL NOTES: ① GFI CIRCUIT BREAKER

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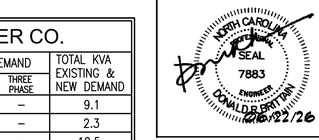
SEAL



PROJECT

CATAWBA COUNTY CATTLEMEN'S ASSOCIATION EDUCATION CENTER

2894 MT. OLIVE CHURCH ROAD
NEWTON, NORTH CAROLINA 28658

DISTRIBUTION

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DD	11-10-2025	DESIGN DEVELOPMENT
CD	06-22-2026	CONSTRUCTION DOCUMENTS

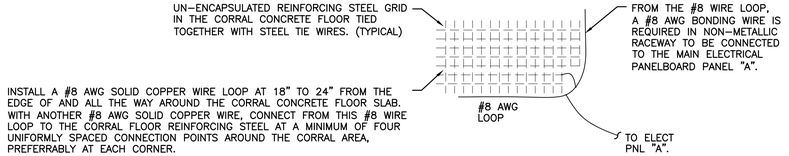
PROJECT NUMBER: 2024.008
CAD DWG FILE:
DRAWN BY: DGR
CHECKED BY: DRB

SHEET TITLE

Specifications
Schedules
Appendix B

E1

051425JFH217100

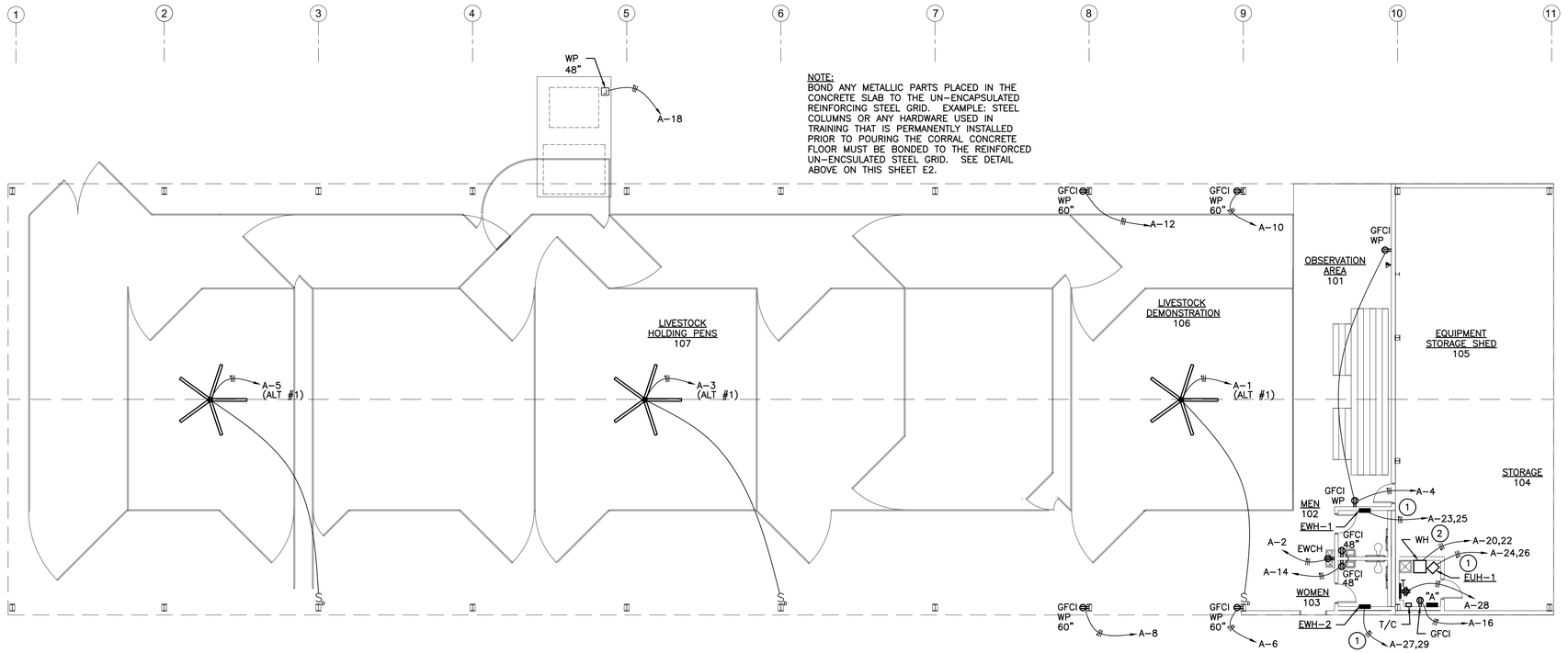


FLOOR STEEL GRID BONDING

NTS

POWER FLOOR PLAN NOTES:

1. 2 #12, #12 GND, ¾"C.
2. 2 #10, #10 GND, ¾"C.



FLOOR PLAN - POWER

SCALE: 3/32" = 1'-0"

062226MW217100

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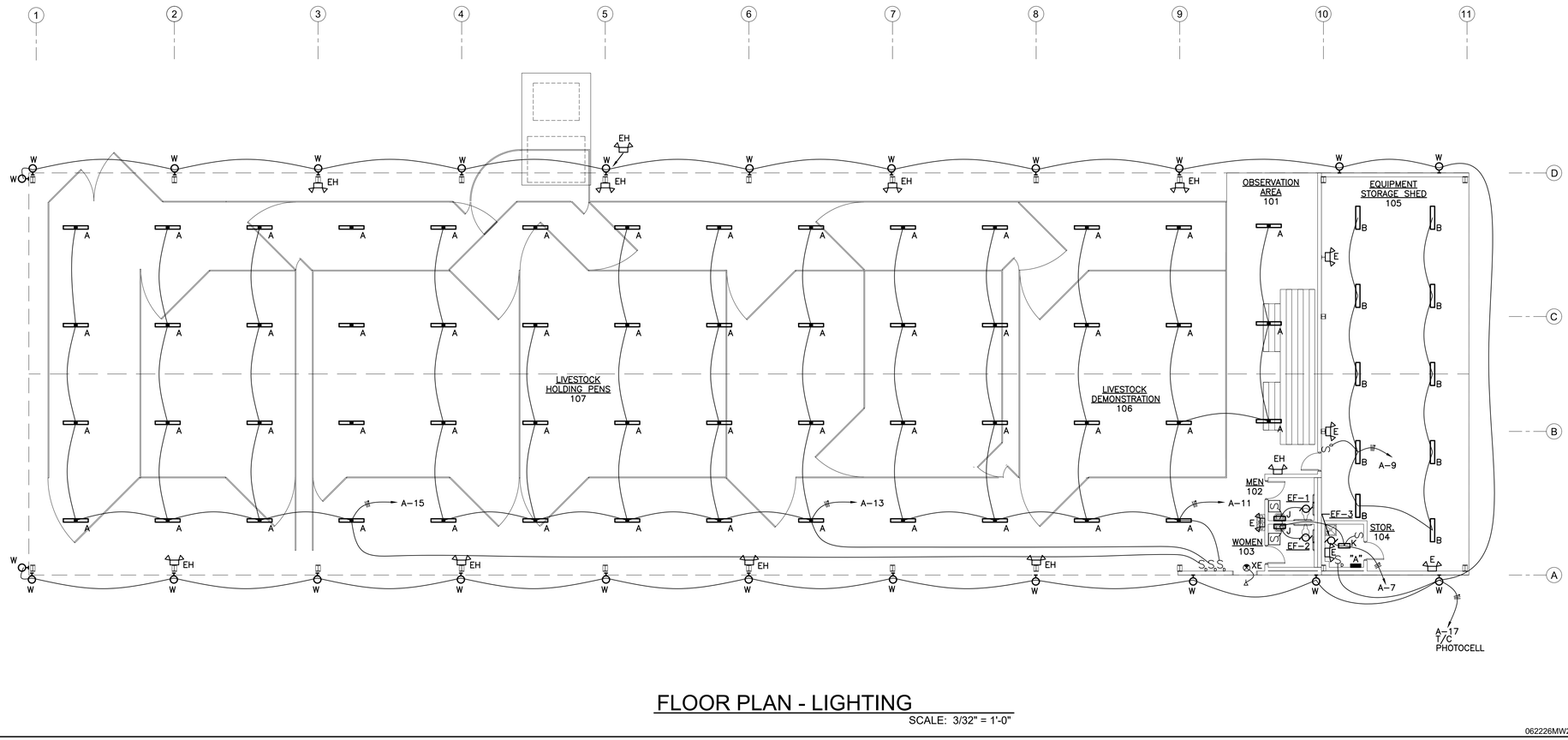
SHEET TITLE

Floor Plan
Power

E2



FLOOR PLAN - LIGHTING

SCALE: 3/32" = 1'-0"

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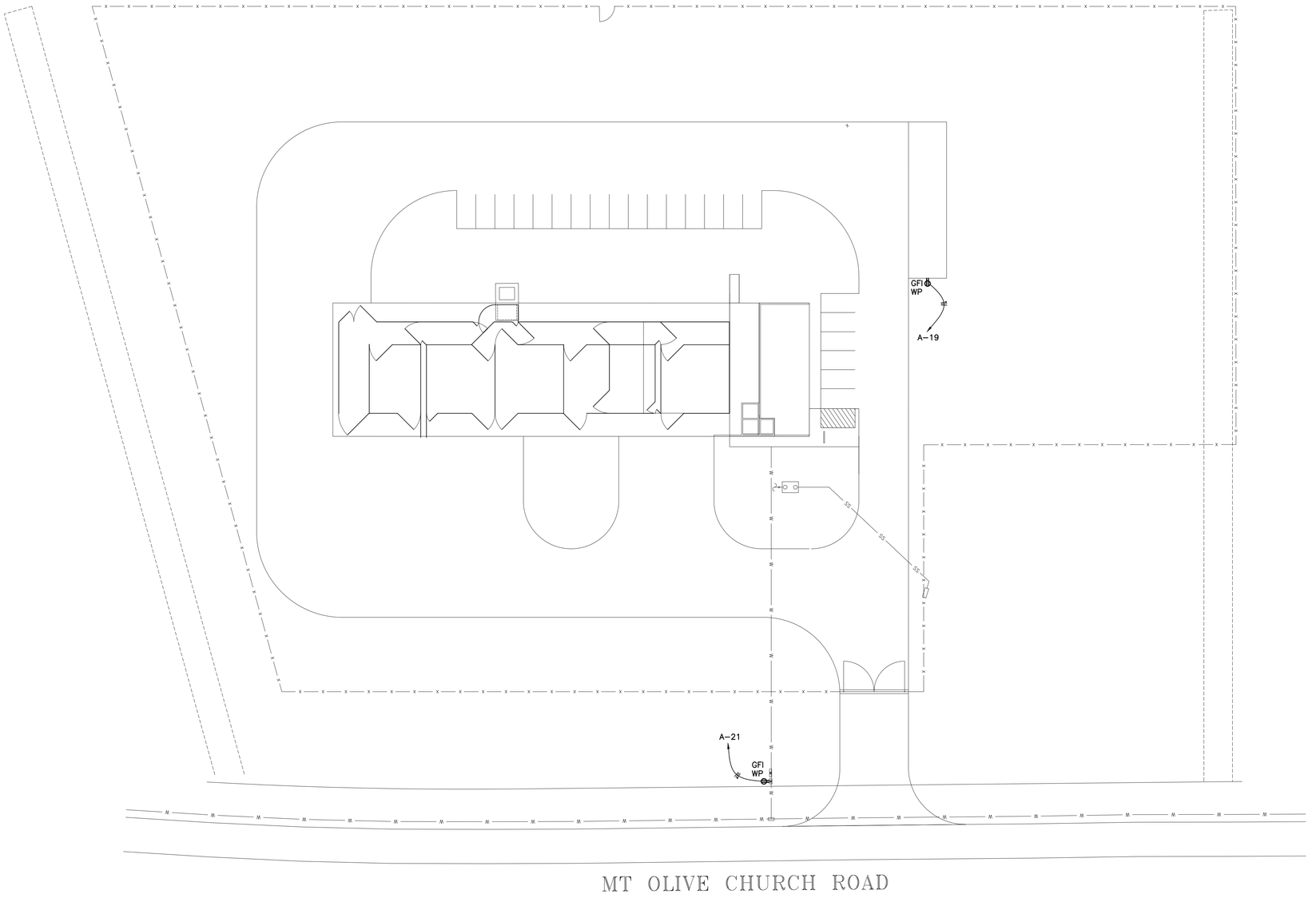
SHEET TITLE

Floor Plan
Lighting

E3



SITE PLAN - ELECTRICAL

SCALE: 1" = 30'-0"

062326DR217100

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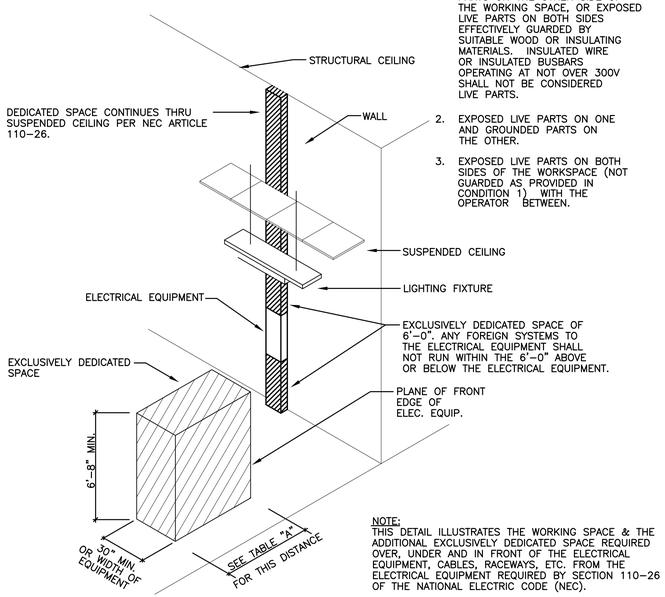
SHEET TITLE

Site Plan
Electrical

E4



WHERE THE "CONDITIONS" ARE AS FOLLOWS

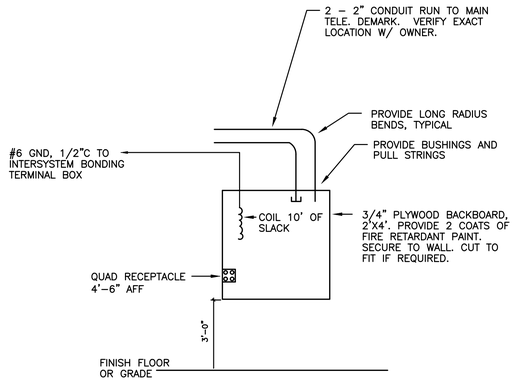
1. EXPOSED LIVE PARTS ON ONE SIDE AND NO LIVE OR GROUNDED PARTS ON THE OTHER SIDE OF THE WORKING SPACE, OR EXPOSED LIVE PARTS ON BOTH SIDES EFFECTIVELY GUARDED BY SUITABLE WOOD OR INSULATING MATERIALS. INSULATED WIRE OR INSULATED BUSBARS OPERATING AT NOT OVER 300V SHALL NOT BE CONSIDERED LIVE PARTS.
2. EXPOSED LIVE PARTS ON ONE AND GROUNDED PARTS ON THE OTHER.
3. EXPOSED LIVE PARTS ON BOTH SIDES OF THE WORKSPACE (NOT GUARDED AS PROVIDED IN CONDITION 1) WITH THE OPERATOR BETWEEN.

NOTE:
THIS DETAIL ILLUSTRATES THE WORKING SPACE & THE ADDITIONAL EXCLUSIVELY DEDICATED SPACE REQUIRED OVER, UNDER AND IN FRONT OF THE ELECTRICAL EQUIPMENT, CABLES, RACEWAYS, ETC. FROM THE ELECTRICAL EQUIPMENT REQUIRED BY SECTION 110-26 OF THE NATIONAL ELECTRIC CODE (NEC).

TABLE A – CLEARANCES				
VOLTAGE TO GROUNDED NOMINAL	MINIMUM CLEAR DISTANCE (FEET) CONDITION:	1	2	3
0 – 150		3	3	3
151 – 600		3	3.5	4

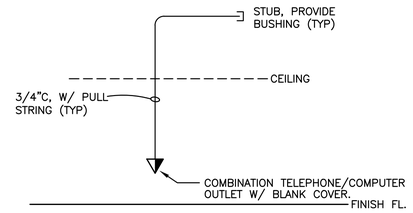
CLEARANCES FOR ELEC. EQUIPMENT

NTS



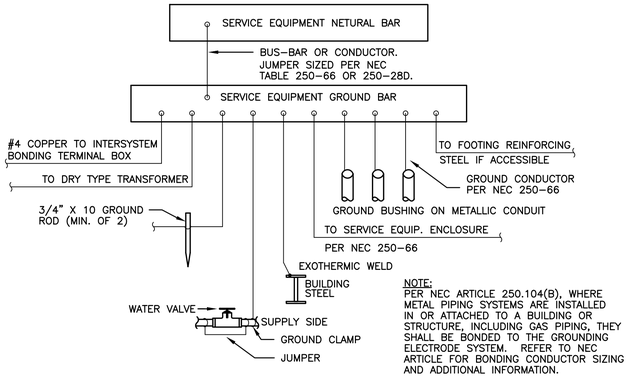
TELEPHONE BOARD SERVICE DETAIL

NTS



TYPICAL COMBINATION TELEPHONE / DATA OUTLET

NTS



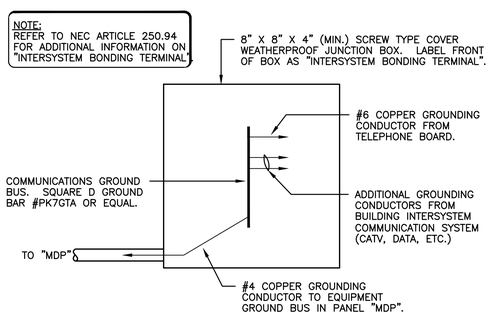
NOTE:
PER NEC ARTICLE 250.104(B), WHERE METAL PIPING SYSTEMS ARE INSTALLED IN OR ATTACHED TO A BUILDING OR STRUCTURE, INCLUDING GAS PIPING, THEY SHALL BE BONDED TO THE GROUNDING ELECTRODE SYSTEM. REFER TO NEC ARTICLE FOR BONDING CONDUCTOR SIZING AND ADDITIONAL INFORMATION.

SERVICE EQUIPMENT GROUNDING DETAIL

NTS

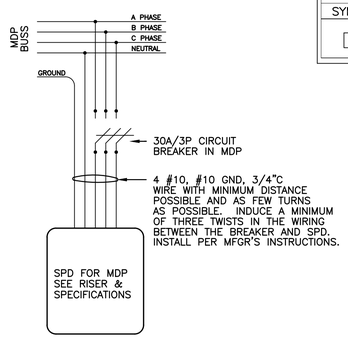
ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	CONDUIT
	CONDUIT UNDERFLOOR OR UNDERGROUND
	ARROW INDICATES HOMERUN, TICKMARKS: NEUTRAL,PHASE,GND.
	POWER PANEL
J	JUNCTION BOX
	DISCONNECT SWITCH; FUSED; NONFUSED
FPN	FUSE PER NAMEPLATE
S_m	MOTOR TOGGLE SWITCH
	MOTOR
	EXISTING OR BY OTHERS
	LIGHT FIXTURE
S, S_3, S_4	SINGLE POLE SWITCH , 3 WAY, 4 WAY
S_P , S_D	PILOT LIGHT , DIMMER
AFF	ABOVE FINISHED FLOOR
	DUPLEX RECEPT , ABOVE COUNTER
WP , GFI	WEATHERPROOF , GROUND FAULT
	QUAD-PLEX RECEPTACLE
	TELEPHONE/COMPUTER COMBINATION OUTLET



INTERSYSTEM BONDING TERMINAL DETAIL

NTS



SURGE PROTECTION DEVICE (SPD) CONNECTION

NTS

OCCUPANCY SENSOR LEGEND

SYMBOL	DESCRIPTION
S	SENSORSWITCH CAT #WSD WH WALL SWITCH SENSOR – PASSIVE INFRARED (PIR)

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PROJECT

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CHECKED BY:	DRB

SHEET TITLE

Details

E5

062226MW217100

System No. W-L-1001

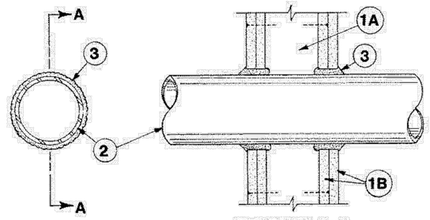
June 15, 2005

F Ratings — 1, 2, 3 and 4 Hr (See Items 2 and 3)

T Ratings — 0, 1, 2, 3, and 4 Hr (See Item 3)

L Rating At Ambient — less than 1 CFM/sq ft

L Rating At 400 F — less than 1 CFM/sq ft



SECTION A-A

1. **Wall Assembly** — The 1, 2, 3 or 4 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Wall framing may consist of either wood studs (max 2 h fire rated assemblies) or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC with nom 2 by 4 in. (51 by 102 mm) lumber end plates and cross braces. Steel studs to be min 3-5/8 in. (92 mm) wide by 1-3/8 in. (35 mm) deep channels spaced max 24 in. (610 mm) OC.

B. **Gypsum Board*** — Nom 1/2 or 5/8 in. (13 or 16 mm) thick, 4 ft. (122 cm) wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 26 in. (660 mm).

2. **Through-Penetrant** — One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening shall be min of 0 in / (0 mm). (point contact) to max 2 in. (51 mm) Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

A. **Steel Pipe** — Nom 24 in. (610 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
B. **Iron Pipe** — Nom 24 in. (610 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 12 in (305 mm) diam (or smaller) or Class 50 (or heavier) ductile iron pressure pipe.
C. **Conduit** — Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in (102 mm) diam (or smaller) steel electrical metallic tubing
D. **Copper Tubing** — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing
E. **Copper Pipe** — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.
F. **Through Penetrating Product*** — Flexible Metal Piping The following types of steel flexible metal gas piping may be used:
1. Nom 2 in. (51 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

OMEGA FLEX INC

2. Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

GASTITE, DIV OF TITEFLEX

3. Nom 1 in. (25 mm) diam (or smaller) steel flexible metal gas piping. Plastic covering on piping may or may not be removed on both sides of floor or wall assembly.

WARD MFG INC

3. **Fill, Void or Cavity Material*** — **Caulk or Sealant** — Min 5/8. , 1-1/4,1-7/8 and 2-1/2 in. (16, 32, 48 and 64 mm) thickness of caulk for 1, 2, 3 and 4 hr rated assemblies, respectively, applied within annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of caulk applied to gypsum board/penetrant interface at point contact location on both sides of wall. The hourly F Rating of the firestop system is dependent upon the hourly fire rating of the wall assembly in which it is installed, as shown in the following table. The hourly T Rating of the firestop system is dependent upon the type or size of the pipe or conduit and the hourly fire rating of the wall assembly in which it is installed, as tabulated below:

Max Pipe or Conduit Diam In (mm)	F Rating Hr	T Rating Hr
1 (25)	1 or 2	0+, 1 or 2
1 (25)	3 or 4	3 or 4
4 (102)	1 or 2	0
6 (152)	3 or 4	0
12 (305)	1 or 2	0

+When copper pipe is used, T Rating is 0 h.

3M COMPANY — CP 25WB+ or FB-3000 WT.

*Bearing the UL Classification Mark

2020 NEC SECTION 547, "AGRICULTURAL BUILDINGS", IS APPLICABLE TO THIS PROJECT. ATTENTION TO THESE SPECIFIC SECTIONS IS CRITICAL AND REQUIRED.

547.2 DEFINITIONS
EQUIPOTENTIAL PLANE (AGRICULTURAL BUILDINGS). AN AREA WHERE WIRE MESH OR OTHER CONDUCTIVE ELEMENTS ARE EMBEDDED IN OR PLACED UNDER CONCRETE, BONDED TO ALL METAL STRUCTURES AND FIXED NON-ELECTRICAL EQUIPMENT THAT COULD BECOME ENERGIZED, AND CONNECTED TO THE ELECTRICAL GROUNDING SYSTEM TO MINIMIZE VOLTAGE DIFFERENCES WITHIN THE PLANE, BETWEEN THE PLANES, THE GROUNDED EQUIPMENT, AND THE EARTH.

547.5 WIRING METHODS
(A) WIRING SYSTEMS. TYPES UF, NMC, COPPER SE CABLES, JACKETED TYPE MC CABLE, RIGID NONMETALLIC CONDUIT, LIQUID TIGHT FLEXIBLE NONMETALLIC CONDUIT, OR OTHER CABLES OR RACEWAYS SUITABLE FOR THE LOCATION, WITH APPROVED TERMINATION FITTINGS, SHALL BE THE WIRING METHODS EMPLOYED.
(B) MOUNTING. ALL CABLES SHALL BE SECURED WITHIN 200 MM (8 IN.) OF EACH CABINET, BOX, OR FITTING. NONMETALLIC BOXES, FITTINGS, CONDUIT, AND CABLES SHALL BE PERMITTED TO BE MOUNTED DIRECTLY TO ANY BUILDING SURFACE COVERED BY THIS ARTICLE WITHOUT MAINTAINING THE 6 MM (¼ IN.) AIRSPACE IN ACCORDANCE WITH 300.6(D).
(C) EQUIPMENT ENCLOSURES, BOXES, CONDUIT BODIES, AND FITTINGS.
(1) EXCESSIVE DUST. EQUIPMENT ENCLOSURES, BOXES, CONDUIT BODIES, AND FITTINGS INSTALLED IN AREAS OF BUILDINGS WHERE EXCESSIVE DUST MAY BE PRESENT SHALL BE DESIGNED TO MINIMIZE THE ENTRANCE OF DUST AND SHALL HAVE NO OPENINGS (SUCH AS HOLES FOR ATTACHMENT SCREWS) THROUGH WHICH DUST COULD ENTER THE ENCLOSURE.
(2) DAMP OR WET LOCATIONS. IN DAMP OR WET LOCATIONS, EQUIPMENT ENCLOSURES, BOXES, CONDUIT BODIES, AND FITTINGS SHALL BE PLACED OR EQUIPPED FOR USE IN WET LOCATIONS AND EQUIPMENT ENCLOSURES SHALL BE WEATHERPROOF.
(3) CORROSIVE ATMOSPHERE. EQUIPMENT ENCLOSURES, BOXES, CONDUIT BODIES, AND FITTINGS SHALL HAVE CORROSION RESISTANCE PROPERTIES SUITABLE FOR THE CONDITIONS.
(G) RECEPTACLES. GROUND-FAULT CIRCUIT-INTERRUPTER PROTECTION SHALL BE PROVIDED AS REQUIRED IN 210.8(B). GFCI PROTECTION SHALL NOT BE REQUIRED FOR OTHER THAN 125-VOLT, 15-AMPERE AND 20-AMPERE RECEPTACLES.

547.6 SWITCHES, RECEPTACLES, CIRCUIT BREAKERS, CONTROLLERS, AND FUSES. SWITCHES, INCLUDING PUSHBUTTONS, RELAYS, AND SIMILAR DEVICES, RECEPTACLES, CIRCUIT BREAKERS, CONTROLLERS, AND FUSES SHALL BE PROVIDED WITH ENCLOSURES AS SPECIFIED IN 547.5(C).

547.7 MOTORS. MOTORS AND OTHER ROTATING ELECTRICAL MACHINERY SHALL BE TOTALLY ENCLOSED OR DESIGNED SO AS TO MINIMIZE THE ENTRANCE OF DUST, MOISTURE, OR CORROSIVE PARTICLES.

547.8 LUMINAIRES.
(A) MINIMIZE THE ENTRANCE OF DUST. LUMINAIRES SHALL BE INSTALLED TO MINIMIZE THE ENTRANCE OF DUST, FOREIGN MATTER, AND CORROSIVE MATERIAL.
(B) EXPOSED TO PHYSICAL DAMAGE. LUMINAIRES EXPOSED TO PHYSICAL DAMAGE SHALL BE PROTECTED BY A SUITABLE GUARD.
(C) EXPOSED TO WATER. LUMINAIRES EXPOSED TO WATER FROM CONDENSATION, BUILDING CLEANSING WATER, OR SOLUTION SHALL BE LISTED FOR USE IN WET LOCATIONS.

547.10 EQUIPOTENTIAL PLANES AND BONDING OF EQUIPOTENTIAL PLANES.
(A) WHERE REQUIRED.
(1) INDOORS. EQUIPOTENTIAL PLANES SHALL BE INSTALLED IN CONFINEMENT AREAS WITH CONCRETE FLOORS WHERE METALLIC EQUIPMENT IS LOCATED THAT MAY BECOME ENERGIZED AND IS ACCESSIBLE TO LIVESTOCK.
(2) OUTDOORS. EQUIPOTENTIAL PLANES SHALL BE INSTALLED IN CONCRETE SLABS WHERE METALLIC EQUIPMENT IS LOCATED THAT MAY BECOME ENERGIZED AND IS ACCESSIBLE TO LIVESTOCK. THE EQUIPOTENTIAL PLANES SHALL ENCOMPASS THE AREA WHERE LIVESTOCK STANDS WHILE ACCESSING METALLIC EQUIPMENT THAT MAY BECOME ENERGIZED.
(B) BONDING. EQUIPOTENTIAL PLANES SHALL BE CONNECTED TO THE ELECTRICAL GROUNDING SYSTEM. THE BONDING CONDUCTOR SHALL BE SOLID COPPER, INSULATED, COVERED OR BARE, AND NOT SMALLER THAN #8 AWG. THE MEANS OF BONDING TO WIRE MESH OR CONDUCTIVE ELEMENTS SHALL BE BY PRESSURE CONNECTORS OR CLAMPS OF BRASS, COPPER, COPPER ALLOY, OR AN EQUALLY SUBSTANTIAL APPROVED MEANS.

NOTE: GROUNDING OR BONDING REQUIREMENTS UNIQUE TO AGRICULTURAL SETTINGS ARE NECESSARY DUE TO THE SENSITIVITY OF LIVESTOCK TO THE SLIGHT DIFFERENCES IN POTENTIAL BETWEEN SURFACES WITH WHICH THEY ARE IN DIRECT CONTACT. THE WET OR DAMP CONCRETE COMMON TO ANIMAL CONFINEMENT AREAS ENHANCES THAT SENSITIVITY.

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SEAL

PROJECT

CATAWBA COUNTY CATTLEMEN'S ASSOCIATION EDUCATION CENTER

2894 MT. OLIVE CHURCH ROAD
NEWTON, NORTH CAROLINA 28658

DISTRIBUTION

MARK	DATE	DESCRIPTION
SD	10-23-2025	SCHEMATIC DESIGN
DD	11-10-2025	DESIGN DEVELOPMENT
CD	06-22-2026	CONSTRUCTION DOCUMENTS

PROJECT NUMBER:	2024.008
CAD DWG FILE:	
DRAWN BY:	DGR
CHECKED BY:	DRB

SHEET TITLE

Details and Etc.

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062226MW217100