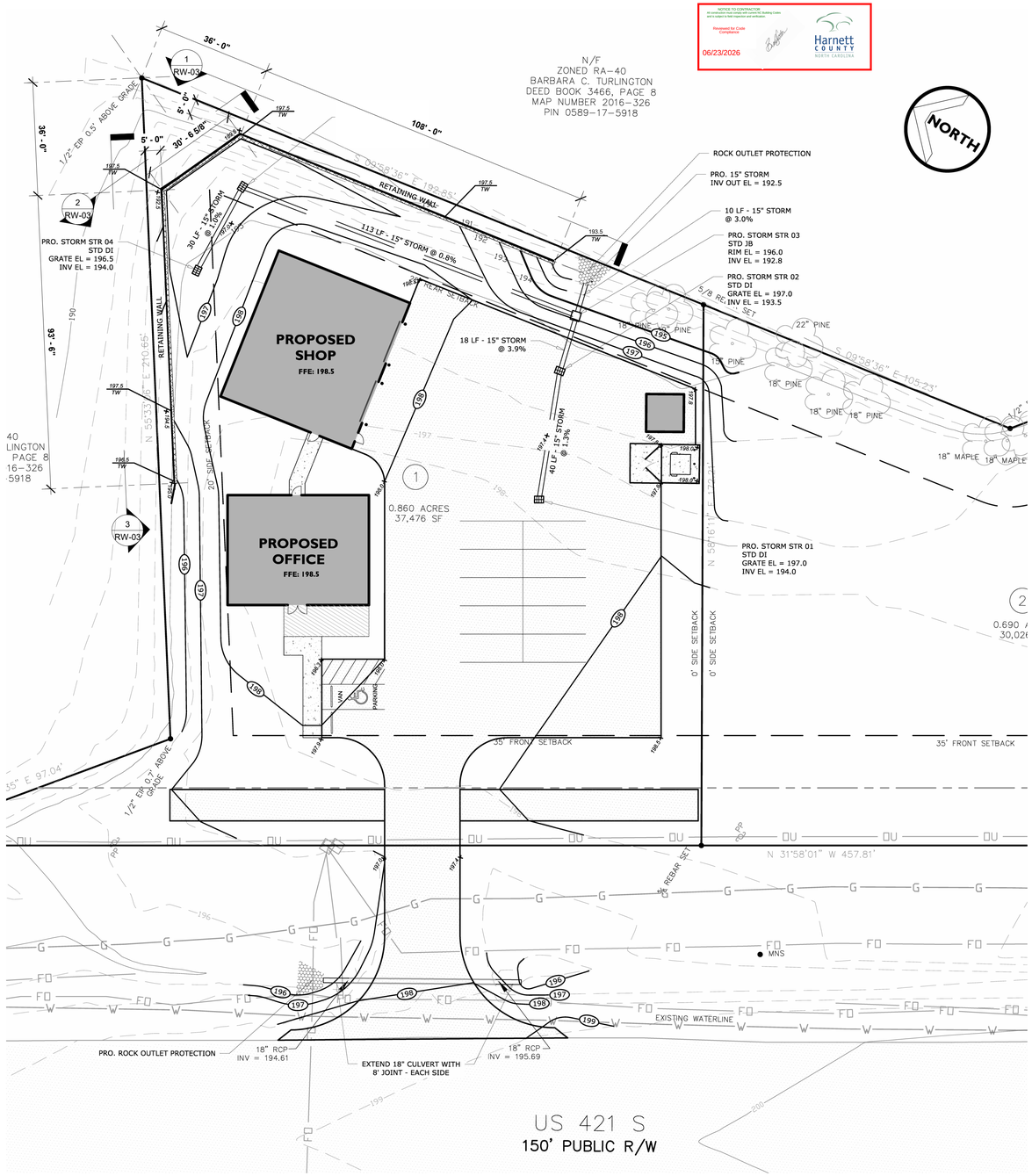



## GENERAL STRUCTURAL NOTES

1. PROJECT OVERVIEW: THE TIRADO TRUCK REPAIR PROJECT IS A SITE DEVELOPMENT AND BUILDING CONSTRUCTION PROJECT LOCATED OFF OF US 421 S IN HARNETT COUNTY, NC. THE SITE IMPROVEMENT PLANS INCLUDE A RETAINING WALL DUE TO THE CHANGE IN GRADE ON THE NORTH CORNER OF THE SITE. THESE PLANS (SHEET DESIGNATION RW-0X) PROVIDE THE RETAINING WALL CONSTRUCTION DETAILS. THE RETAINING WALL WILL BE A CAST-IN-PLACE CONCRETE CANTILEVER RETAINING WALL. NO BUILDING FOUNDATION LOADS OR VEHICLE SURCHARGE LOADS HAVE BEEN ACCOUNTED FOR IN DESIGN. BUILDING FOUNDATIONS, IN THE LOCATIONS AND ELEVATIONS SHOWN, WILL NOT TRANSFER ANY SUBSTANTIAL LOADS TO THE RETAINING WALLS.

2. CODES: 2018 NORTH CAROLINA BUILDING CODE (IBC 2015), ACI 318-14

3. LOADS:
- A. EARTH BACKFILL – SEE SOIL PARAMETER ASSUMPTIONS
- B. SURCHARGE – 200 PSF SOIL SURCHARGE ASSUMED FOR STRENGTH CALCULATIONS. REQUIRED SOIL BEARING AND STABILITY FACTORS OF SAFETY ARE NOT MET UNDER 200 PSF SURCHARGE LOADING IN SOME LOCATIONS.

4. SOIL PARAMETERS:
- A. SUBGRADE AND BACKFILL SOILS ASSUMED FOR RETAINING WALL DESIGN. USCS TYPES:
  - a. SW – WELL GRADED CLEAN SANDS, GRAVELLY SANDS
  - b. SP – POORLY GRADED SAND/ GRAVEL MIX
  - c. SM – POORLY GRADED SILTY SANDS
  - d. SC – POORLY GRADED CLAYEY SANDS
  - e. GM – SILTY GRAVELS, POORLY GRADED GRAVEL/ SAND/ SILT
  - f. GC – CLAYEY GRAVELS, POORLY GRADED GRAVEL/ SAND CLAY
- B. SOIL TYPES FOR SUBGRADE AND BACKFILL ARE TO BE VERIFIED BY A REGISTERED GEOTECHNICAL CONSULTANT.
- C. ASSUMED SOIL PARAMETERS (BASED UPON NAVFAC DM7.2):
  - a. ALLOWABLE SOIL BEARING CAPACITY_____2000 PSF (NET)
  - b. ACTIVE WALL PRESSURE_____38 PSF/ FT
  - c. PASSIVE SOIL PRESSURE_____300 PSF/ FT
  - d. COEFFICIENT OF FRICTION_____0.40

5. GENERAL NOTES:
- A. RETAINING WALL LAYOUT IS BASED UPON THE "SITE GRADING AND STORM DRAINAGE" PLAN SHEET C4 PREPARED BY J THOMAS ENGINEERING, SEALED ON 6-24-2025. CONTRACTOR SHALL ENSURE THAT THE RETAINING WALL PLAN REFLECTS THE LATEST APPROVED SITE DEVELOPMENT PLAN.
- B. THE CONTRACTOR SHALL RETAIN THE SERVICES OF A REGISTERED PROFESSIONAL LAND SURVEYOR FOR A BOUNDARY SURVEY.
- C. THE CONTRACTOR SHALL FOLLOW ALL REQUIREMENTS FOR TEMPORARY EROSION CONTROL MEASURES PRIOR TO LAND DISTURBING ACTIVITIES.
- D. THE CONTRACTOR SHALL OBTAIN A UTILITIES LOCATE PRIOR TO LAND DISTURBING ACTIVITIES.
- E. CONTACT THE ENGINEER IF ANY CONSTRUCTION DETAILS CANNOT BE CONSTRUCTED AS REQUIRED BY THESE DRAWINGS.

6. RETAINING WALL CONSTRUCTION NOTES:
- A. SUBGRADE FOR RETAINING WALL FOOTINGS SHALL BE VERIFIED TO BE A TYPE ACCEPTABLE PER SECTION 4 OF THESE NOTES PRIOR TO FORMING AND PLACING CONCRETE.
- B. CONCRETE PLACEMENT OCCUR WITHIN 24 HOURS OF EXCAVATION OR AS SOON AS PRACTICAL.
- C. GEOTECHNICAL CONSULTANT SHALL APPROVE THE WALL BACKFILL SOIL AS A TYPE ACCEPTABLE PER SECTION 4 OF THESE NOTES. THE PREFERENCE FOR WALL BACKFILL SOILS ARE THOSE WITH HIGH PERMEABILITY/ DRAINAGE CAPABILITIES.
- D. HEAVY COMPACTION AND EARTHMOVING EQUIPMENT SHALL REMAIN GREATER THAN 5 FEET AWAY FROM THE FACE OF THE RETAINING WALL. ACCEPTABLE EQUIPMENT INCLUDES A WALK-BEHIND TRENCH COMPACTOR OR SKID STEER LOADER.
- E. WALL DRAINAGE SHALL BE PROVIDED AS SHOWN ON THE PLANS. PVC DRAINAGE PIPES THROUGH THE RETAINING WALL SHALL BE INSTALLED AT NO GREATER THAN 10' INTERVALS.
- F. WEAKENED PLANE WALL CONTROL JOINTS SHALL BE PROVIDED AT NO MORE THAN 25' INTERVALS. CUT ONE HALF OF ALL HORIZONTAL WALL REINFORCEMENT AT THE LOCATION OF EACH WALL CONTROL JOINT.

7. CONCRETE NOTES:
- A. ALL ASPECTS OF CONCRETE CONSTRUCTION TO INCLUDE CONCRETE MIX DESIGN, REBAR DETAILING, FORMING AND PLACEMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING:
  - a. ACI 318-14 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
  - b. ACI 301-16 - SPECIFICATIONS FOR STRUCTURAL CONCRETE
  - c. ACI SP-66 – ACI DETAILING MANUAL

- A. CONCRETE MIX
  - a. FOOTINGS – MINIMUM F'c = 3,000 PSI AT 28 DAYS (NO AIR ENTRAINMENT)
  - b. WALL – MINIMUM F'c = 4,500 PSI AT 28 DAYS
    1. MAX w/c RATIO = 0.45
    2. NOMINAL MAXIMUM AGGREGATE SIZE LIMITED TO 0.75, 1 OR 1.5 INCHES
    3. CONCRETE SHALL BE AIR ENTRAINED WITH A MINIMUM AIR CONTENT OF 5 PERCENT.

- A. REINFORCING STEEL
  - a. MATERIAL: ASTM A615 GRADE 60
  - b. LAP SPLICES SHALL BE PROVIDED AS SPECIFIED IN TYPICAL DETAILS
  - c. BARS SHALL BE SUPPORTED AND HELD FIRMLY IN PLACE WITH STANDARD ACCESSORIES TO PROVIDE THE REQUIRED CONCRETE COVER/ CLEARANCE REQUIREMENTS.
  - d. REQUIRED COVER/ CLEARANCE IS SHOWN ON THE DRAWING DETAILS.

- A. FORMWORK
  - a. FORMWORK SHALL BE DESIGNED BY THE CONTRACTOR FOR THE FLUID FORCE OF THE WET CONCRETE TO PREVENT UNACCEPTABLE DEFORMATIONS OF THE FORMS.
  - b. MAXIMUM PERMISSIBLE FORMWORK DEFLECTION UNDER FLUID CONCRETE WEIGHT IS 0.25 INCH.
  - c. CONCRETE FORMWORK SHALL BE DETAILED AND CONSTRUCTED TO PROVIDE A SMOOTH APPEARANCE ON THE EXPOSED FACES OF THE WALL. CONTRACTOR/ DESIGNER SHOULD PAY ATTENTION TO THE FORMWORK FACE MATERIAL AND JOINTS.
  - d. PATCH ALL WALL TIE HOLES WITH GROUT AFTER SUFFICIENTLY CUTTING BACK WALL TIES.

- A. PLACEMENT
  - a. CONCRETE SHALL BE DEPOSITED IN WALLS BY MEANS OF A TREMIE PIPE. CONCRETE SHALL BE PERMITTED TO FREEFALL NO MORE THAN 6 FEET FROM THE END OF THE TREMIE PIPE.
  - b. CONCRETE SHALL BE CONSOLIDATED BY MEANS OF MECHANICAL VIBRATION IN ACCORDANCE WITH ACI 301.
  - c. CONSOLIDATION METHODS SHALL BE SUFFICIENT TO REDUCE WALL "BUG HOLES" (AIR POCKETS) AND HONEYCOMBING WITHOUT OVER CONSOLIDATING THE CONCRETE AND CAUSING SEGREGATION.
  - d. CONTRACTOR SHALL BE CAREFUL DURING PLACEMENT TO AVOID IRREGULAR/ UNSIGHTLY COLD JOINTS IN THE WALL PLACEMENT.

- A. CURING
  - a. ALL CONCRETE SHALL BE CURED FOR A MINIMUM OF 7 DAYS IN ACCORDANCE WITH THE METHODS PROVIDED IN ACI 301.
  - b. THE PREFERRED METHOD OF CURING IS THE APPLICATION OF A ROLLER APPLIED LIQUID APPLIED CONCRETE CURING COMPOUND. ROLL ONCE IN THE N-S DIRECTION THEN ROLL ONCE IN THE E-W DIRECTION (OR HORIZONTAL THEN VERTICAL).
  - c. STRIP WALL FORMED AS SOON AS REASONABLY PRACTICAL (USUALLY AFTER ONE DAY) AND APPLY CURING COMPOUND. LEAVING WALL FORMS IN PLACE IS NOT A SUFFICIENT CURING METHOD AS DETERMINED BY THE CONCRETE INDUSTRY (ACI).

ABBREVIATIONS:

| | |
|---|---|
| BO WALL | BOTTOM OF WALL |
| O.C. | ON CENTER |
| TO FTG | TOP OF FOOTING |
| TO WALL | TOP OF WALL |

DRAWING LIST:

| | | |
|---|---|---|
| • | RW-01 | RETAINING WALL LOCATION PLAN |
| • | RW-02 | RETAINING WALL FOOTING PLAN |
| • | RW-03 | RETAINING WALL ELEVATIONS |
| • | RW-04 | RETAINING WALL DETAILS |

NORTH CAROLINA PROFESSIONAL SEAL 041989 ENGINEER PHILLIP J. BURCAL
11/7/2025

PHILLIP J BURCAL ENGINEERING
17923 PENINSULA CLUB DR N
CORNELIUS, NC 28031
PBURCAL@GMAIL.COM
704-779-1112

PREPARED FOR:

JENKINS CONSULTING ENGINEERS, PA
OFFICE in EUREKA SPRINGS, NORTH CAROLINA
CORPORATION NUMBER C-3070 kellyd@jenkinsce.pro
1606 McARTHUR RD. FAYETTEVILLE, NC 28311-1002
910.822.1724

| No. | Description | Date |
|---|---|---|
| 0 | ISSUED FOR CONSTRUCTION | 7 NOV 25 |

# LUIS TIRADO

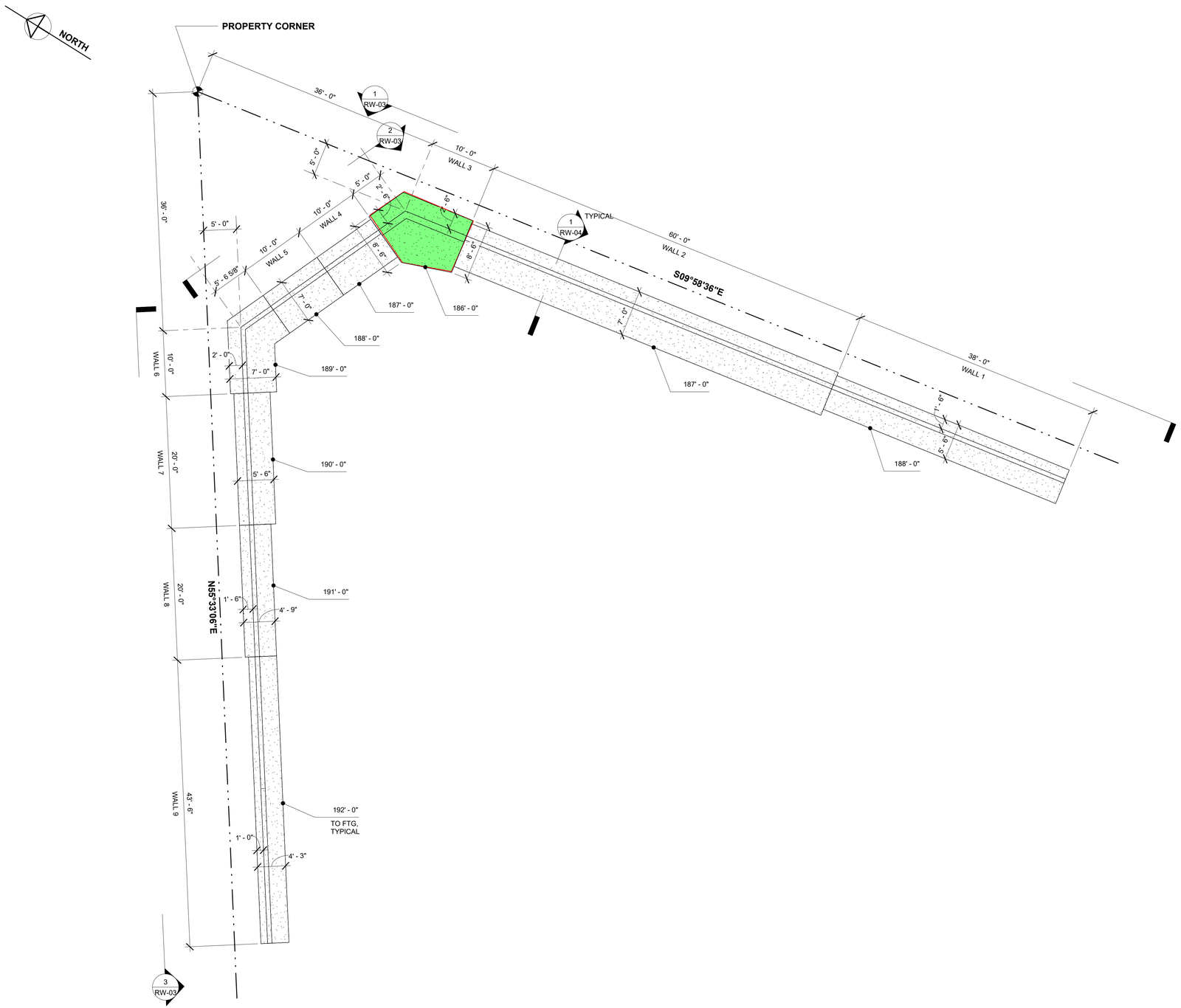
# TIRADO TRUCK REPAIR

# RETAINING WALL LOCATION PLAN

| | |
|---|---|
| Project Number | 2508 |
| Date | 7 NOV 25 |
| Drawn By | PJB |
| Checked By | PJB |
| Scale | As indicated |

# RW-01

11/7/2025 3:27:36 PM




SHEET NOTES:
1. REFERENCE DRAWING RW-01 FOR PROJECT NOTES AND CONCRETE NOTES
2. SEE DRAWING RW-04 FOR RETAINING WALL SCHEDULE AND DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 041969 ENGINEER PHILLIP J. BURCAL
11/7/2025


PHILLIP J BURCAL ENGINEERING
17923 PENINSULA CLUB DR N
CORNELIUS, NC 28031
PBURCAL@GMAIL.COM
704-779-1112


PREPARED FOR:

JENKINS CONSULTING ENGINEERS, PA
OFFICE in EUREKA SPRINGS, NORTH CAROLINA
CORPORATION NUMBER C-3070 kellyd@jenkinsce.pro
1606 McARTHUR RD. FAYETTEVILLE, NC 28311-1002
910.822.1724

| No. | Description | Date |
|---|---|---|
| 0 | ISSUED FOR CONSTRUCTION | 7 NOV 25 |

# LUIS TIRADO

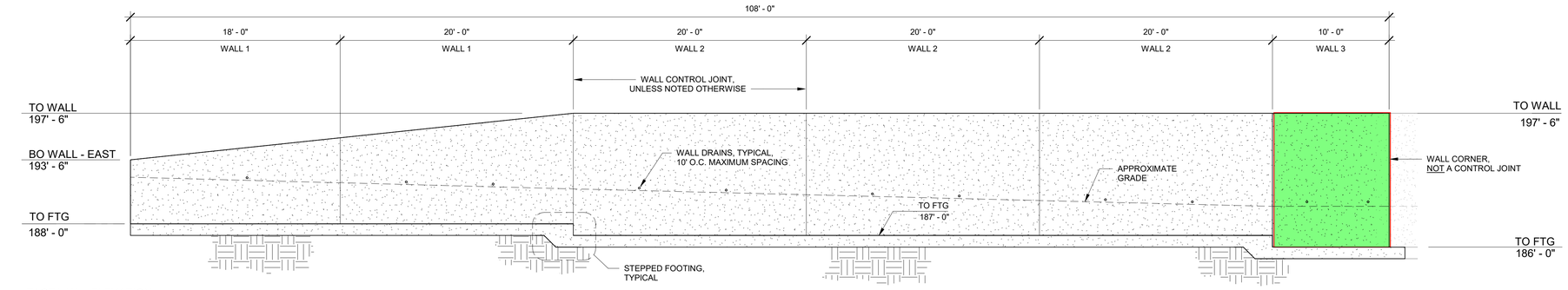
# TIRADO TRUCK REPAIR

## RETAINING WALL FOOTING PLAN

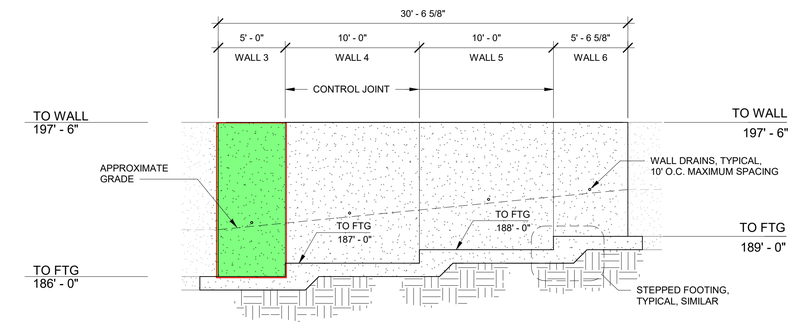
| | |
|---|---|
| Project Number | 2508 |
| Date | 7 NOV 25 |
| Drawn By | PJB |
| Checked By | PJB |
| Scale | 1/8" = 1'-0" |

# RW-02

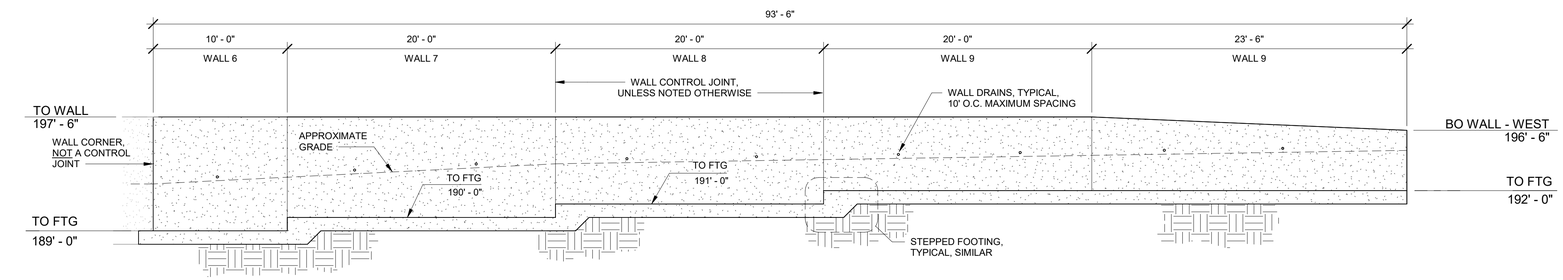
11/7/2025 3:27:36 PM




1 EAST WALL ELEVATION
3/16" = 1'-0"




2 NORTH WALL ELEVATION
3/16" = 1'-0"




3 WEST WALL ELEVATION
3/16" = 1'-0"

SHEET NOTES:
1. REFERENCE DRAWING RW-01 FOR PROJECT NOTES AND CONCRETE NOTES
2. CALLOUTS/ NOTES ARE TO BE CONSIDERED TYPICAL FOR ALL VIEWS ON SHEET
3. REFERENCE DRAWING RW-04 FOR TYPICAL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 041989 ENGINEER PHILLIP J. BURCAL
11/7/2025

PHILLIP J BURCAL ENGINEERING
17923 PENINSULA CLUB DR N
CORNELIUS, NC 28031
PBURCAL@GMAIL.COM
704-779-1112

PREPARED FOR:

JENKINS CONSULTING ENGINEERS, PA
OFFICE in EUREKA SPRINGS, NORTH CAROLINA
CORPORATION NUMBER C-3070 kellyd@jenkinsce.pro
1606 McARTHUR RD. FAYETTEVILLE, NC 28311-1002
910.822.1724

| No. | Description | Date |
|---|---|---|
| 0 | ISSUED FOR CONSTRUCTION | 7 NOV 25 |

# LUIS TIRADO

# TIRADO TRUCK REPAIR

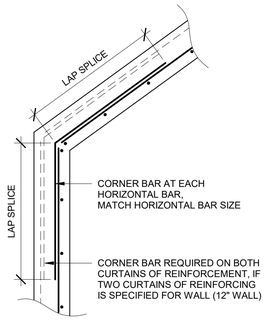
## RETAINING WALL ELEVATIONS

| | |
|---|---|
| Project Number | 2508 |
| Date | 7 NOV 25 |
| Drawn By | PJB |
| Checked By | PJB |

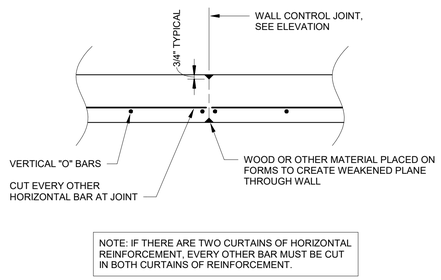
# RW-03

Scale 3/16" = 1'-0"

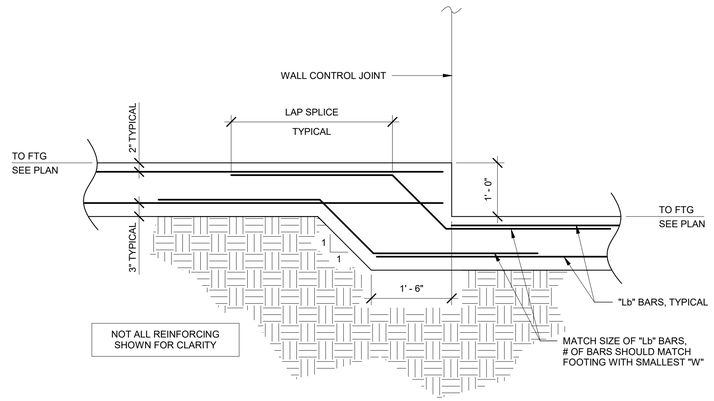
11/7/2025 3:27:36 PM



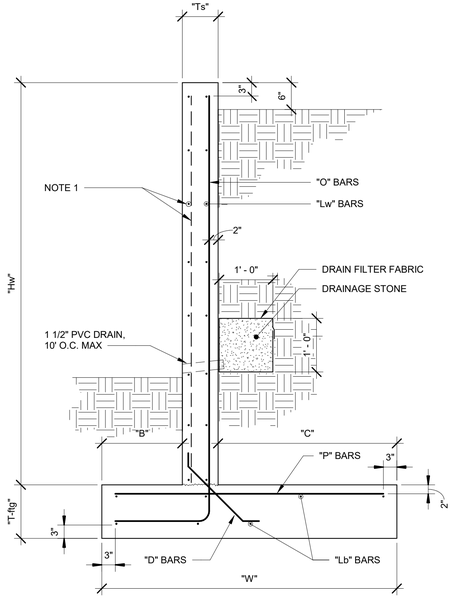

4 TYPICAL CORNER DETAIL
3/4" = 1'-0"




5 TYPICAL WALL CONTROL JOINT
1" = 1'-0"




6 TYPICAL STEPPED FOOTING
3/4" = 1'-0"




1 TYPICAL SECTION
3/4" = 1'-0"

NOTE 1: WHEN "Ts" IS 12" OR MORE, PROVIDE #4 BARS @ 12" O.C., EACH WAY ON EXTERIOR FACE OF WALL. OMIT BARS WHEN "Ts" IS LESS THAN 12".

| RETAINING WALL SCHEDULE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WALL MARK | Ts | T-ftg | Hw (1) | B | W | C | O (2) | Lw | D | P | Lb |
| 1 | 8" | 12" | 9'-6"* | 1'-6" | 5'-6" | 3'-4" | #6 @ 12" | #4 @ 12" | #6 @ 12" | #6 @ 18" | 8 #4 |
| 2 | 8" | 12" | 10'-6" | 2'-0" | 7'-0" | 4'-4" | #8 @ 12" | #4 @ 12" | #6 @ 12" | #8 @ 18" | 9 #4 |
| 3 | 12" | 12" | 11'-6" | 2'-6" | 8'-6" | 5'-0" | #8 @ 8" | #4 @ 12" | #6 @ 8" | #8 @ 16" | 8 #4 |
| 4 | 8" | 12" | 10'-6" | 2'-0" | 7'-0" | 4'-4" | #8 @ 12" | #4 @ 12" | #6 @ 12" | #8 @ 18" | 11 #4 |
| 5 | 8" | 12" | 9'-6" | 2'-0" | 7'-0" | 4'-4" | #8 @ 12" | #4 @ 12" | #6 @ 12" | #8 @ 18" | 9 #4 |
| 6 | 8" | 12" | 8'-6" | 2'-0" | 7'-0" | 4'-4" | #8 @ 12" | #4 @ 12" | #6 @ 12" | #8 @ 18" | 9 #4 |
| 7 | 8" | 12" | 7'-6" | 1'-6" | 5'-6" | 3'-4" | #6 @ 12" | #4 @ 12" | #6 @ 12" | #6 @ 18" | 8 #4 |
| 8 | 8" | 12" | 6'-6" | 1'-6" | 4'-9" | 2'-7" | #6 @ 12" | #4 @ 12" | #6 @ 12" | #6 @ 18" | 7 #4 |
| 9 | 8" | 8" | 5'-6"* | 1'-0" | 4'-3" | 2'-7" | #6 @ 12" | #4 @ 12" | #6 @ 12" | #6 @ 18" | 6 #4 |

NOTES: (1) "*" MEANS THE WALL IS SLOPED; MAXIMUM HEIGHT LISTED
(2) LAP SPLICE PERMITTED ON "O" BARS IN STEM

2 RETAINING WALL SCHEDULE
12" = 1'-0"

| **LAP SPLICE SCHEDULE**, INCHES F'c = 3,000 PSI | | |
|---|---|---|
| BAR SIZE | TOP BARS (1) | OTHER BARS (2) |
| #3 | 28 | 22 |
| #4 | 37 | 29 |
| #5 | 47 | 36 |
| #6 | 56 | 43 |
| #7 | 81 | 63 |
| #8 | 93 | 72 |
| #9 | 105 | 81 |

NOTES: (1) TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW THE BARS.
(2) OTHER BARS ARE ALL OTHER BARS THAT ARE NOT TOP BARS.

3 TYPICAL LAP SPLICE SCHEDULE
12" = 1'-0"

SHEET NOTES:
1. REFERENCE DRAWING RW-01 FOR PROJECT NOTES AND CONCRETE NOTES

NORTH CAROLINA PROFESSIONAL SEAL 041989 ENGINEER PHILLIP J. BURCAL
11/7/2025

PHILLIP J BURCAL ENGINEERING
17923 PENINSULA CLUB DR N
CORNELIUS, NC 28031
PBURCAL@GMAIL.COM
704-779-1112

PREPARED FOR:

JENKINS CONSULTING ENGINEERS, PA
OFFICE in EUREKA SPRINGS, NORTH CAROLINA
CORPORATION NUMBER C-3070 kellyd@jenkinsce.pro
1606 McARTHUR RD. FAYETTEVILLE, NC 28311-1002
910.822.1724

| No. | Description | Date |
|---|---|---|
| 0 | ISSUED FOR CONSTRUCTION | 7 NOV 25 |

LUIS TIRADO

TIRADO TRUCK REPAIR

# RETAINING WALL DETAILS

| | |
|---|---|
| Project Number | 2508 |
| Date | 7 NOV 25 |
| Drawn By | PJB |
| Checked By | PJB |

# RW-04

Scale: As indicated

11/7/2025 3:27:36 PM