

**REQUEST FOR COMMITTEE ACTION**

**HENDERSON COUNTY  
TECHINICAL REVIEW COMMITTEE**

**MEETING DATE:** June 4, 2019

**SUBJECT:** Combined Master and Development for Luna Ridge Major Subdivision  
(2019 – M03)

**STAFF CONTACT:** Eric Warren, Planner

**ATTACHMENTS:** 1. Staff Report  
2. Combined Master & Development Plan

**SUMMARY OF REQUEST:**

A subdivision application was submitted on behalf of property owners Mountain Asset Planning, LP on May 7, 2019. The application is for Luna Ridge Major Subdivision, consisting of 34 lots for single family dwellings and 5,809 ft of new private roadway. The subject area is located off Hutch Mountain Rd. (SR 1556) and contains 203.27 acres in four separate parcels (PIN: 9672-01-2875, 9662-91-2005, 9672-00-1345, 9671-19-1082).

**TECHNICAL REVIEW COMMITTEE ACTION REQUESTED:**

Staff has found that the Combined Master and Development Plan appears to meet the standards of the subdivision regulations of Chapter 42A, Henderson County Land Development Code (LDC).

**Suggested Motion:** I move that the TRC (approve, approve with conditions, or deny) the Combined Master and Development plan for Luna Ridge Major Subdivision based on the conditions noted in the staff report and any conditions discussed by the TRC.

**Henderson County Planning Department Staff Report**

**Combined Master and Development Plan  
Luna Ridge (2019 – M03)**

**Property Owner(s): Mountain Asset Planning, LP**  
**Applicant: Andy Baker, Terra Firma Management, INC (Agent for Owner)**  
**PINs: 9672-01-2875, 9662-91-2205, 9672-00-1345, 9671-19-1082**

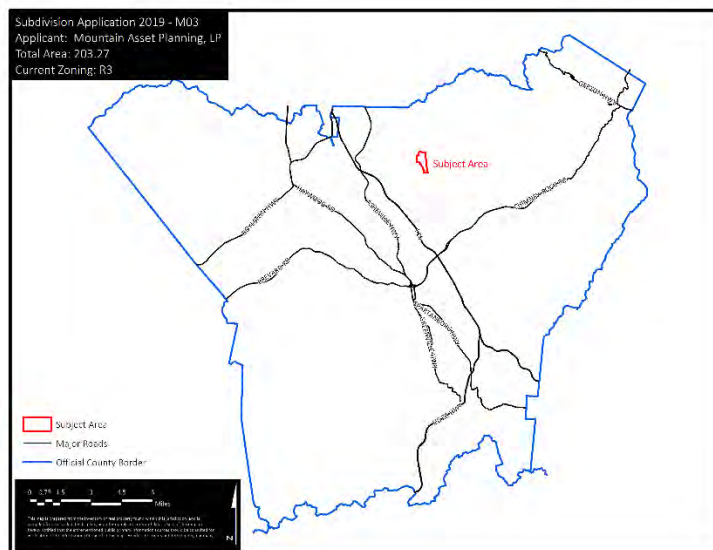
**Master Plan Comments:**

According to Chapter 42A, Henderson County Land Development Code (LDC) §42A-341, the purpose of a Master Plan is to provide general information about the proposed development to allow for an assessment of its impact on the orderly growth and development of the County, environmental quality, land values, natural features identified on the site analysis sketch and the County’s roads and governmental services. During the review of the Combined the Master and Development Plan, the Technical Review Committee should take into consideration: applicable recommendations of the *Henderson County Comprehensive Plan*, the potential use of the land to be subdivided, and the impact of the subdivision and proposed use whether residential, commercial or industrial.

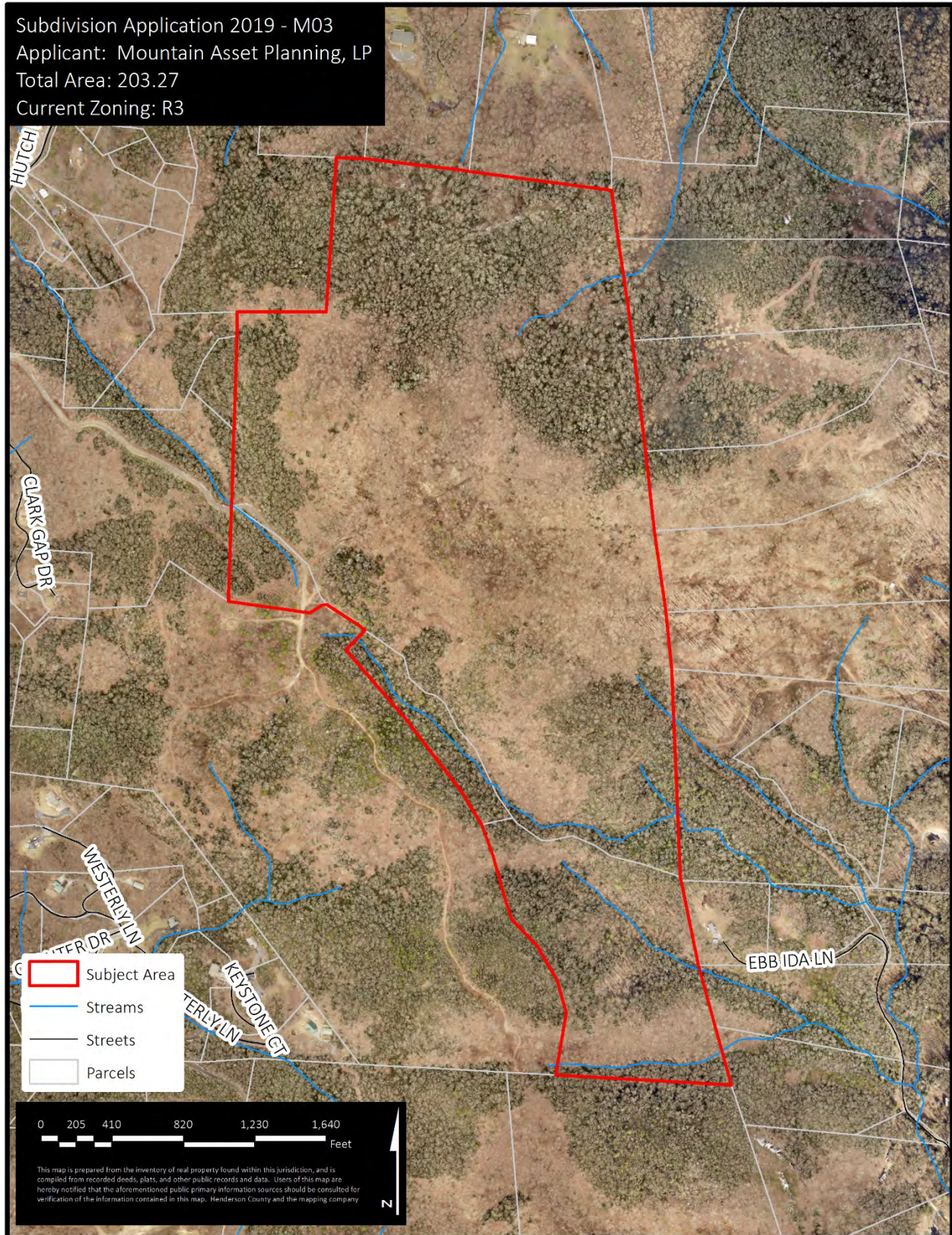
When reviewing the Combined Master and Development Plan it is important to consider that, due to severe topographic conditions, inadequate road access, distance from services, unique natural areas, soils that do not easily support soil drainage systems and/or the proximity to existing and incompatible land uses/zoning, all land may not be suitable to be subdivided for the purpose of dense development (LDC §42A-75).

Staff has reviewed the submitted Combined Master and Development Plan for the Luna Ridge Major Subdivision, taking into consideration the recommendations of the *Henderson County Comprehensive Plan* and reviewing the plan for conformance with Henderson County Land Development Code. Staff offers the following comments:

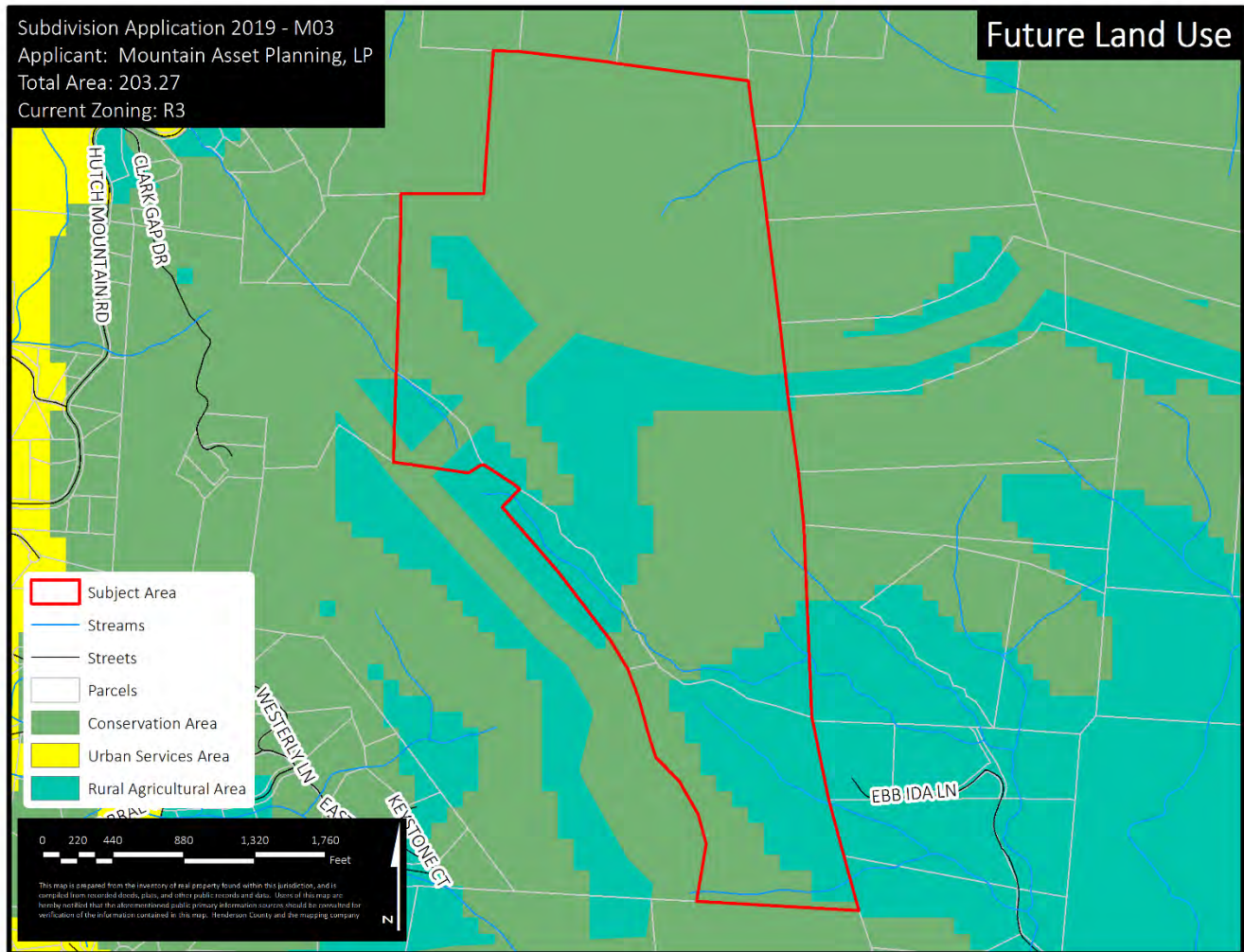
**Map A: County Context**



### Map B: Aerial Imagery

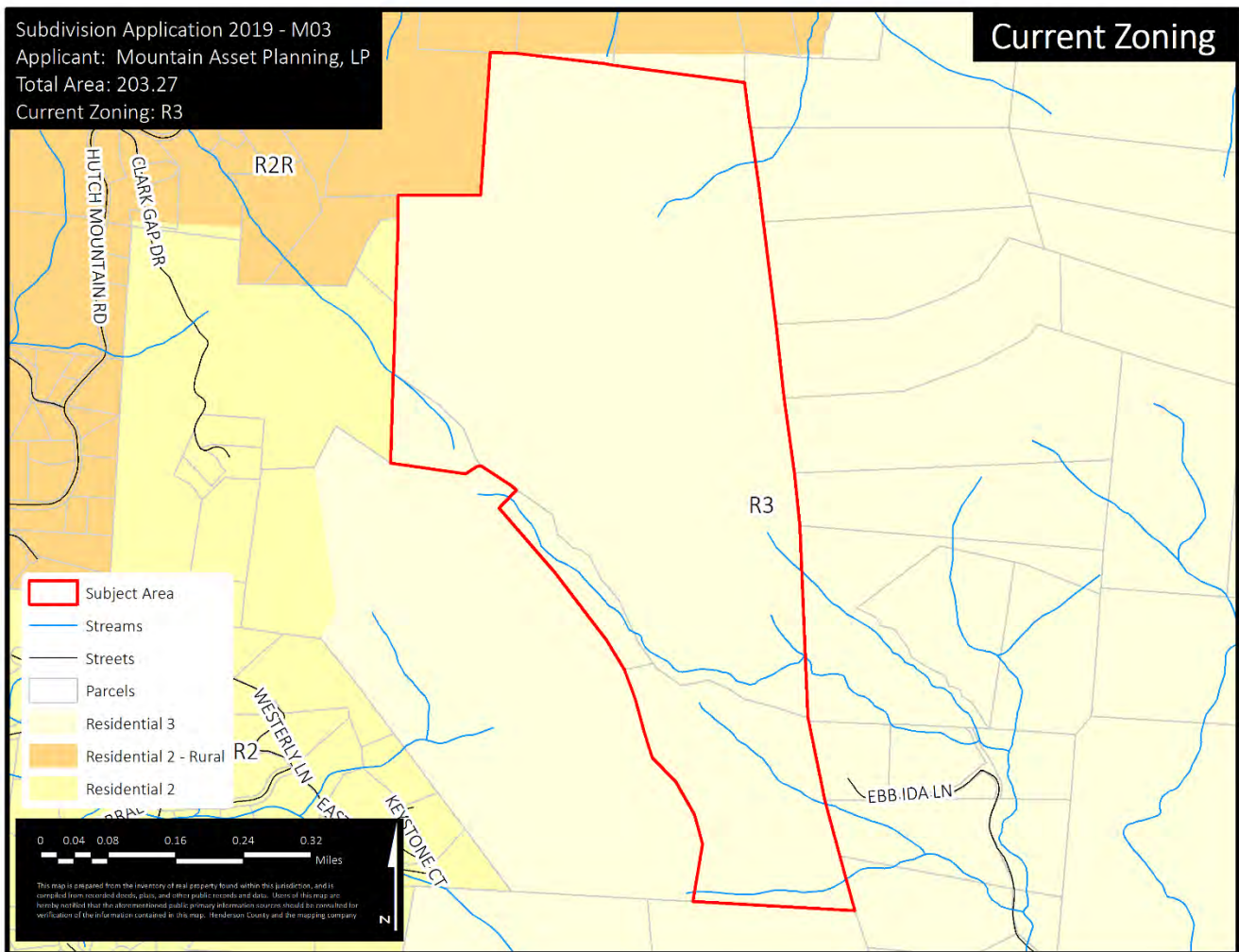


**Map C: County Comprehensive Plan Future Land Use Map**



1. **Henderson County Comprehensive Plan (CCP).** The Future Land Use Map of the CCP shows the Subject Area as being located within an area of Conservation with some Rural Agriculture Area within it.
  - a. **Conservation Area:** “This category includes land areas that are intended to remain largely in their natural state, with only limited development. Such areas should be targeted for protection through regulations and incentives.”
  - b. **Rural Agriculture Area:** “The RAA covers those portions of the county that are predominantly rural and are characterized by low-density residential development with substantial land areas devoted to agriculture and undeveloped lands. Land use policies will seek to retain that character.”

**Map D: Official Zoning Map**



- Chapter 42A, Henderson County Land Development Code (LDC).** According to Chapter 42A, Henderson County Land Development Code (LDC) and its Official Zoning Map adopted September 19, 2007 (as amended), the proposed project site is located within the Residential District Three (R3) (See Map D: Official Zoning Map).

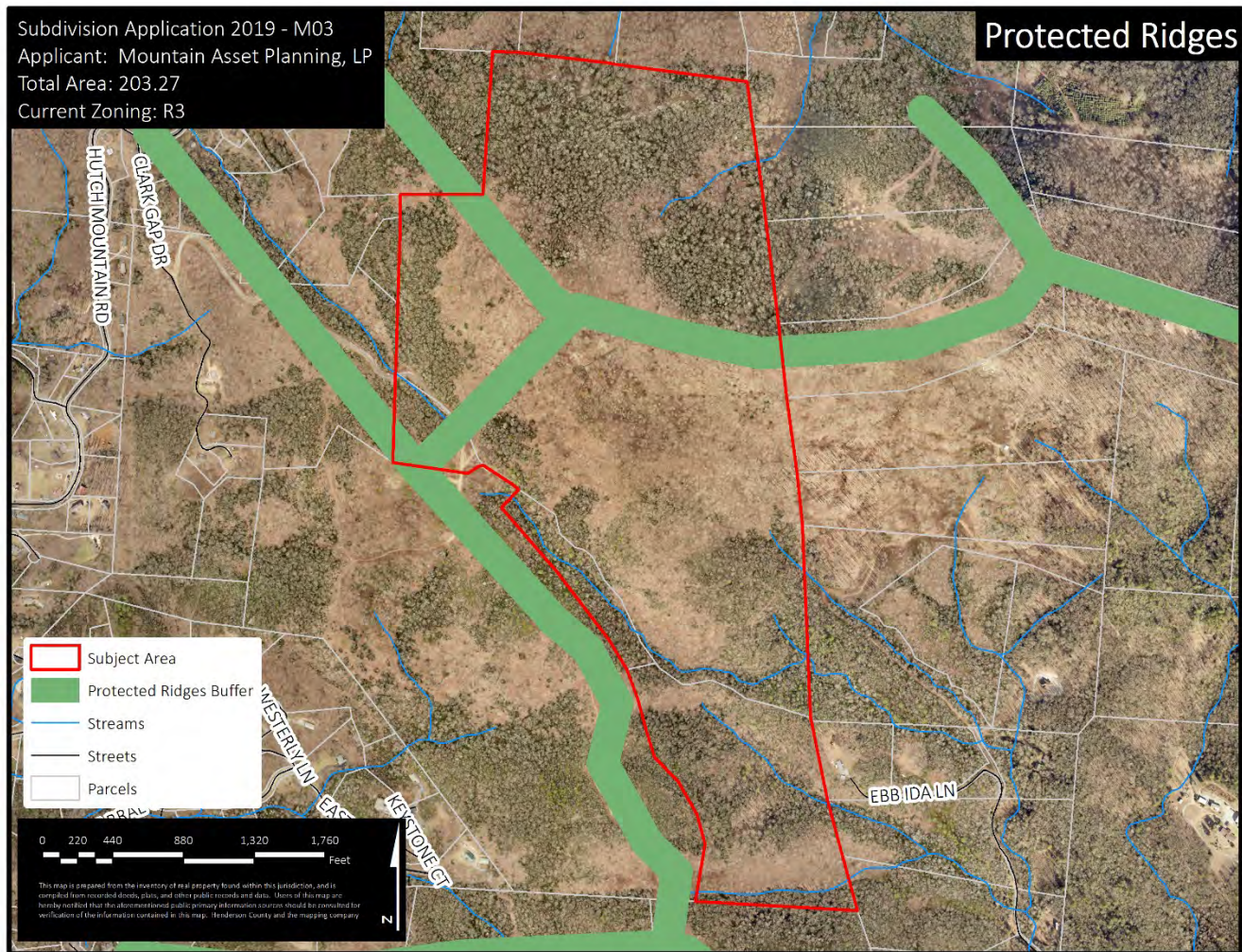
**Residential Three (R3):** “The purpose of Residential District Three (R3) is to foster orderly growth where the *principal use* of land is low density residential. The intent of this district is to allow for *residential development* consistent with the recommendations of the *Comprehensive Plan*. This general *use district* is typically meant to be utilized in areas designated as Rural (RAA) in the *Comprehensive Plan*.

- R3 allows for a standard density of .66 units per acre. The Combined Master and Development plan for Luna Ridge Subdivision proposes a density of 0.17 units per acre.

- Water and Sewer Availability.** The applicant proposes use of individual water and septic systems for each lot in the subdivision. Applicant has presented a Report of Findings from Land Resource Management for a preliminary soil investigation as well as a well permit and well construction record from AAA Sweetwater Well & Pump, Inc.

4. **Road System:** The subdivision will be served by private roads built in accordance with the Subdivision Local Road standard stated in the LDC. The total linear footage of new roads proposed is 5,809 linear feet. Road profiles on the attached plan specify that the maximum grade does not exceed 18% on any of the proposed roads. There is a combination of 16' and 18' road widths proposed, with 4' shoulders. The applicant has been pre-approved by the Property Addressing Coordinator for all proposed road names. The entrance road, Clark Gap Rd., is a private gravel road within a 50'-60' wide right of way. Applicant is proposing to re-grade and pave Clark Gap Rd. to its intersection with Hutch Mountain Rd. (SR 1556).

**Map E: Protected Ridges**



5. **Protected Ridges:** The project site is partially encumbered by the protected ridges buffer.
  - a. LDC §42-252 regulates the construction and permitting of “tall buildings” within the protected ridge buffer.
  - a. Tall buildings or structures" include any building, structure or unit within a multiunit building with a vertical height of more than 40 feet measured from the top of the foundation of said building, structure or unit and the uppermost point of said building, structure or unit; provided, however, that where such foundation measured from the natural finished grade of the crest or the natural finished grade of the high side of the

slope of a ridge exceeds 3 feet, then such measurement in excess of 3 feet shall be included in the 40-foot limitation described herein; provided, further, that no such building, structure or unit shall protrude at its uppermost point above the crest of the ridge by more than 35 feet.

#### 6. **Project Proposal Summary:**

- 34 Lots
- 0.17 units per acre density
- 2.86-acre average lot size
- 98.3 acres of open/common space
- 5,809 linear feet of private roads
- Individual well and septic systems
- Gated Entrance

#### **Master Plan Comments:**

1. **Soil Erosion and Sedimentation Control Plan.** The Applicant shall submit written notice from the appropriate local agencies verifying that an Erosion and Sedimentation Control Plan has been received or a written notice from a professional land surveyor, engineer, landscape architect, architect, or professional planner certifying that no plan is required (LDC §42A-113B).
2. **Private Roads.** Private roads shall be constructed in accordance with the Private Subdivision Local Road standards stated in Chapter 42 (LDC§42-104).
3. **Shoulder Stabilization.** All areas disturbed by the construction of a public road, including cut and fill slopes, shoulders and ditch banks, shall be seeded to stabilize the soil and prevent erosion. Seeding should be done as soon as feasible after road construction (LDC §42A-97).
4. **Road Drainage, Culverts and Shoulder Stabilization.** Road or drainage structures shall be constructed in accordance with state roads standards. Road drainage side ditches shall be constructed with sufficient depth and width to carry the expected volume of storm water runoff (LDC §42A-100). All areas disturbed by the construction of a public road, including cut and fill slopes, shoulders and ditch banks, shall be seeded to stabilize the soil and prevent erosion. Seeding should be done as soon as feasible after road construction (LDC §42A-97).
5. **Street Tree Requirements.** According to the street tree requirements of Chapter 42A (LDC §42A-145 and LDC §42A-146) the applicant must provide one tree per 50 linear feet of property abutting an internal road. Trees may be placed in groups with a minimum spacing of no less than 15 feet and a maximum spacing of no more than 65 feet. The trees may be placed within the right-of-way or within 20 feet of the edge of the right-of-way. The applicant may use existing trees in accordance with LDC §42A-153 instead of planting new trees. These existing trees must also be located within the right-of-way or 20 feet off the edge of the right-of-way as required by LDC §42A-146
6. **Flag Lots.** Lots shall not be designed as *flag lots* except where approval may be obtained from the reviewing agency for unusual circumstances (including severe topographic conditions, the presence

of *unique natural areas*, preservation of working agricultural lands, or other limiting site conditions). Lots 8 & 34 are currently designed as flag lots.

7. **Miscellaneous Advisory Provisions.** The Applicant should become familiar with the Miscellaneous Advisory Provisions of Chapter 42 (LDC §42A-87).
8. **Final Plat Requirements.** The Final Plat(s) must meet the requirements provided by the Planning Department whenever a subdivision of land occurs (LDC §42A-343).



# LUNA RIDGE SUBDIVISION

## DEVELOPMENT PLAN

## HENDERSON COUNTY

### NOTES

#### SITE NOTES:

- PROJECT ADDRESS: CLARK GAP DR
- TOTAL ACREAGE: 203.27 ACRES
- ZONING: HENDERSON COUNTY - R3
- PROJECT PIN NUMBER(S): 9672012875
- EXISTING TOPO INFO SHOWN WAS PROVIDED BY: BROOKS ENGINEERING ASSOCIATES
- EXISTING BOUNDARY INFO PROVIDED BY: BROOKS ENGINEERING ASSOCIATES
- FEMA FLOOD PANEL: 37009672003, 37009662003
- RECEIVING STREAM: BYERS CREEK & FEATHERSTONE CREEK
- SOIL TYPE(S): AHG, TUE, POF, ANF, EDE
- DEED BOOK / PAGE: 1495/26
- LATITUDE / LONGITUDE: 35d24'30"/82d27'39"
- DISTURBED ACREAGE: 10.5 ac
- EROSION CONTROL REVIEW: HENDERSON COUNTY
- STORMWATER MANAGEMENT REVIEW: HENDERSON COUNTY

#### GENERAL NOTES:

- CONTRACTOR SHALL PROTECT ADJACENT PROPERTIES, THE GENERAL PUBLIC AND ALL OF THE OWNER'S FACILITIES AND SHALL BE RESPONSIBLE FOR THE REPAIR OF ALL DAMAGES WHICH OCCUR DURING CONSTRUCTION.
- LOCATION OF ALL EXISTING UTILITIES, AS SHOWN HEREON, ARE APPROXIMATE ONLY. NO GUARANTEE IS MADE OR IMPLIED BY THE LOCATION REFLECTED IN THE PLANS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE TYPE, SIZE AND LOCATION OF ALL UTILITIES AND OTHER FEATURES WHICH MAY AFFECT CONSTRUCTION OR THE INTENDED FUNCTION OF THE DESIGN. CONTRACTOR SHALL NOTIFY DESIGNER PRIOR TO CONSTRUCTION IF EXISTING CONDITIONS DIFFER FROM THAT INDICATED IN THE PLANS.
- A PRECONSTRUCTION MEETING BETWEEN THE OWNER, THE CONTRACTOR, AND THE DESIGN ENGINEER SHALL BE CONDUCTED PRIOR TO THE START OF AND CONSTRUCTION ACTIVITIES.
- ANY ALTERATION TO THE PLANS MUST BE APPROVED BY THE PROJECT ENGINEER, OR APPROPRIATE AGENCY PRIOR TO THE COMMENCEMENT OF WORK.
- THE CONTRACTOR SHALL OBTAIN, AND PAY FOR, PRIOR TO BEGINNING ANY WORK, ALL PERMITS AND LICENSES NECESSARY TO ACCOMPLISH THE WORK.
- CONTRACTOR(S) SHALL BE RESPONSIBLE FOR ADEQUATE SUPERVISION TO PREVENT DAMAGE AND MOVEMENT FROM EQUIPMENT WORKING AROUND CONSTRUCTION STAKES. THESE CONSTRUCTION STAKES SHALL REMAIN IN PLACE AND BE PROTECTED UNTIL OWNER APPROVES THEIR REMOVAL. ANY STAKES THAT HAVE BEEN DISPLACED AS A RESULT OF CONSTRUCTION ACTIVITY ARE TO BE REPLACED BY A LICENSED LAND SURVEYOR ENGAGED BY THE CONTRACTOR AT NO COST TO THE OWNER.
- THE ENGINEER WILL NOT BE CONTINUOUSLY PRESENT IN THE FIELD, IT IS SPECIFICALLY UNDERSTOOD THAT HE DOES NOT UNDERTAKE NOR ASSUME ANY OBLIGATION FOR SUPERVISION OF CONSTRUCTION, SAFETY MEASURES TAKEN DURING THE COURSE OF CONSTRUCTION, RESPONSIBILITY FOR SCHEDULING THE WORK FOR INSURING COMPLETE COMPLIANCE WITH THE CONTRACT DOCUMENTS AND/OR ALL CODE REQUIREMENTS, RULES AND REGULATION OF ANY PUBLIC OR PRIVATE AUTHORITY HAVING JURISDICTION OVER THE WHOLE OR ANY PART OF THE WORK. IN ADDITION, THE ENGINEER NEITHER UNDERTAKES, ASSUMES, NOR GUARANTEES THE WORK AND/OR PERFORMANCE OF THE CONTRACTOR.

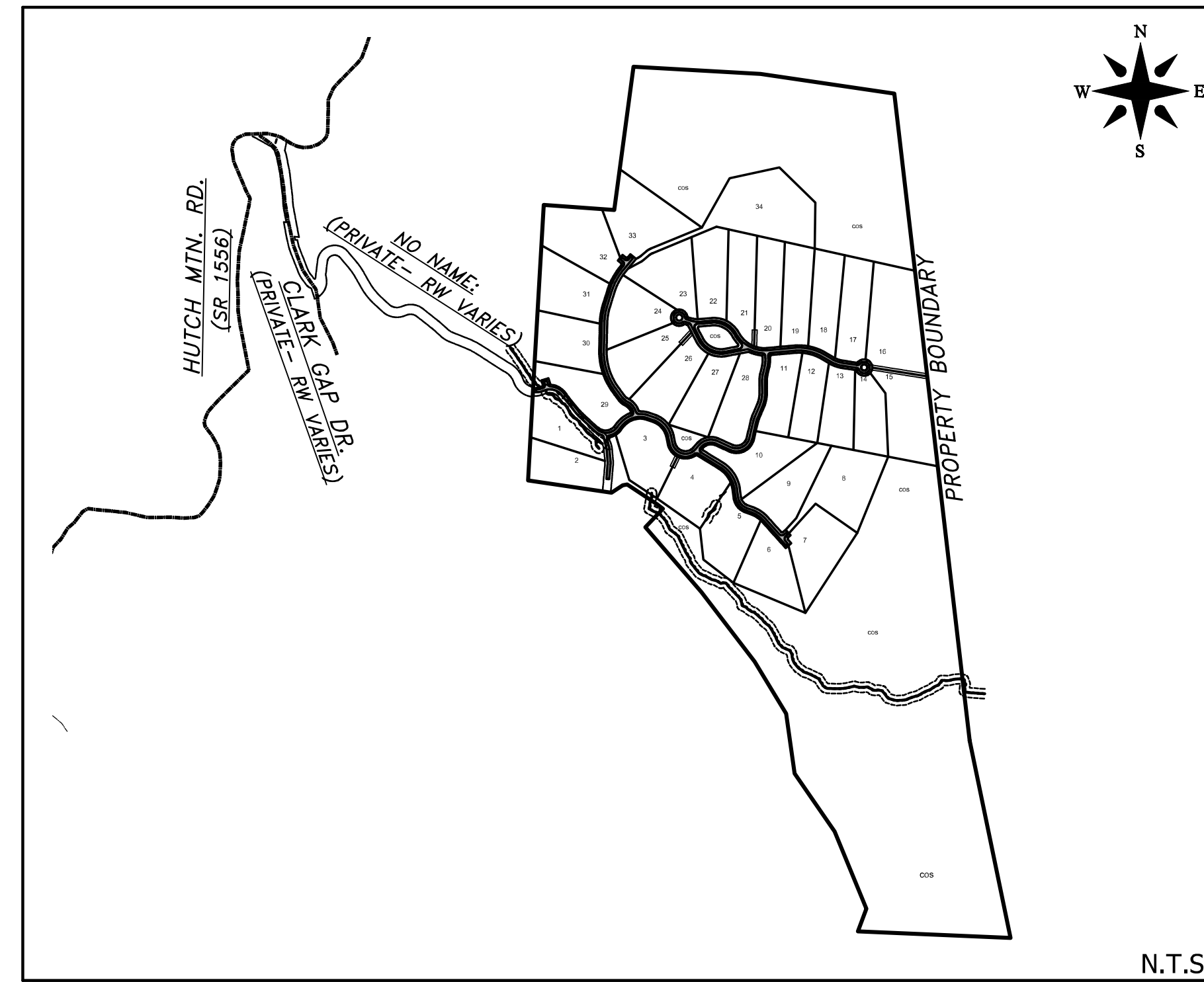
#### EROSION CONTROL NOTES:

- ALL DRAINAGE EASEMENTS MUST BE GRASSED AND/OR RIP-RAPPED PER THE PLANS TO CONTROL EROSION.
- ALL GRADING, EROSION CONTROL, STORMWATER OPERATIONS AND INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH HENDERSON COUNTY STANDARD SPECIFICATIONS AND DETAILS.
- NO STREAM OR WETLAND DISTURBANCE SHALL OCCUR WITHOUT AN ARMY CORPS OF ENGINEERS PERMIT.
- THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.
- ANY EXCESS CUT MATERIAL DEVELOPED IN THE CONSTRUCTION OF THIS SITE SHALL BE DISPOSED OF IN AN APPROPRIATELY PERMITTED SPOIL SITE. CONTRACTOR TO PROVIDE PROOF OF PERMITS PRIOR TO CONSTRUCTION.
- IN ACCORDANCE WITH NPDES GENERAL STORMWATER PERMIT, THE FOLLOWING CONDITIONS MUST BE MET:
  - THE EROSION CONTROL PLAN MUST BE IMPLEMENTED - DEVIATIONS ARE A VIOLATION OF THE PERMIT
  - DEPOSITION OF SEDIMENT OFFSITE OR IN A STREAM/WETLAND IS A DIRECT VIOLATION OF THE PERMIT
  - A COPY OF ALL PLANS MUST BE RETAINED BY THE PERMIT.
  - VISIBLE DEPOSITION OF SEDIMENT SHALL BE REPORTED TO HENDERSON COUNTY WITHIN 24 HOURS OF INSPECTION
  - A RAIN GAGE SHALL BE MAINTAINED ON SITE.
  - A WRITTEN RECORD OF THE DAILY RAINFALL AMOUNTS SHALL BE RETAINED.
  - AT LEAST ONCE PER WEEK, EACH EROSION CONTROL MEASURE SHALL BE INSPECTED TO ENSURE THAT IT IS OPERATING CORRECTLY AND RECORDS MAINTAINED.
  - INSPECTIONS SHALL ALSO BE MADE WITHIN 24 HOURS OF RAIN EVENTS OVER 1/2 INCH.
  - THE QUALITY OF ALL STORMWATER DISCHARGES SHALL BE OBSERVED AND RECORDED.
  - IF ANY VISIBLE SEDIMENTATION IS LEAVING THE SITE OR ENTERING WATERS OF THE STATE, CORRECTIVE ACTION SHALL BE TAKEN IMMEDIATELY TO CONTROL THE DISCHARGE OF SEDIMENTS.
- SELF INSPECTION RECORDS SHALL BE KEPT ON SITE AND MADE AVAILABLE TO THE EROSION CONTROL INSPECTOR UPON REQUEST.
- EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE AND AN AMENDED PLAN BE SUBMITTED AND APPROVED SHOWING MODIFIED EROSION CONTROL DEVICES.
- THE SITE SHALL RECEIVE TEMPORARY/PERMANENT SEEDING WITHIN 7 DAYS OF COMPLETION OF GRADING OPERATIONS.
- ALL WORK IN THE NCDOT RIGHT-OF-WAY MUST BE DONE IN ACCORDANCE WITH NCDOT SPECIFICATIONS AND STANDARDS.
- INSTALL AND MAINTAIN TEMPORARY SEDIMENT BASINS DURING ROUGH GRADING.
- PROVIDE WATERTIGHT JOINTS ON ANY STORM DRAINS WHERE VELOCITIES EXCEED 15 FT/SEC (SEE PIPE CHART).
- ALL PERIMETER DRAINS, SWALES, SLOPES, DITCHES AND ALL SLOPES STEEPER THAN 3:1 SHALL BE STABILIZED IN SEVEN (7) DAYS. ALL OTHER SLOPES MUST BE STABILIZED WITHIN FOURTEEN (14) DAYS.
- COMPACTION FOR ALL SOIL SHALL MEET 98% OF THE MAXIMUM STANDARD PROCTOR TESTING CERTIFIED BY A PROFESSIONAL ENGINEER FOR IN-SITU SOILS ONSITE.
- COMPACTION FOR ALL MATERIAL IN ROAD BASE SHALL MEET 100% OF THE MAXIMUM MODIFIED PROCTOR TESTING CERTIFIED BY A PROFESSIONAL ENGINEER FOR MATERIAL BROUGHT ONSITE.
- NO BASE COURSE SHALL BE PLACED ON MUCK, PIPE, CLAY, ORGANIC OR ANY OTHER UNSUITABLE MATTER.

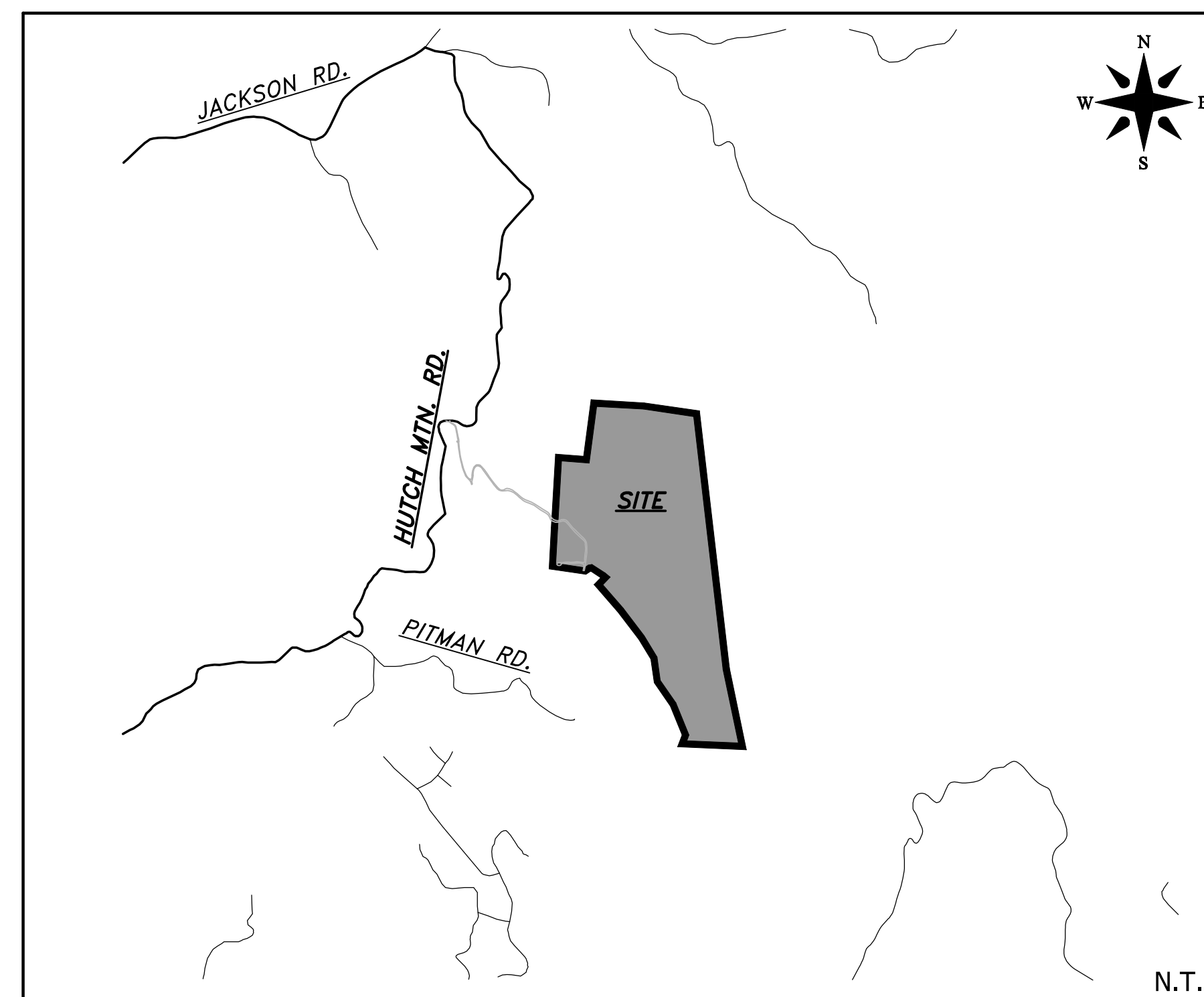
#### INSPECTION SCHEDULE:

- NO CONSTRUCTION SHALL COMMENCE PRIOR TO A PRECONSTRUCTION MEETING WITH THE OWNER, THE CONTRACTOR, THE ENGINEER, AND A REPRESENTATIVE OF HENDERSON COUNTY.
- ALL SHOP DRAWINGS SHALL BE SUBMITTED AT OR PRIOR TO THE PRECONSTRUCTION MEETING.
- ENGINEER TO BE CALLED FOR PERIODIC INSPECTIONS.
- CALL ENGINEERING PRIOR TO COVERING UNDERGROUND STRUCTURES FOR FINAL INSPECTIONS.
- REFER TO MANUFACTURER'S SPECIFICATION MANUAL AND STATE AND LOCAL STANDARDS FOR ADDITIONAL REQUIREMENTS AND STANDARDS.

### PROJECT MAP



### VICINITY MAP



### CONTACTS

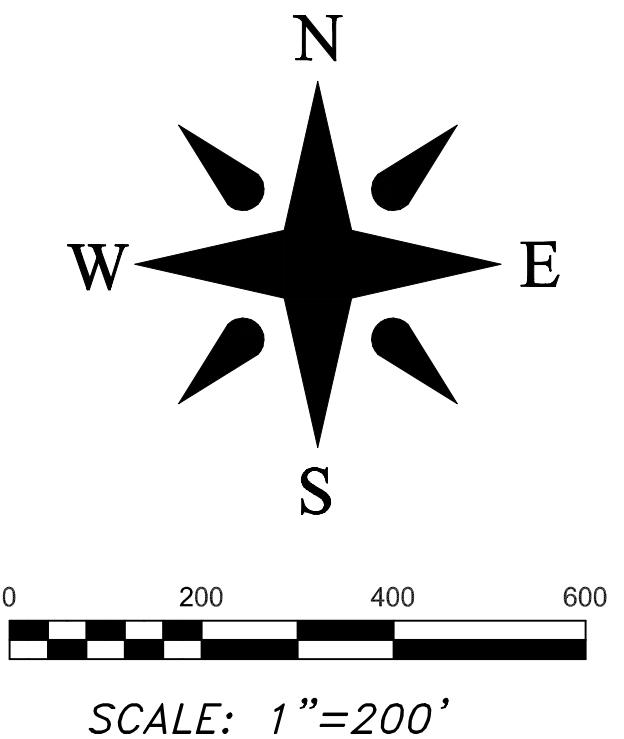
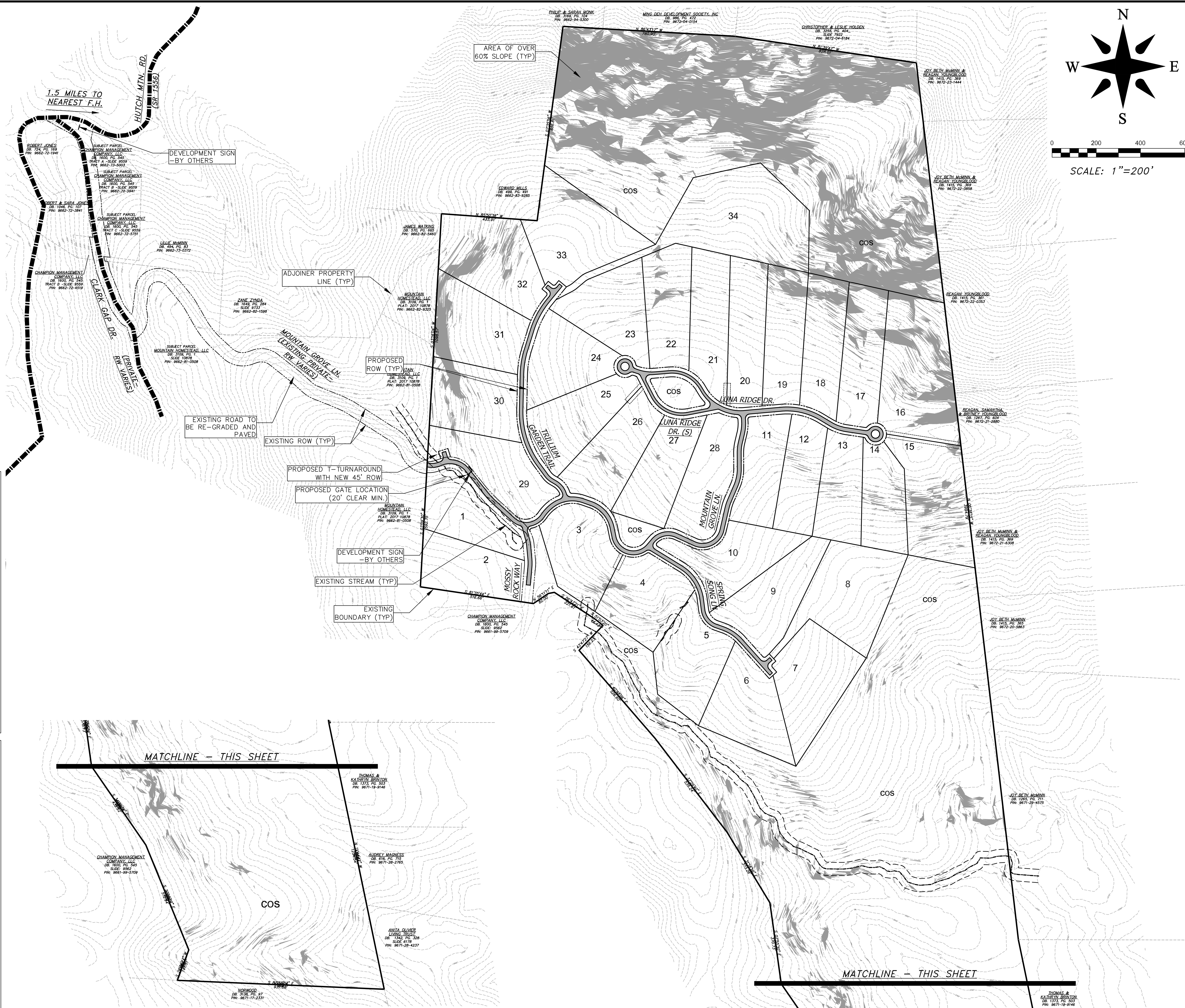
<b>DEVELOPER:</b> TERRA FIRMA MANAGEMENT, INC.	<b>CONTACT INFO:</b> ANDY BAKER 120 HIGH HICKORY TRAIL SWANNANOVA, NC 28778 616-402-0367 andy@tfmcarolina.com
<b>OWNER:</b> MOUNTAIN ASSET PLANNING, LP	<b>CONTACT INFO:</b> RICHARD ANDERSON 27 GLEN COVE DR ARDEN, NC 28704
<b>ENGINEER:</b> BROOKS ENGINEERING ASSOCIATES, PA	<b>CONTACT INFO:</b> JOHN KINNAIRD 17 ARLINGTON STREET ASHEVILLE, NC 28801 828-232-4700 jkinnaird@brooksea.com
<b>SURVEYOR:</b> BROOKS ENGINEERING ASSOCIATES	<b>CONTACT INFO:</b> PAUL SEXTON 828-232-4700 psexton@brooksea.com

### SHEET INDEX

NO.:	TITLE:
C-0.0	COVER
C-1.0	MASTER PLAN
C-2.0	EXISTING CONDITIONS
C-3.0	CLEARING AND GRUBBING PLAN
C-4.0	OVERALL SITE PLAN
C-4.1	SITE PLAN (1 OF 4)
C-4.2	SITE PLAN (2 OF 4)
C-4.3	SITE PLAN (3 OF 4)
C-4.4	SITE PLAN (4 OF 4)
C-4.5	SITE DETAILS
C-4.6	ROAD PROFILES (1 OF 2)
C-4.7	ROAD PROFILES (2 OF 2)
C-5.0	OVERALL GRADING EROSION AND STORMWATER PLAN
C-5.1	GRADING EROSION AND STORMWATER PLAN (1 OF 4)
C-5.2	GRADING EROSION AND STORMWATER PLAN (2 OF 4)
C-5.3	GRADING EROSION AND STORMWATER PLAN (3 OF 4)
C-5.4	GRADING EROSION AND STORMWATER PLAN (4 OF 4)
C-5.5	EROSION CONTROL DETAILS
C-5.6	EROSION CONTROL DETAILS
C-5.7	STORMWATER DETAILS



REVISIONS/SUBMISSIONS	Date
TRC SUBMITTAL	5/7/19
No. 1	
PERMIT SET	
Reviewer: MCB Scale: AS NOTED Date: 5/7/19	17 Arlington Street Asheville, N.C. 28801 Phone: 1-828-232-4700 Fax: 1-828-232-1331 www.brooksea.com
Planning • Engineering • Surveying • Environmental Services •	
Project No: 486519	Drawing Title: C-0 COVER SHEET
LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN HENDERSON COUNTY NORTH CAROLINA	



**SITE AND ZONING NOTES**

PROPERTY ZONING: R3  
 PROPERTY SIZE: 203.27 ACRES  
 PROPERTY STEEPER THAN 60%: 22.25 AC (10.9%)

MINIMUM LOT SIZE: 1.5 ACRES  
 SMALLEST PROPOSED LOT: 2.09 ACRES  
 MINIMUM LOT WIDTH: 30' @ R.O.W.  
 MAXIMUM BUILDING HEIGHT: 40'  
 SETBACKS:  
 FRONT: 15' (LOCAL)  
 REAR: 15'  
 SIDE: 15'

COMMON OPEN SPACE PROVIDED: 98.3 ACRES

\*ALL DIMENSIONS ARE FROM EDGE OF ASPHALT, FACE OF CURB, FACE OF WALL, OR FACE OF BUILDING UNLESS OTHERWISE NOTED.

\*ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF DETAILS, SPECIFICATIONS, AND OTHER DEVELOPMENT ORDINANCES OF HENDERSON CO.

LANDSCAPE NOTES:  
 1. STREET TREES SHALL BE LARGE DECIDUOUS TREES AND SELECTED FROM HENDERSON COUNTY'S LANDSCAPING RECOMMENDED SPECIES LIST.  
 2. TREES SHALL BE HEALTHY AND IN COMPLIANCE WITH SECTION 42-184 OF THE HENDERSON COUNTY LAND DEVELOPMENT CODE.  
 3. STREET TREES SHALL BE AT LEAST 2 INCHES IN CALIPER AND 12' TALL AT PLANTING.

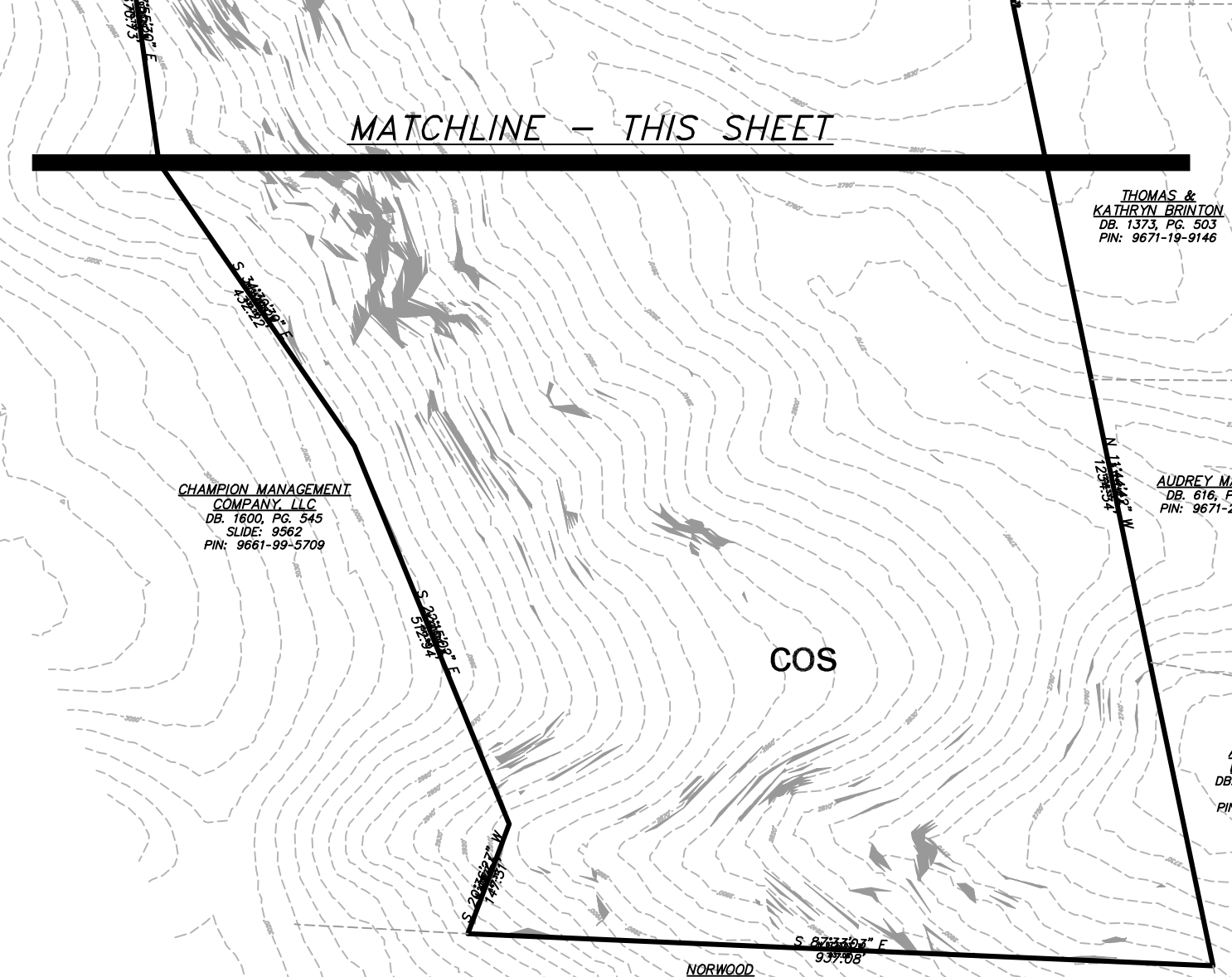
**DEVELOPMENT DATA**

PROPERTY ADDRESS: CLARK GAP DR  
 PIN NUMBER: 9672012875  
 PROPERTY SIZE: 203.27 ACRES  
 ZONING REVIEW: HENDERSON COUNTY  
 EROSION CONTROL REVIEW: HENDERSON COUNTY  
 STORMWATER REVIEW: HENDERSON COUNTY  
 ZONING CLASSIFICATION: R-3  
 PROPOSED NUMBER OF UNITS: 34  
 PROPOSED DENSITY: 0.17 units/acre  
 PROPOSED LINEAR FEET OF ROAD: 5,809'  
 PORTIONS OF LOTS 7, 8, 14, 15, & 16 ARE WITHIN 1/2 MILE OF A FARMLAND PRESERVATION DISTRICT. WATER AND SEWER WILL BE PROVIDED BY INDIVIDUAL WELLS AND SEPTIC SYSTEMS. PUBLIC WATER AND SEWER SYSTEMS ARE APPROXIMATELY 1.5 MILES FROM THE SITE.

PROPERTY OWNER: MOUNTAIN ASSET PLANNING, LP  
 CONTACT: RICHARD ANDERSON  
 ADDRESS: 27 GLEN COVE DR  
 ADDRESS 2: ARDEN, NC 28704

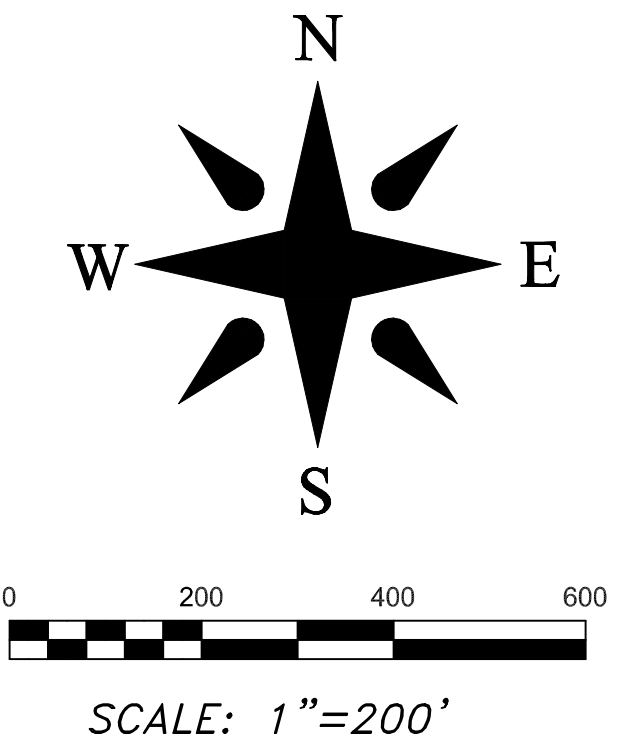
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 CONTACT: JOHN KINNARD  
 ADDRESS: 17 ARLINGTON ST  
 ADDRESS 2: ASHEVILLE, NC 28801  
 EMAIL: JKINNARD@BROOKSEA.COM  
 PHONE: 828-232-4700



Project No: <b>486519</b>	C-1.0	Drawing Title: <b>MASTER PLAN</b>	LUNA RIDGE SUBDIVISION		NORTH CAROLINA	
			DEVELOPMENT PLAN		HENDERSON COUNTY	
Design: TMM Drawn: E.J.H. Checked: TMM			Review: MCB Scale: AS NOTED Date: 5/7/19		17 Arlington Street Asheville, N.C. 28801 Phone: 1-828-232-4700 Fax: 1-828-232-1331 www.brooksea.com	
DESIGNER: <b>BROOKS ENGINEERING ASSOCIATES</b>						
<b>PERMIT SET</b> Planning • Engineering • Surveying • Environmental Services •			REVISIONS/SUBMISSIONS No. 1 TRC SUBMITTAL Date 5/7/19		REGISTRATION NUMBER WITH A TRIANGLE INDICATES CHANGES MADE ON THIS SHEET	

File Location: L:\2019 Projects\486519 TFM\_Luna Mountain\486519-CIVIL-BASE.dwg



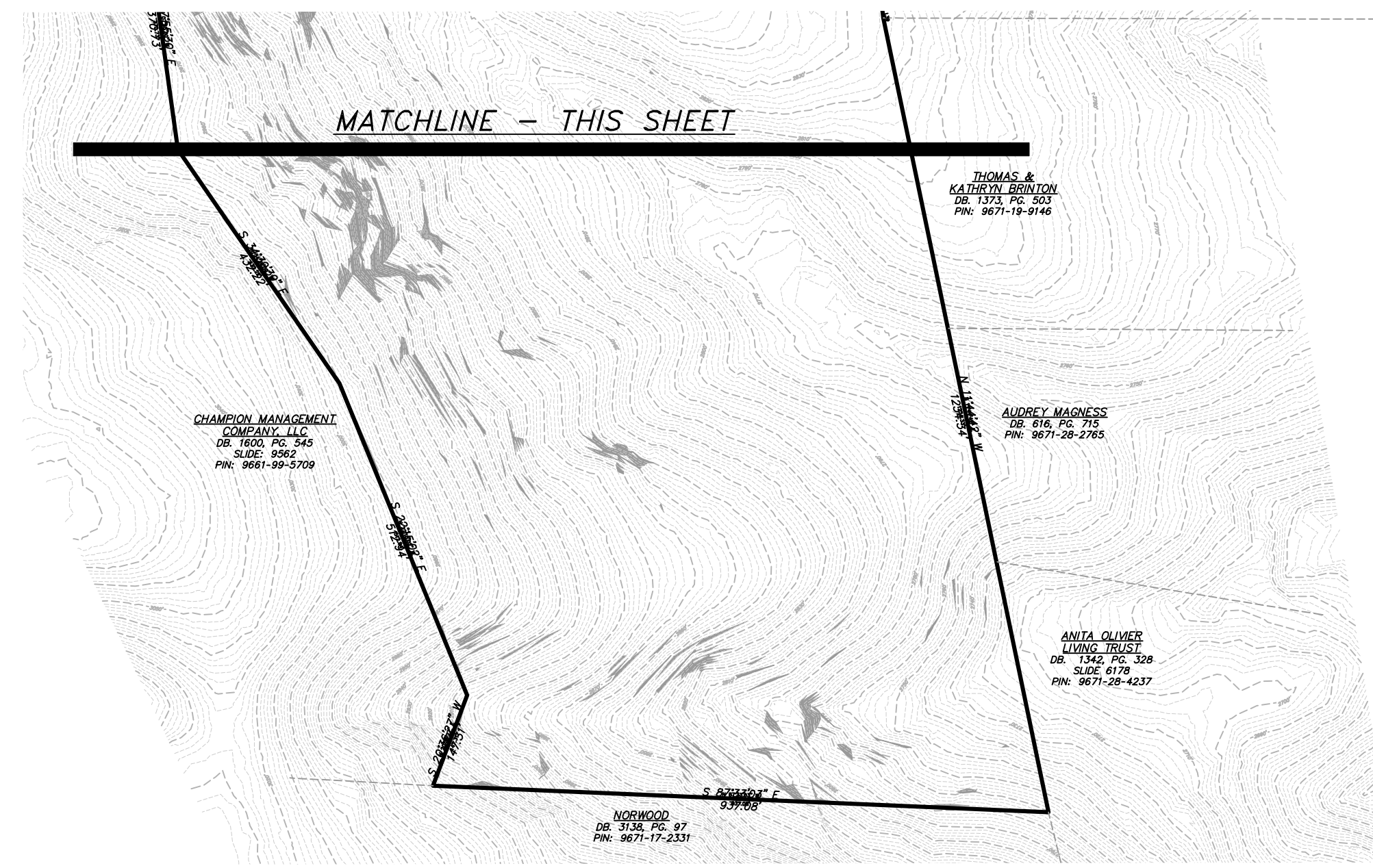
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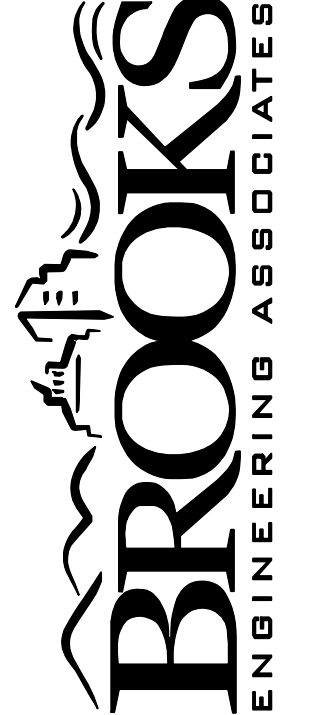
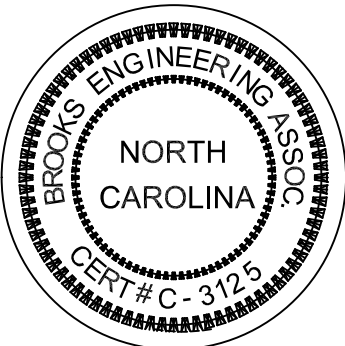
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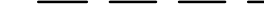


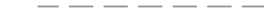







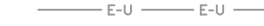


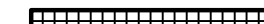
DEVELOPER: TERRA FIRMA MANAGEMENT, INC.  
 CONTACT: ANDY BAKER  
 ADDRESS: 120 HIGH HICKORY TRAIL  
 ADDRESS 2: SWANANOA, NC 28778  
 EMAIL: ANDY@TFM-CAROLINA.COM  
 PHONE: 616-402-0367

ENGINEER: BROOKS ENGINEERING  
 CONTACT: JOHN KINNAIRD  
 ADDRESS: 17 ARLINGTON ST  
 ADDRESS 2: ASHEVILLE, NC 28801  
 EMAIL: JKINNAIRD@BROOKSEA.COM  
 PHONE: 828-232-4700



Project No: <b>486519</b>	LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN HENDERSON COUNTY NORTH CAROLINA	Drawing Title: <b>EXISTING CONDITIONS</b>	 <b>BROOKS ENGINEERING ASSOCIATES</b> Planning • Engineering • Surveying • Environmental Services •	Designer: TMM Drafter: EJH Checker: TMM	Reviewer: MCB Scale: AS NOTED Date: 5/7/19	17 Arlington Street Asheville, N.C. 28801 Phone: 1-828-232-4700 Fax: 1-828-232-1331 www.brooksea.com	 <b>PERMIT SET</b>	No. 1 Revisions/Submissions: TRC SUBMITTAL	Date: 5/7/19
				File Location: L:\2019 Projects\486519 TFM_Luna Mountain\486519-CIVIL-BASE.dwg					

**EROSION CONTROL PLAN LEGEND**

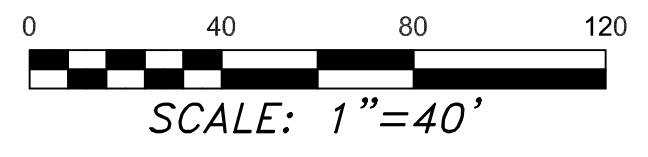
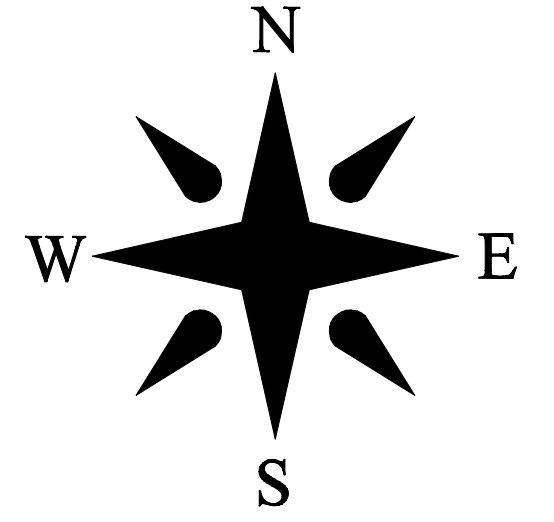
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-  EXIST. STREAM
-  EXIST. STREAM BUFFER
-  EXIST. NCDOT R.O.W.
-  EXIST. ADJOINER
-  EXIST. PUBLIC WATER
-  EXIST. FIRE HYDRANT
-  EXIST. OVERHEAD UTILITIES
-  EXIST. POWER POLE
-  EXIST. UNDRGRND UTILITIES
-  EXIST. STORM DRAIN
-  TEMP. CONSTRUCTION ENTRANCE
-  TEMP. SILT FENCE
-  PERMANENT DIVERSION DITCH
-  LIMITS OF DISTURBANCE
-  TEMP. CHECK DAM
-  TEMPORARY INLET PROTECTION
-  OUTLET PROTECTION
-  PROP. E/C SLOPE MATTING

MES WATKINS  
I. 570, PG. 665  
9662-82-5460

MOUNTAIN  
STEAD, LLC  
3109, PG. 1  
2017 10878  
1662-82-9325

AIN  
D, LLC  
PG. 1  
10878  
31-0508

CHAMPION MANAGEMENT  
COMPANY, LLC  
DB. 1600, PG. 545  
SLIDE: 9562  
PIN: 9661-99-5709



**EROSION CONTROL NOTES**

1. ALL EROSION MEASURES AND PRACTICES SHALL BE IN ACCORDANCE WITH THE APPROPRIATE JURISDICTION'S DETAILS AND SPECIFICATIONS.
2. IN ACCORDANCE WITH THE NPDES GENERAL STORMWATER PERMIT, THE FOLLOWING CONDITIONS MUST BE MET:
  2. THE EROSION CONTROL PLAN MUST BE IMPLEMENTED - DEVIATIONS ARE A VIOLATION OF THE PERMIT
  2. A COPY OF ALL PLANS MUST BE RETAINED BY THE PERMIT DEPOSITION OF SEDIMENT OFFSITE OR IN A STREAM OR WETLAND ARE CONSIDERED A VIOLATION OF THE PERMIT.
  2. VISIBLE DEPOSITION OF SEDIMENT SHALL BE REPORTED TO NCDEQ WITHIN 24 HOURS OF INSPECTION.
  2. A RAIN GAUGE SHALL BE MAINTAINED ON SITE.
  2. A WRITTEN RECORD OF THE DAILY RAINFALL AMOUNTS SHALL BE RETAINED.
  2. AT LEAST ONCE PER WEEK, EACH EROSION CONTROL MEASURE SHALL BE INSPECTED TO ENSURE THAT IT IS OPERATING CORRECTLY AND RECORDS MAINTAINED.
  2. INSPECTIONS SHALL ALSO BE MADE WITHIN 24 HOURS OF RAIN EVENTS OVER 1/2 INCH.
  2. THE QUALITY OF ALL STORMWATER DISCHARGES SHALL BE OBSERVED AND RECORDED.
  2. IF ANY VISIBLE SEDIMENTATION IS LEAVING THE SITE OR ENTERING WATERS OF THE STATE, CORRECTIVE ACTION SHALL BE TAKEN IMMEDIATELY TO CONTROL THE DISCHARGE OF SEDIMENTS.
3. AN APPROVED COPY OF THE EROSION CONTROL PLAN WITH PLACARD AND APPROVAL LETTER, AND A COPY OF THE NPDES PERMIT, WITH A MINIMUM OF 30 DAYS OF SELF-INSPECTION REPORTS, ARE TO BE KEPT ON SITE UNTIL PROJECT CLOSURE BY NCDEQ. THEY MUST BE MADE AVAILABLE TO THE EROSION CONTROL INSPECTOR UPON REQUEST.
4. THE SELF-INSPECTION PROGRAM IS SEPARATE FROM THE WEEKLY SELF-MONITORING PROGRAM OF THE NPDES STORMWATER PERMIT FOR CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL USE THE INSPECTION AND MONITORING RECORDS FOR ACTIVITIES UNDER STORMWATER GENERAL PERMIT NCG010000 AND SELF-INSPECTION RECORDS FOR LAND DISTURBING ACTIVITIES PER G.S. 113A-54.1. THE INSPECTIONS SHOULD BE CONDUCTED AFTER EACH PHASE OF THE PROJECT, AND CONTINUED UNTIL PERMANENT GROUND COVER IS ESTABLISHED.
5. ALL DRAINAGE EASEMENTS MUST BE GRASSED AND/OR RIP-RAPPED PER THE PLANS TO CONTROL EROSION.
6. THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND-DISTURBING ACTIVITIES.
7. EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE AND AN AMENDED PLAN BE SUBMITTED AND APPROVED SHOWING MODIFIED EROSION CONTROL DEVICES.
8. A RAIN GAUGE WILL BE INSTALLED ON THE SITE.
9. THE SITE SHALL RECEIVE TEMPORARY/PERMANENT SEEDING WHEN CONSTRUCTION IS COMPLETE OR DELAYED FOR ANY REASON. SEE SHEET C-5.5 FOR A DETAILED TIME FRAME.
10. CONTRACTOR TO PROVIDE INLET PROTECTION AT EACH STRUCTURE AS STORM SYSTEM IS CONSTRUCTED.
11. INSTALL AND MAINTAIN TEMPORARY SEDIMENT BASINS DURING ROUGH GRADING.
12. PROVIDE WATERTIGHT JOINTS ON ANY STORM DRAINS WHERE VELOCITIES EXCEED 15 FT/SEC (SEE PIPE CHART).
13. STOCKPILE, STAGING, AND LAYDOWN AREAS ARE TO BE WITHIN THE LIMITS OF DISTURBANCE AND SHOULD BE LOCATED AT LEAST 50 FEET AWAY FROM STORM DRAIN OUTLETS AND SURFACE WATERS.

30' STREAM BUFFER (TYP)

PROPOSED CONSTRUCTION ENTRANCE

EXISTING ROW (TYP)

PROPOSED SILT FENCE (TYP)

PROPOSED LIMITS OF DISTURBANCE (TYP)

REINFORCED OUTLET (TYP)

30' STREAM BUFFER (TYP)

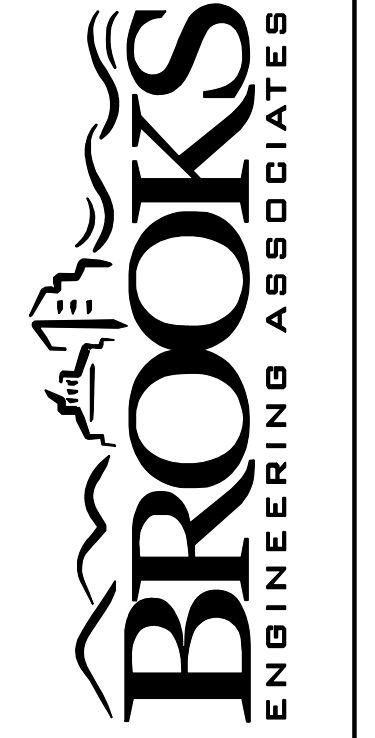
EXISTING STREAM (TYP)

EXISTING BOUNDARY (TYP)

REAGAN Y  
DB. 1415,  
PIN: 9672



Designated: TMM  
Drawn: E/JH  
Checked: TMM  
Reviewed: MCB  
Scale: AS NOTED  
Date: 5/7/19  
17 Arlington Street  
Asheville, N.C. 28801  
Phone: 1-828-232-4700  
Fax: 1-828-232-1331  
www.brooksea.com



LUNA RIDGE SUBDIVISION  
DEVELOPMENT PLAN  
NORTH CAROLINA  
HENDERSON COUNTY

Project No: 486519  
Drawing Title: C-3.0  
CLEARING AND GRUBBING PLAN

No.	REVISIONS/SUBMISSIONS	Date
1	TRC SUBMITTAL	5/7/19

PERMIT SET

Drawing Title: CLEARING AND GRUBBING PLAN

File Location: L:\2019 Projects\486519\TMM\_Mtich Mountain\486519-CIVIL-BASE.dwg

**SITE PLAN LEGEND**

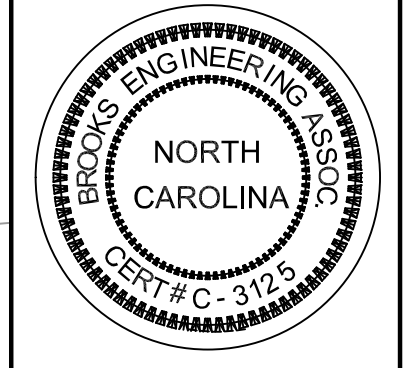
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	EXIST. STREAM BUFFER
	EXIST. WETLAND
	EXIST. RIGHT OF WAY
	EXIST. EDGE OF GRAVEL
	EXIST. SEWER EASEMENT
	EXIST. WATER EASEMENT
	EXIST. OVERHEAD UTILITIES
	NEW PROPERTY LINES
	NEW RIGHT OF WAY
	NEW DRIVEWAY EASEMENT
	BUILDING SETBACK LINE
	NEW PAVEMENT

JAMES WATKINS  
DB. 570, PG. 665  
PIN: 9662-82-5460

MOUNTAIN  
HOMESTEAD, LLC  
DB. 3109, PG. 1  
PLAT: 2017 10878  
PIN: 9662-82-9325

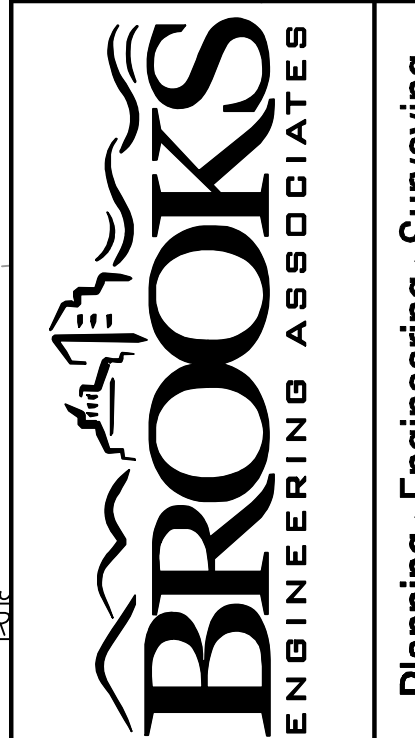
MOUNTAIN  
STEAD, LLC  
3109, PG. 1  
2017 10878  
562-81-0508

REAGAN YOUNG  
DB. 1415, PG.  
PIN: 9672-22-0



Designated: TMM  
Drawn: E.J.H.  
Checked: TMM  
Scale: AS NOTED  
Date: 5/7/19

17 Arlington Street  
Asheville, N.C. 28801  
Phone: 1-828-232-4700  
Fax: 1-828-232-1331  
www.brooksea.com



Project No: 486519  
Drawing Title: C-4.0  
LUNA RIDGE SUBDIVISION  
DEVELOPMENT PLAN  
NORTH CAROLINA  
HENDERSON COUNTY

PERMIT SET

OVERALL SITE PLAN

**SITE AND ZONING NOTES**

PROPERTY ZONING: R3  
PROPERTY SIZE: 203.27 ACRES  
PROPERTY STEEPER THAN 60%: 22.25 AC (10.9%)

MINIMUM LOT SIZE: 1.5 ACRES  
SMALLEST PROPOSED LOT: 2.09 ACRES  
MINIMUM LOT WIDTH: 30' @ R.O.W.  
MAXIMUM BUILDING HEIGHT: 40'  
SETBACKS:  
FRONT: 15' (LOCAL)  
REAR: 15'  
SIDE: 15'  
COMMON OPEN SPACE PROVIDED: 98.3 ACRES

\*ALL DIMENSIONS ARE FROM EDGE OF ASPHALT, FACE OF CURB, FACE OF WALL, OR FACE OF BUILDING UNLESS OTHERWISE NOTED.

\*ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF DETAILS, SPECIFICATIONS, AND OTHER DEVELOPMENT ORDINANCES OF HENDERSON CO.

LANDSCAPE NOTES:  
1. STREET TREES SHALL BE LARGE DECIDUOUS TREES AND SELECTED FROM HENDERSON COUNTY'S LANDSCAPING RECOMMENDED SPECIES LIST.  
2. TREES SHALL BE HEALTHY AND IN COMPLIANCE WITH SECTION 42-184 OF THE HENDERSON COUNTY LAND DEVELOPMENT CODE.  
3. STREET TREES SHALL BE AT LEAST 2 INCHES IN CALIPER AND 12' TALL AT PLANTING.

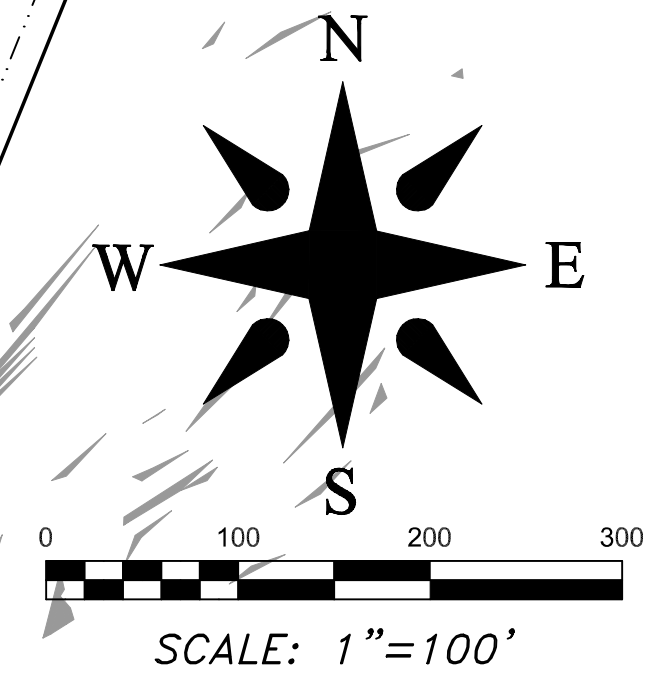
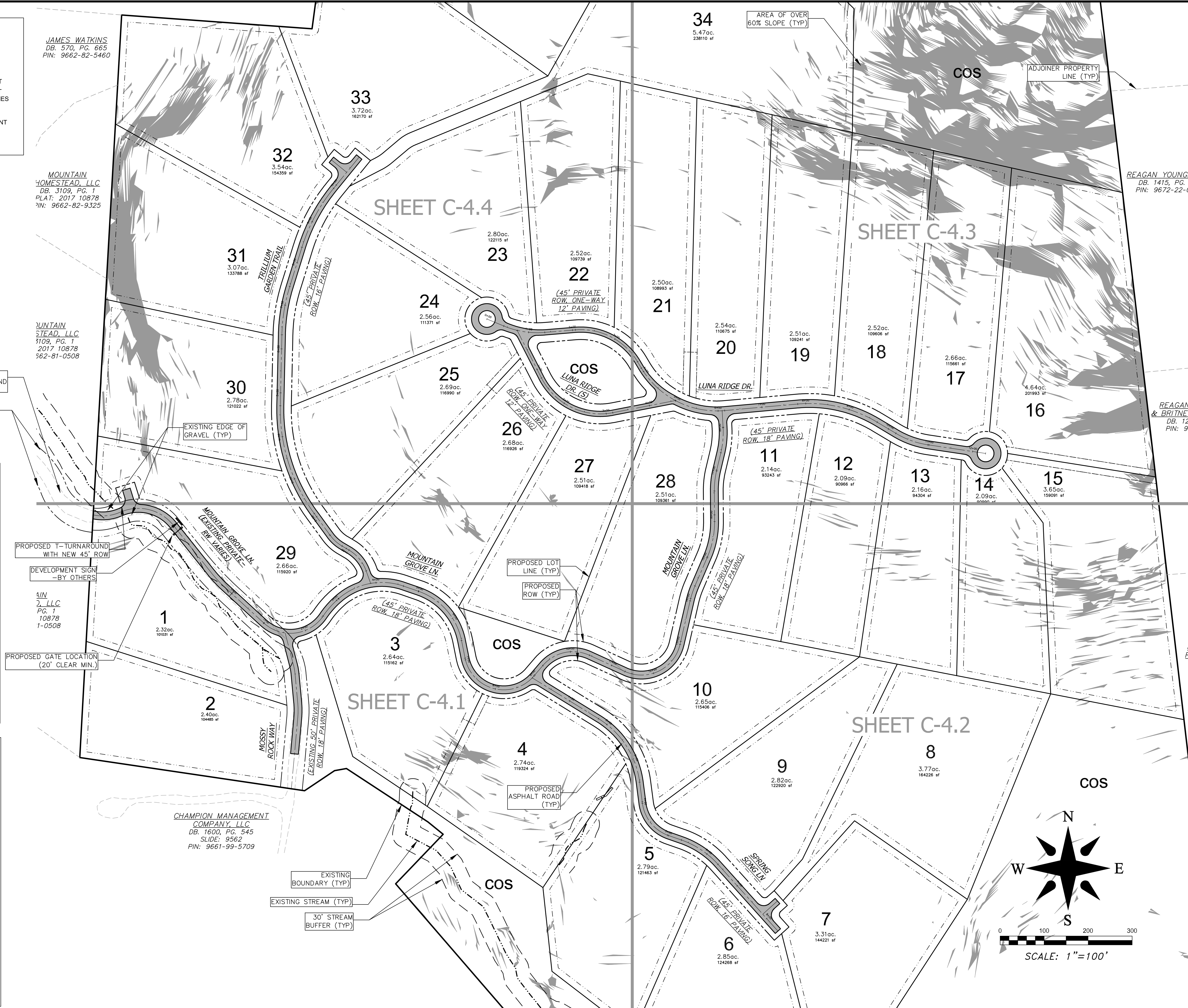
**DEVELOPMENT DATA**

PROPERTY ADDRESS: CLARK GAP DR  
PIN NUMBER: 9672012875  
PROPERTY SIZE: 203.27 ACRES  
ZONING REVIEW: HENDERSON COUNTY  
EROSION CONTROL REVIEW: HENDERSON COUNTY  
STORMWATER REVIEW: HENDERSON COUNTY  
ZONING CLASSIFICATION: R-3  
PROPOSED NUMBER OF UNITS: 34  
PROPOSED DENSITY: 0.17 units / acre  
PROPOSED LINEAR FEET OF ROAD: 5,809'  
PORTIONS OF LOTS 7, 8, 14, 15, & 16 ARE WITHIN 1/2 MILE OF A FARMLAND PRESERVATION DISTRICT.  
WATER AND SEWER WILL BE PROVIDED BY INDIVIDUAL WELLS AND SEPTIC SYSTEMS.  
PUBLIC WATER AND SEWER SYSTEMS ARE APPROXIMATELY 1.5 MILES FROM THE SITE.

PROPERTY OWNER: MOUNTAIN ASSET PLANNING, LP  
CONTACT: RICHARD ANDERSON  
ADDRESS: 27 GLEN COVE DR  
ADDRESS 2: ARDEN, NC 28704

DEVELOPER: TERRA FIRMA MANAGEMENT, INC.  
CONTACT: ANDY BAKER  
ADDRESS: 120 HIGH HICKORY TRAIL  
ADDRESS 2: SWANNANOVA, NC 28778  
EMAIL: ANDY@TFMNCAROLINA.COM  
PHONE: 616-402-0367

ENGINEER: BROOKS ENGINEERING  
CONTACT: JOHN KINNAIRD  
ADDRESS: 17 ARLINGTON ST  
ADDRESS 2: ASHEVILLE, NC 28801  
EMAIL: JKINNAIRD@BROOKSEA.COM  
PHONE: 828-232-4700



Date	5/7/19
REVISIONS/SUBMISSIONS	TRC SUBMITTAL
No.	1

Revisions/Submission number with a triangle indicates changes made on this sheet.

**SITE PLAN LEGEND**

	EXIST. BOUNDARY
	EXIST. STREAM
	EXIST. STREAM BUFFER
	EXIST. WETLAND
	EXIST. RIGHT OF WAY
	EXIST. EASEMENT
	EXIST. EDGE OF GRAVEL
	EXIST. SEWER EASEMENT
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	NEW PROPERTY LINES
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	NEW DRIVEWAY EASEMENT
	BUILDING SETBACK LINE
	NEW PAVEMENT
	PROPOSED STREET TREE

**MOUNTAIN HOMESTEAD, LLC**  
 DB. 3109, PG. 1  
 PLAT: 2017 10878  
 PIN: 9662-81-0508

**CHAMPION MANAGEMENT COMPANY, LLC**  
 DB. 1600, PG. 545  
 SLIDE: 9562  
 PIN: 9661-99-5709

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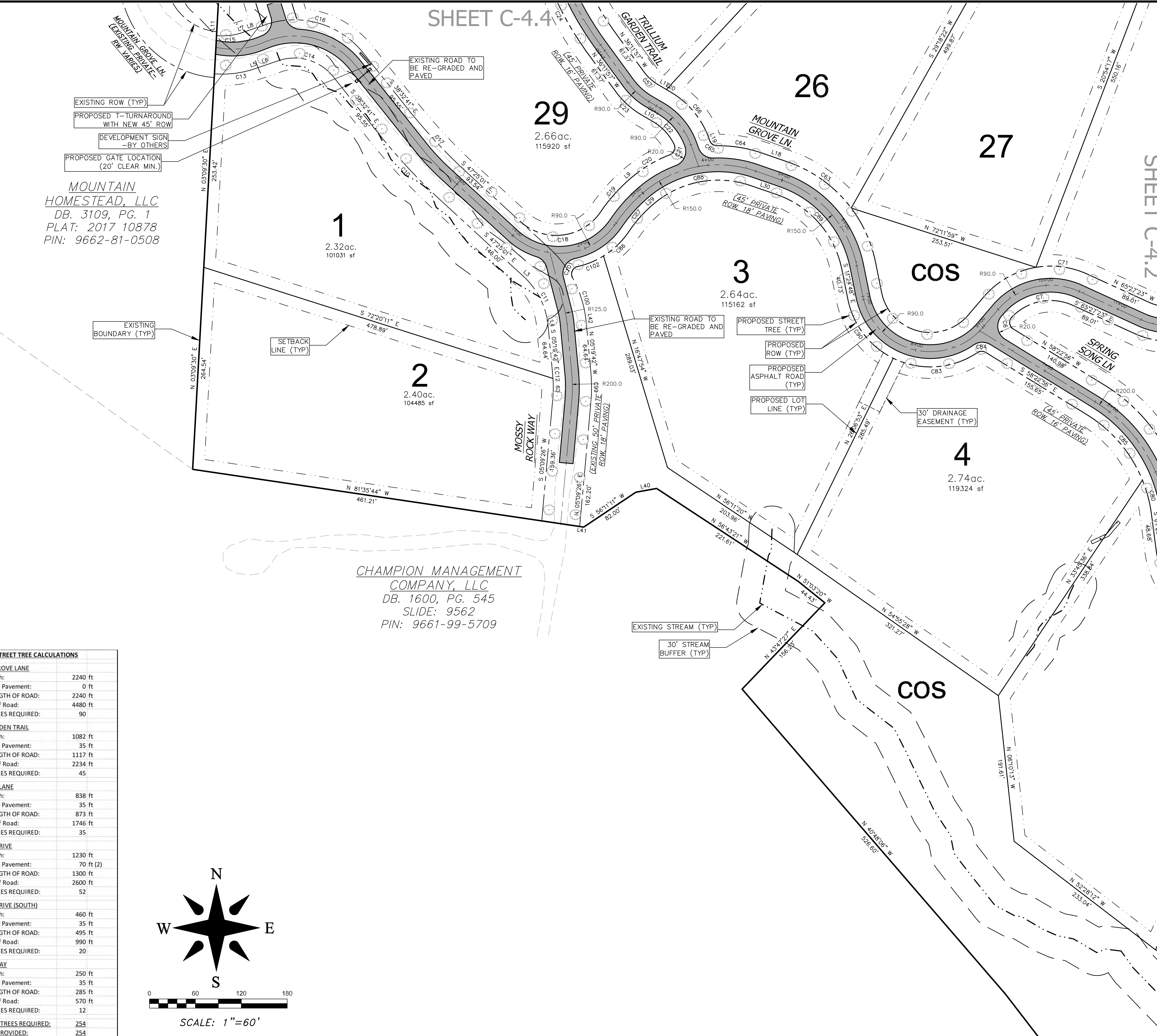
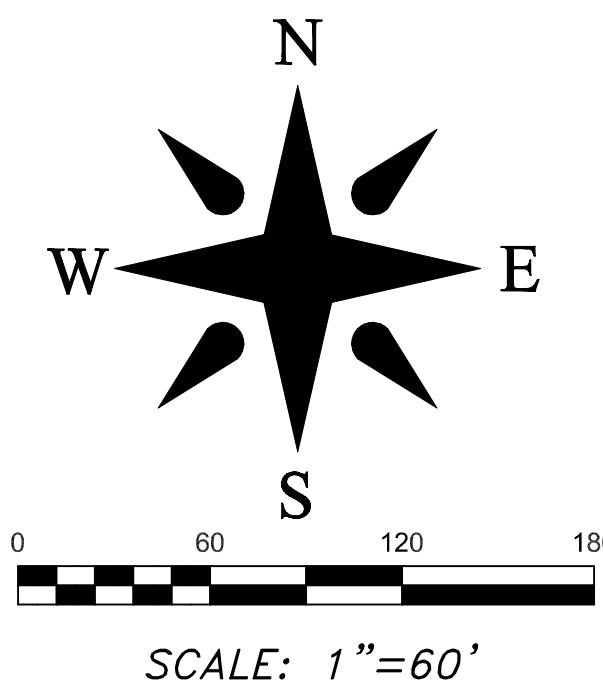
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 CONTACT: RICHARD ANDERSON  
 ADDRESS: 27 GLEN COVE DR  
 ADDRESS 2: ARDEN, NC 28704  
 DEVELOPER: TERRA FIRMA MANAGEMENT, INC.  
 CONTACT: ANDY BAKER  
 ADDRESS: 120 HIGH HICKORY TRAIL  
 ADDRESS 2: SWAINANOVA, NC 28778  
 EMAIL: ANDY@TFMCAROLINA.COM  
 PHONE: 616-402-0367  
 ENGINEER: BROOKS ENGINEERING  
 CONTACT: JOHN KINNAIRD  
 ADDRESS: 17 ARLINGTON ST  
 ADDRESS 2: ASHEVILLE, NC 28801  
 EMAIL: JKINNAIRD@BROOKSEA.COM  
 PHONE: 828-232-4700

**LUNA RIDGE STREET TREE CALCULATIONS**

ROAD NAME	ROAD LENGTH	TURNAROUND PAVEMENT	TOTAL LENGTH OF ROAD	2" LENGTH OF ROAD	STREET TREES REQUIRED
MOUNTAIN GROVE LANE	2240 ft	0 ft	2240 ft	4480 ft	90
TRILLIUM GARDEN TRAIL	1082 ft	35 ft	1117 ft	2234 ft	45
SPRING SONG LANE	838 ft	35 ft	873 ft	1746 ft	35
LUNA RIDGE DRIVE	1230 ft	70 ft (2)	1300 ft	2600 ft	52
LUNA RIDGE DRIVE (SOUTH)	460 ft	35 ft	495 ft	990 ft	20
MOSS ROCK WAY	250 ft	35 ft	285 ft	570 ft	12
<b>TOTAL STREET TREES REQUIRED:</b>					<b>254</b>
<b>TOTAL TREES PROVIDED:</b>					<b>254</b>

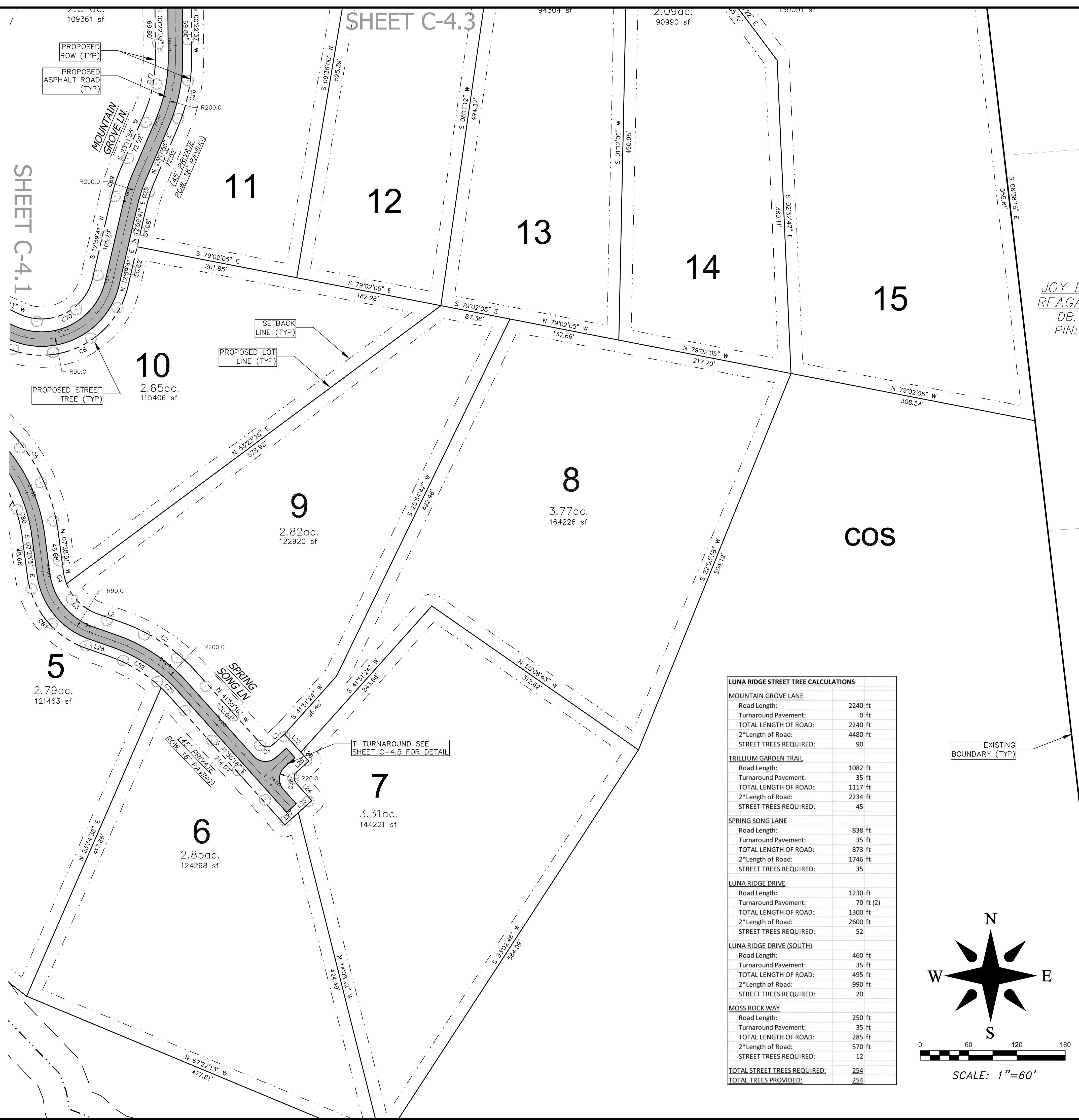


Project No: <b>486519</b>	Drawing Title: <b>C-4.1</b>	LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN NORTH CAROLINA HENDERSON COUNTY	 <b>BROOKS ENGINEERING ASSOCIATES</b> Planning • Engineering • Surveying • Environmental Services •	Design: TMM Drawn: EJJ Checked: TMM	Review: MCB Scale: AS NOTED Date: 5/7/19	17 Arlington Street Asheville, N.C. 28801 Phone: 1-828-232-4700 Fax: 1-828-232-1331 www.brooksea.com
				No. 1 Revisions/Submissions: TRC SUBMITTAL	Date: 5/7/19	PERMIT SET

File Location: L:\2019 Projects\486519 TFM\_Huba Mountain\486519-CIVIL-BASE.dwg

**SITE PLAN LEGEND**

- EXIST. BOUNDARY
- EXIST. STREAM
- EXIST. STREAM BUFFER
- EXIST. WETLAND
- EXIST. RIGHT OF WAY
- EXIST. EASEMENT
- EXIST. EDGE OF GRAVEL
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- EXIST. OVERHEAD UTILITIES
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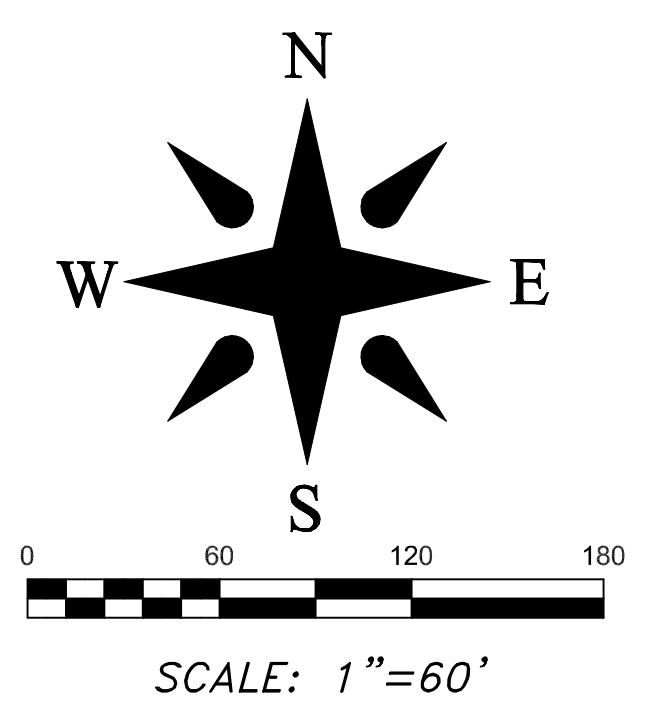
PROPERTY OWNER: MOUNTAIN ASSET PLANNING, LP  
 CONTACT: RICHARD ANDERSON  
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DEVELOPER: TERRA FIRMA MANAGEMENT, INC.  
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JOY BETH McMINN &  
 REAGAN YOUNGBLOOD  
 DB. 1415, PG. 369  
 PIN: 9672-21-6308

JOY BETH McMINN  
 DB. 1415, PG. 365  
 PIN: 9672-20-5863

Project No: <b>486519</b>	Drawing Title: <b>C-4.2</b>	LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN HENDERSON COUNTY NORTH CAROLINA	Planning • Engineering • Surveying • Environmental Services •	Reviewer: MCB Scale: AS NOTED Designer: E/JH Checker: TMM Date: 5/7/19	17 Arlington Street Asheville, N.C. 28801 Phone: 1-828-232-4700 Fax: 1-828-232-1331 www.brooksea.com
			PERMIT SET	JOY BETH McMINN & REAGAN YOUNGBLOOD DB. 1415, PG. 369 PIN: 9672-21-6308	
REVISIONS/SUBMISSIONS No. 1 TRC SUBMITTAL Date 5/7/19		JOY BETH McMINN & REAGAN YOUNGBLOOD DB. 1415, PG. 369 PIN: 9672-21-6308			

File Location: L:\2019 Projects\486519 TFM\_Luna Mountain\DWG\486519-CIVIL-BASE.dwg

**SITE PLAN LEGEND**

- EXIST. BOUNDARY
- EXIST. STREAM
- EXIST. STREAM BUFFER
- EXIST. WETLAND
- EXIST. RIGHT OF WAY
- EXIST. EASEMENT
- E-SE EXIST. EDGE OF GRAVEL
- E-WE EXIST. SEWER EASEMENT
- E-OU EXIST. FIRE HYDRANT
- EXIST. WATER EASEMENT
- EXIST. OVERHEAD UTILITIES
- NEW PROPERTY LINES
- NEW RIGHT OF WAY
- NEW DRIVEWAY EASEMENT
- BUILDING SETBACK LINE
- NEW PAVEMENT
- PROPOSED STREET TREE

**SITE AND ZONING NOTES**

PROPERTY ZONING: R3  
 PROPERTY SIZE: 203.27 ACRES  
 PROPERTY STEEPER THAN 60%: 22.25 AC (10.9%)

MINIMUM LOT SIZE: 1.5 ACRES  
 SMALLEST PROPOSED LOT: 2.09 ACRES  
 MINIMUM LOT WIDTH: 30' @ R.O.W.  
 MAXIMUM BUILDING HEIGHT: 40'  
 SETBACKS:  
 FRONT: 15' (LOCAL)  
 REAR: 15'  
 SIDE: 15'

COMMON OPEN SPACE PROVIDED: 98.3 ACRES

\*ALL DIMENSIONS ARE FROM EDGE OF ASPHALT, FACE OF CURB, FACE OF WALL, OR FACE OF BUILDING UNLESS OTHERWISE NOTED.

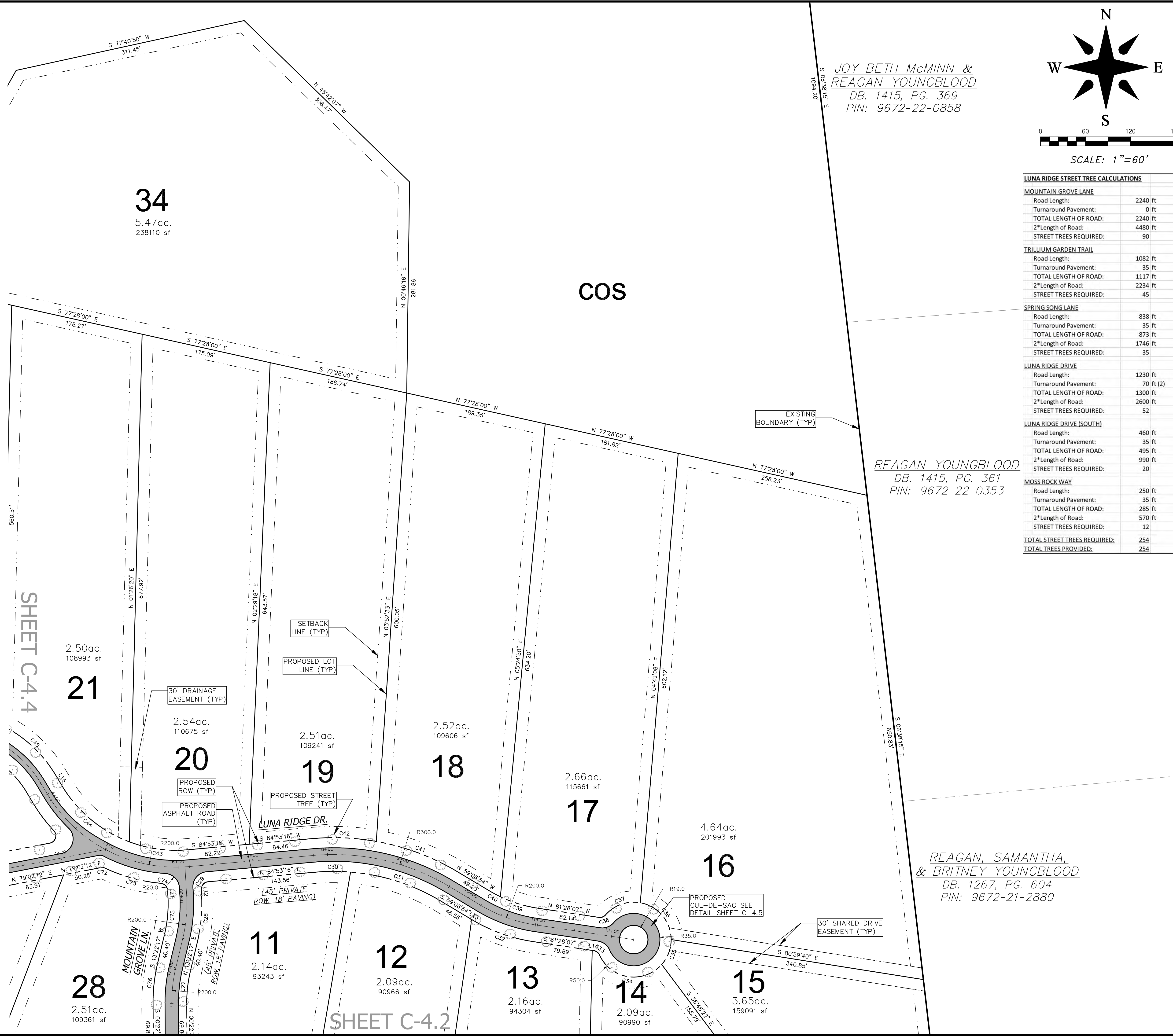
\*ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF DETAILS, SPECIFICATIONS, AND OTHER DEVELOPMENT ORDINANCES OF HENDERSON CO.

LANDSCAPE NOTES:  
 1. STREET TREES SHALL BE LARGE DECIDUOUS TREES AND SELECTED FROM HENDERSON COUNTY'S LANDSCAPING RECOMMENDED SPECIES LIST.  
 2. TREES SHALL BE HEALTHY AND IN COMPLIANCE WITH SECTION 42-184 OF THE HENDERSON COUNTY LAND DEVELOPMENT CODE.  
 3. STREET TREES SHALL BE AT LEAST 2 INCHES IN CALIPER AND 12' TALL AT PLANTING.

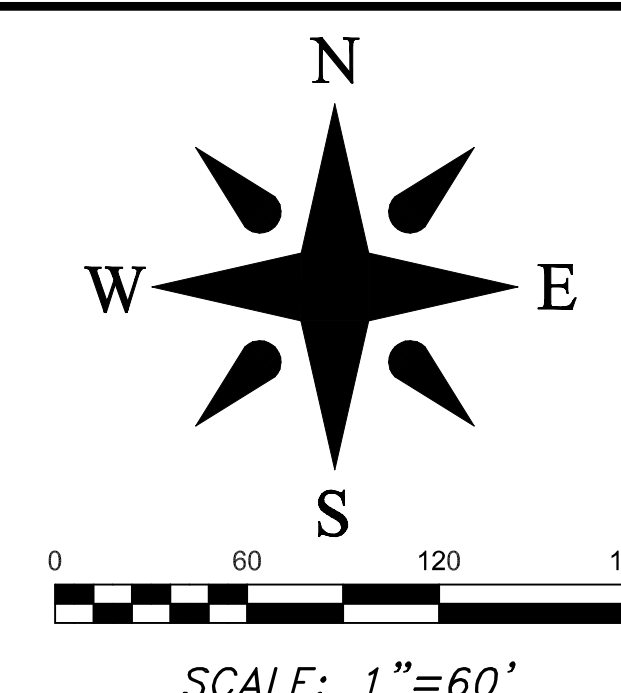
**DEVELOPMENT DATA**

PROPERTY ADDRESS: CLARK GAP DR  
 PIN NUMBER: 9672012875  
 PROPERTY SIZE: 203.27 ACRES  
 ZONING REVIEW: HENDERSON COUNTY  
 EROSION CONTROL REVIEW: HENDERSON COUNTY  
 STORMWATER REVIEW: HENDERSON COUNTY  
 ZONING CLASSIFICATION: R-3  
 PROPOSED NUMBER OF UNITS: 34  
 PROPOSED DENSITY: 0.17 units / acre  
 PROPOSED LINEAR FEET OF ROAD: 5,809'  
 PORTIONS OF LOTS 7, 8, 14, 15, & 16 ARE WITHIN 1/2 MILE OF A FARMLAND PRESERVATION DISTRICT. WATER AND SEWER WILL BE PROVIDED BY INDIVIDUAL WELLS AND SEPTIC SYSTEMS.  
 PUBLIC WATER AND SEWER SYSTEMS ARE APPROXIMATELY 1.5 MILES FROM THE SITE.

PROPERTY OWNER: MOUNTAIN ASSET PLANNING, LP  
 CONTACT: RICHARD ANDERSON  
 ADDRESS: 27 GLEN COVE DR  
 ADDRESS 2: ARDEN, NC 28704  
 DEVELOPER: TERRA FIRMA MANAGEMENT, INC.  
 CONTACT: ANDY BAKER  
 ADDRESS: 120 HIGH HICKORY TRAIL  
 ADDRESS 2: SWANNANOVA, NC 28778  
 EMAIL: ANDY@TFM-CAROLINA.COM  
 PHONE: 616-402-0357  
 ENGINEER: BROOKS ENGINEERING  
 CONTACT: JOHN KINNAIRD  
 ADDRESS: 17 ARLINGTON ST  
 ADDRESS 2: ASHEVILLE, NC 28801  
 EMAIL: JKINNAIRD@BROOKSEA.COM  
 PHONE: 828-232-4700

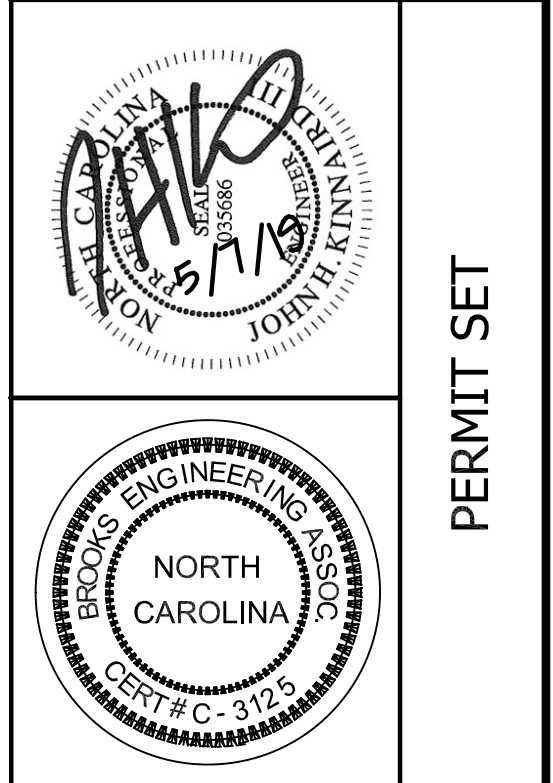


JOY BETH McMINN &  
 REAGAN YOUNGBLOOD  
 DB. 1415, PG. 369  
 PIN: 9672-22-0858



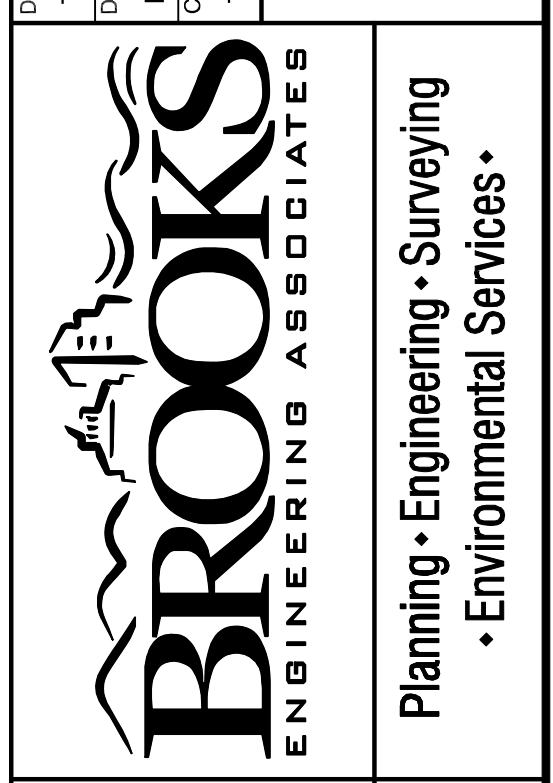
LUNA RIDGE STREET TREE CALCULATIONS	
<b>MOUNTAIN GROVE LANE</b>	
Road Length:	2240 ft
Turnaround Pavement:	0 ft
TOTAL LENGTH OF ROAD:	2240 ft
2" Length of Road:	4480 ft
STREET TREES REQUIRED:	90
<b>TRILLIUM GARDEN TRAIL</b>	
Road Length:	1082 ft
Turnaround Pavement:	35 ft
TOTAL LENGTH OF ROAD:	1117 ft
2" Length of Road:	2234 ft
STREET TREES REQUIRED:	45
<b>SPRING SONG LANE</b>	
Road Length:	838 ft
Turnaround Pavement:	35 ft
TOTAL LENGTH OF ROAD:	873 ft
2" Length of Road:	1746 ft
STREET TREES REQUIRED:	35
<b>LUNA RIDGE DRIVE</b>	
Road Length:	1230 ft
Turnaround Pavement:	70 ft (2)
TOTAL LENGTH OF ROAD:	1300 ft
2" Length of Road:	2600 ft
STREET TREES REQUIRED:	52
<b>LUNA RIDGE DRIVE (SOUTH)</b>	
Road Length:	460 ft
Turnaround Pavement:	35 ft
TOTAL LENGTH OF ROAD:	495 ft
2" Length of Road:	990 ft
STREET TREES REQUIRED:	20
<b>MOSS ROCK WAY</b>	
Road Length:	250 ft
Turnaround Pavement:	35 ft
TOTAL LENGTH OF ROAD:	285 ft
2" Length of Road:	570 ft
STREET TREES REQUIRED:	12
<b>TOTAL STREET TREES REQUIRED:</b>	<b>254</b>
<b>TOTAL TREES PROVIDED:</b>	<b>254</b>

Date	5/7/19
REVISIONS/SUBMISSIONS	TRC SUBMITTAL
No.	1



Review: MCB  
 Scale: AS NOTED  
 Design: TMM  
 Drawn: EJJ  
 Checked: TMM  
 Date: 5/7/19

17 Arlington Street  
 Asheville, N.C. 28801  
 Phone: 1-828-232-4700  
 Fax: 1-828-232-1331  
 www.brooksea.com



Project No: 486519  
 Drawing Title: C-4.3  
 LUNA RIDGE SUBDIVISION  
 DEVELOPMENT PLAN  
 NORTH CAROLINA  
 HENDERSON COUNTY

Planning • Engineering • Surveying  
 • Environmental Services •

SITE PLAN

File Location: L:\2019 Projects\486519\_TPM\_Hudson Mountain\DWG\486519-CIVIL-BASE.dwg



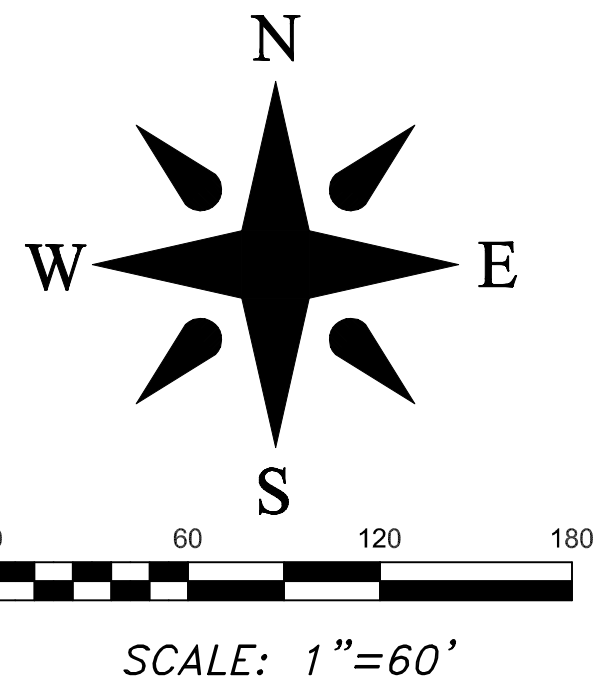
**SITE PLAN LEGEND**

- EXIST. BOUNDARY
- EXIST. STREAM
- EXIST. STREAM BUFFER
- EXIST. WETLAND
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**LUNA RIDGE STREET TREE CALCULATIONS**

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**TOTAL TREES PROVIDED: 254**



EDWARD MILLS  
DB. 499, PG. 491  
PIN: 9662-83-9285

JAMES WATKINS  
DB. 570, PG. 665  
PIN: 9662-82-5460

MOUNTAIN  
HOMESTEAD, LLC  
DB. 3109, PG. 1  
PLAT: 2017 10878  
PIN: 9662-82-9325

MOUNTAIN  
HOMESTEAD, LLC  
DB. 3109, PG. 1  
PLAT: 2017 10878  
PIN: 9662-81-0508

**SITE AND ZONING NOTES**

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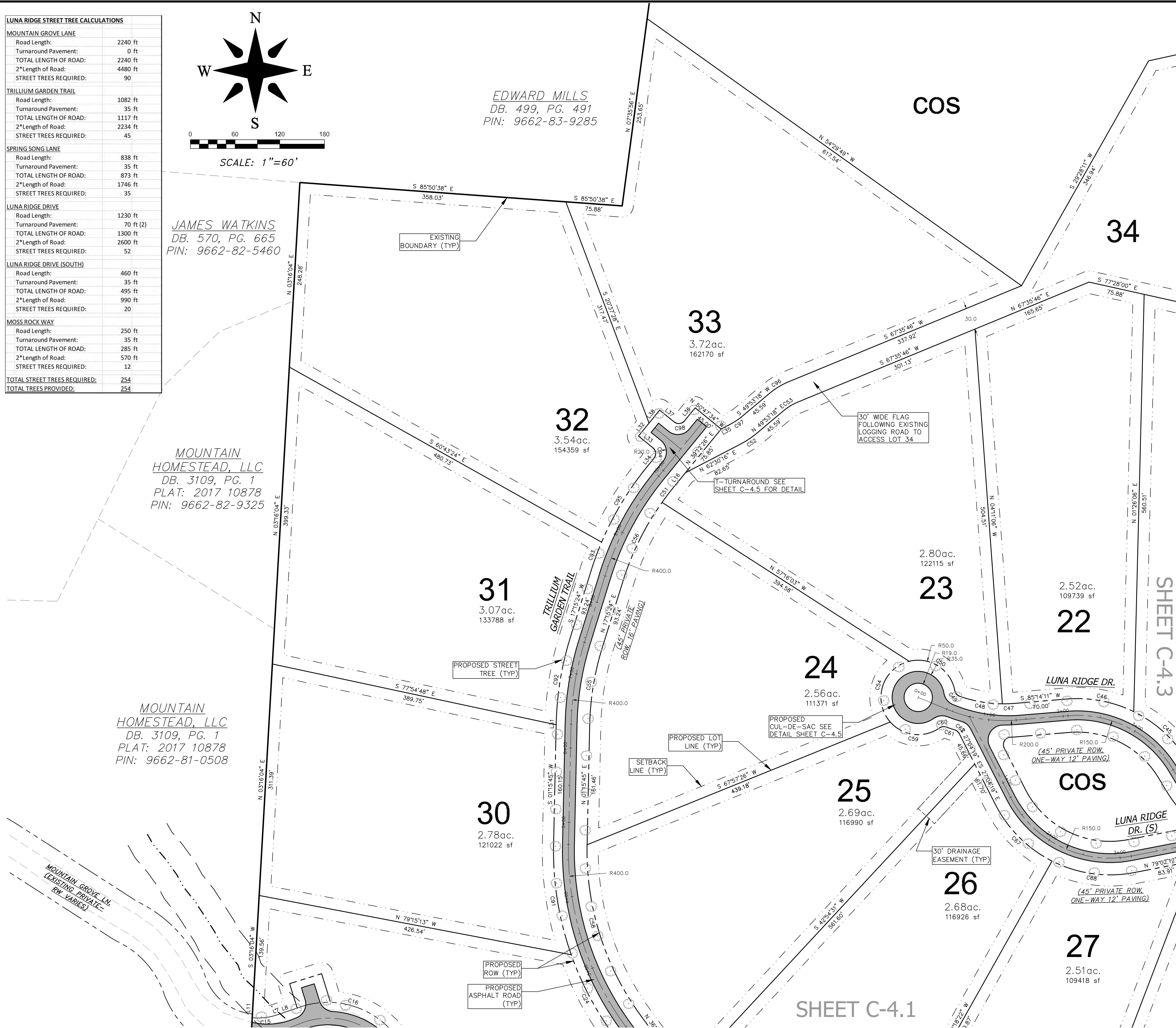
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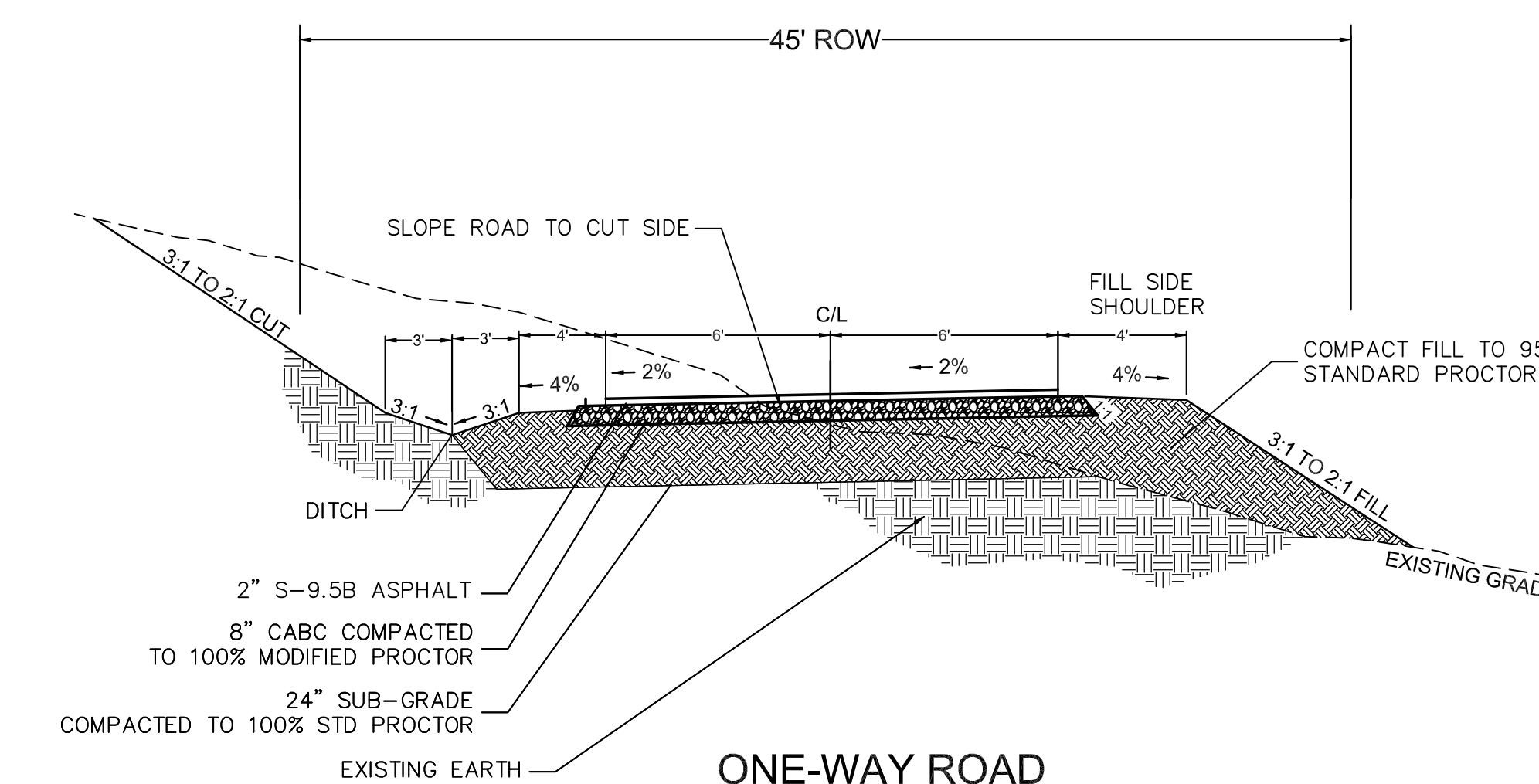
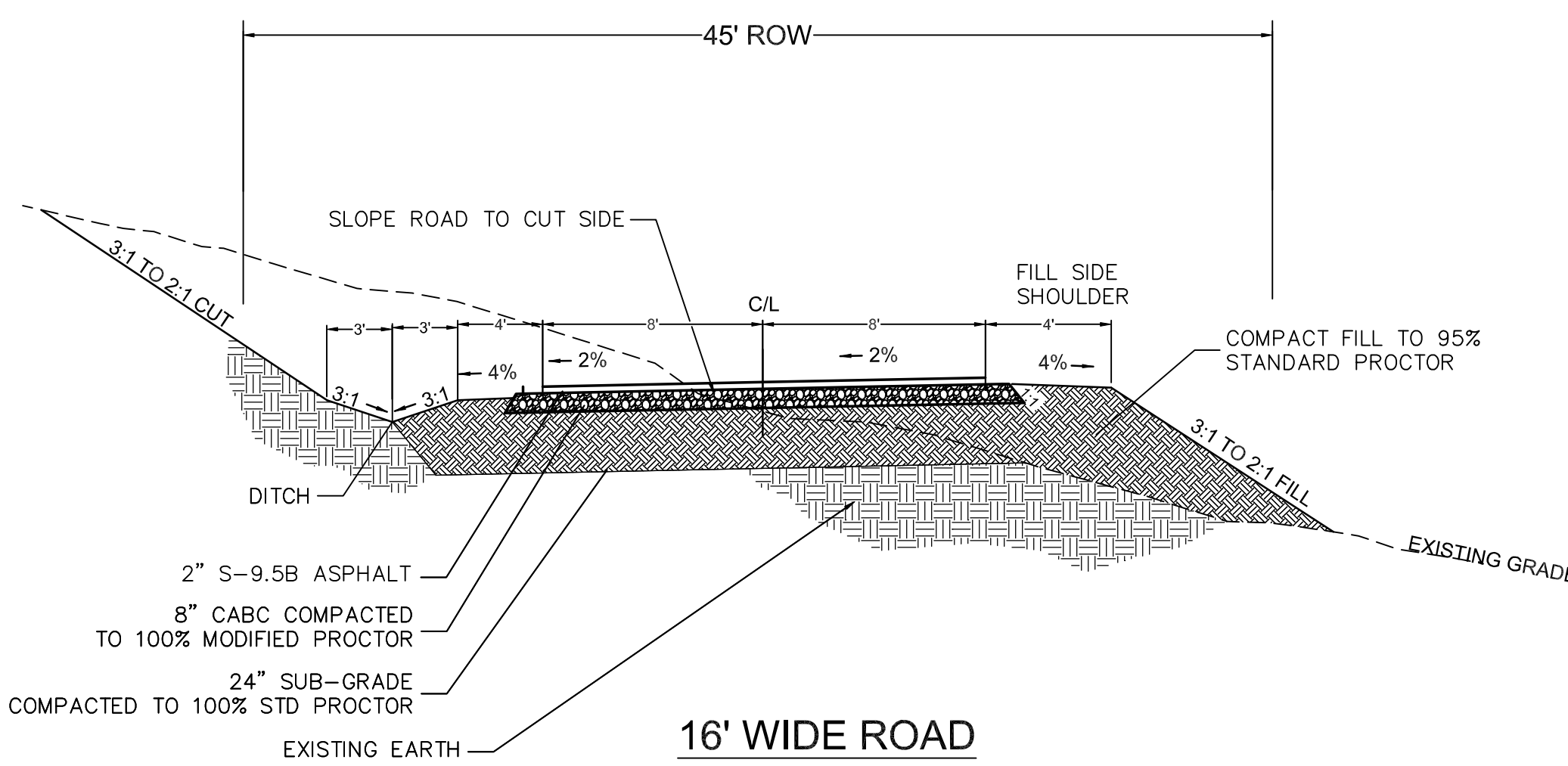
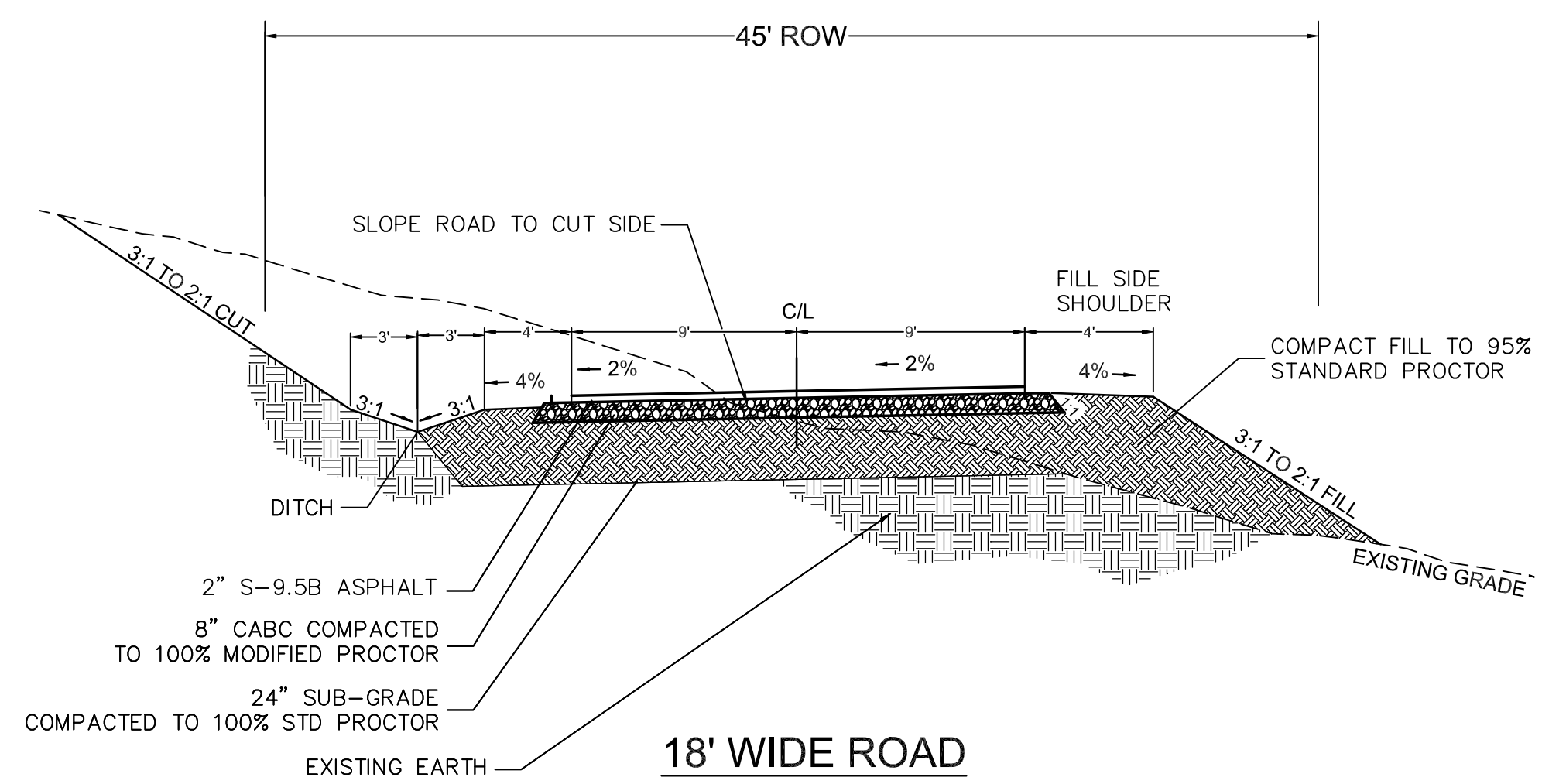


<b>Project No:</b> 486519	<b>Project Title:</b> SITE PLAN	<b>Design:</b> TMM	<b>Drawn:</b> EJH	<b>Checked:</b> TMM	<b>Date:</b> 5/7/19
<b>REVISIONS/SUBMISSIONS</b>		<b>REVISIONS/SUBMISSIONS</b>			
1		TRC SUBMITTAL			
<b>DESIGNER:</b> MCB <b>SCALE:</b> AS NOTED <b>DRAWN:</b> EJH <b>CHECKED:</b> TMM <b>DATE:</b> 5/7/19		17 Arlington Street Asheville, N.C. 28801 Phone: 1-828-232-4700 Fax: 1-828-232-1331 www.brooksea.com			
		LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN NORTH CAROLINA HENDERSON COUNTY			

SHEET C-4.1

SHEET C-4.3

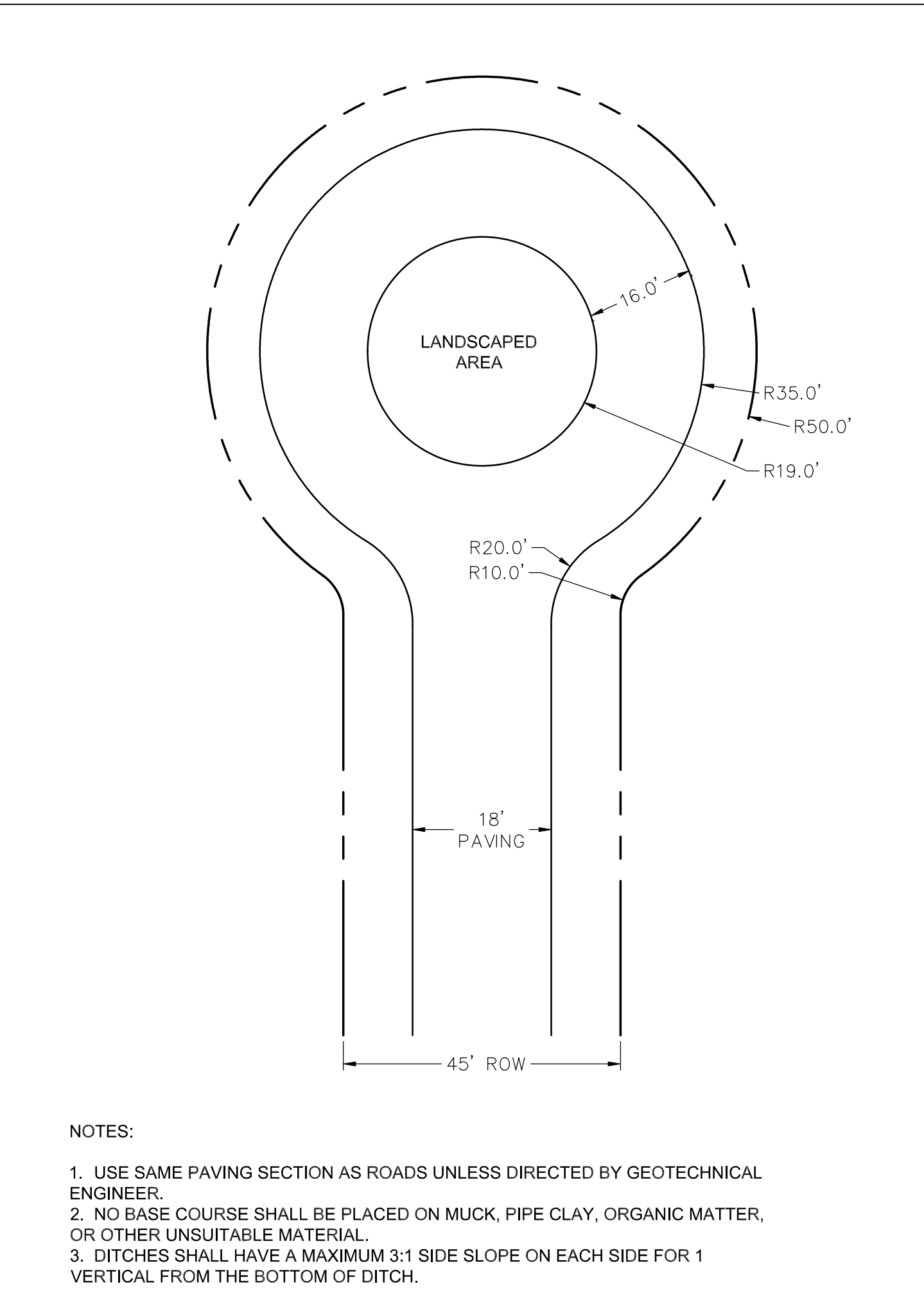
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- NOTES:
1. NO BASE COURSE SHALL BE PLACED ON MUCK, PIPE CLAY, ORGANIC MATTER, OR OTHER UNSUITABLE MATERIAL.
  2. DITCHES SHALL HAVE A MAXIMUM 3:1 SIDE SLOPE ON EACH SIDE FOR 1 VERTICAL FROM THE BOTTOM OF DITCH.
  3. ROADS SHALL BE DESIGNED AND BUILT IN ACCORDANCE WITH "PRIVATE SUBDIVISION LOCAL ROAD" STANDARDS PER THE HENDERSON COUNTY SUBDIVISION REGULATIONS, LATEST EDITION.

A ROAD CROSS SECTIONS

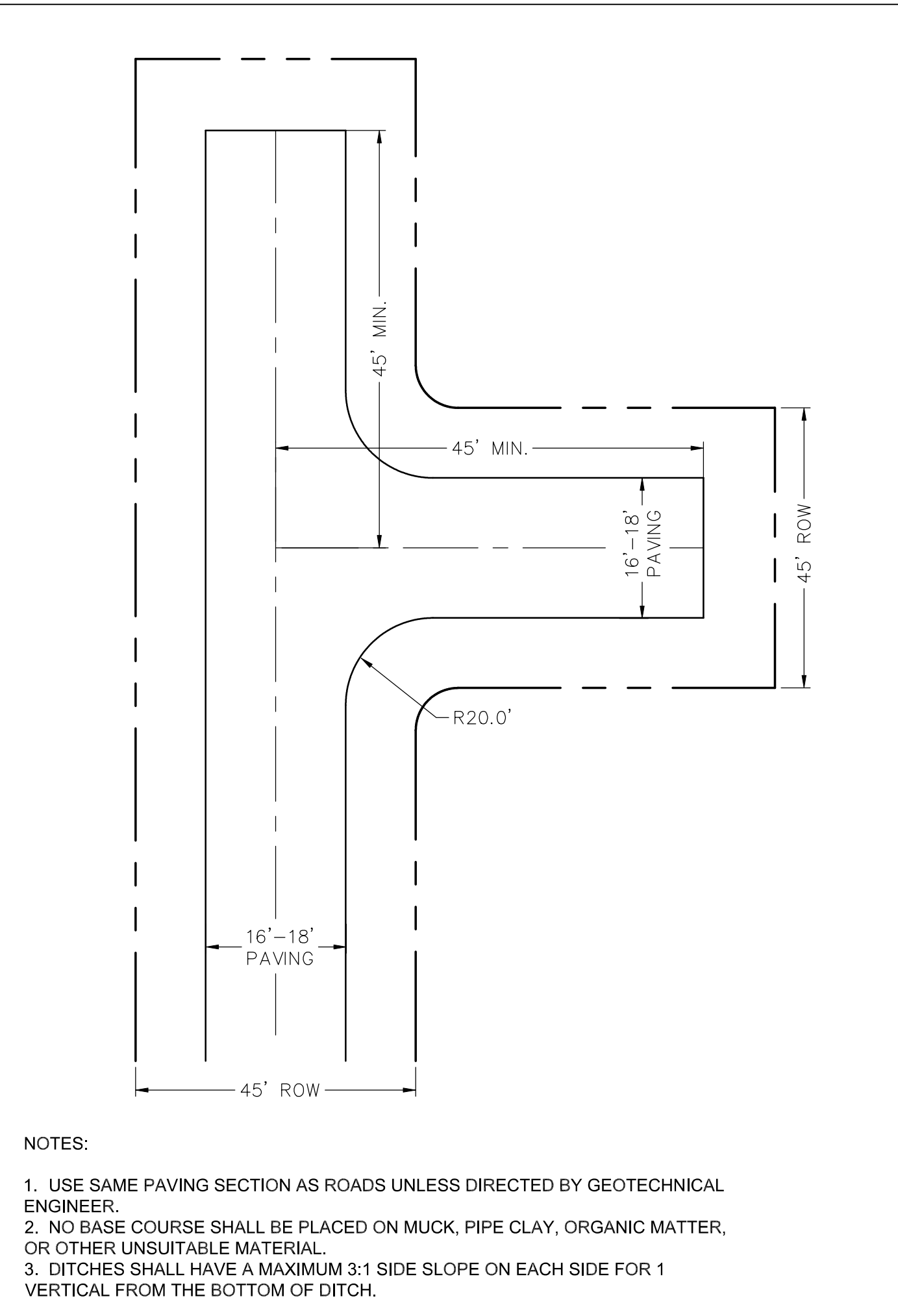
SCALE= NTS



- NOTES:
1. USE SAME PAVING SECTION AS ROADS UNLESS DIRECTED BY GEOTECHNICAL ENGINEER.
  2. NO BASE COURSE SHALL BE PLACED ON MUCK, PIPE CLAY, ORGANIC MATTER, OR OTHER UNSUITABLE MATERIAL.
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B CUL-DE-SAC DETAIL

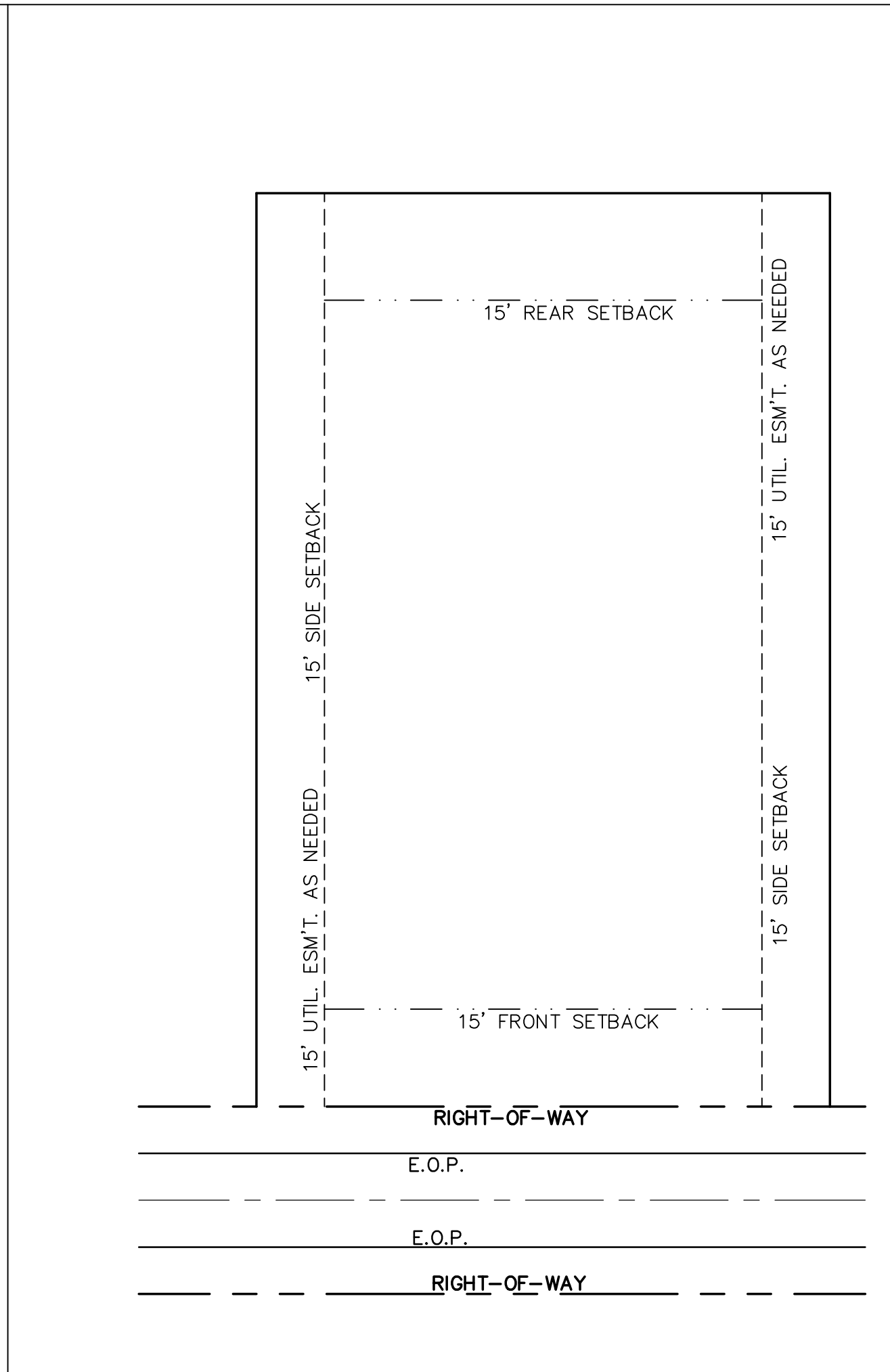
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C T-TURNAROUND

SCALE= NTS



D TYPICAL LOT LAYOUT

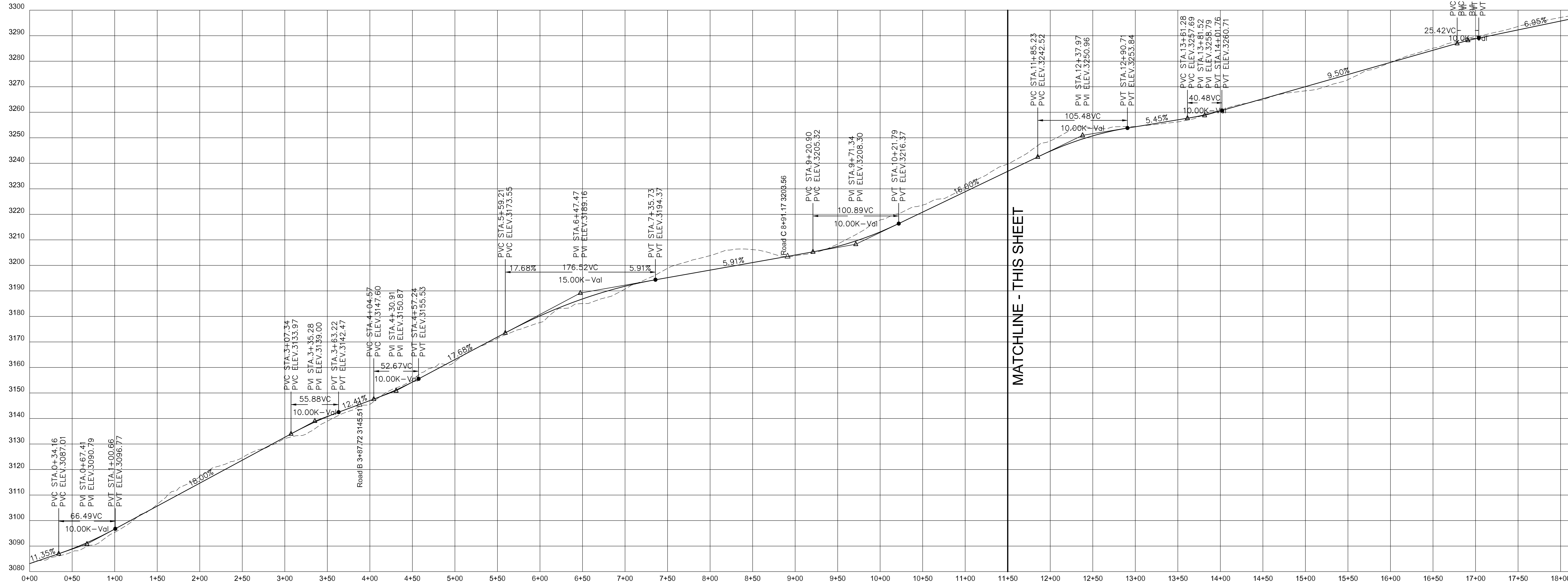
SCALE= NTS

LINE	BEARING	DISTANCE	CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
L1	S 48°04'44"	W 20.00'	C1	10.00'	15.71'	14.14'	N 86°55'16"	90°00'00"
L2	N 70°47'29"	W 30.68'	C2	225.00'	113.37'	112.18'	N 56°21'23"	28°52'12"
L3	S 47°25'00"	E 0.00'	C3	65.00'	56.02'	54.30'	N 46°06'00"	49°22'57"
L4	S 05°19'43"	E 0.00'	C4	65.00'	15.80'	15.76'	N 14°26'41"	13°55'40"
L5	N 71°07'44"	E 0.00'	C5	225.00'	198.89'	193.38'	N 32°55'53"	50°54'05"
L6	N 71°07'41"	E 32.49'	C6	10.00'	17.78'	15.53'	N 07°26'24"	101°53'04"
L7	N 71°07'43"	W 0.00'	C7	70.00'	86.79'	81.34'	N 79°01'23"	71°02'29"
L8	N 71°07'41"	E 32.49'	C8	110.00'	194.96'	170.43'	N 63°46'09"	101°32'57"
L9	N 49°05'47"	E 0.69'	C9	175.00'	27.55'	27.52'	S 00°38'50"	90°11'11"
L10	N 59°35'43"	W 17.98'	C10	775.00'	120.01'	119.89'	S 42°58'51"	8°52'21"
L11	N 03°09'30"	W 24.76'	C11	100.00'	73.46'	71.82'	S 26°22'22"	42°05'14"
L12	N 03°24'39"	W 5.71'	C12	175.00'	4.48'	4.48'	S 04°35'43"	1°27'57"
L13	N 59°06'54"	E 0.69'	C13	130.00'	53.49'	53.12'	N 82°55'02"	23°34'33"
L14	N 81°28'07"	E 2.25'	C14	65.00'	79.78'	74.87'	S 73°42'30"	70°19'39"
L15	N 30°52'20"	W 16.83'	C15	80.00'	34.27'	34.01'	N 83°24'04"	24°32'35"
L16	N 39°12'26"	E 26.11'	C16	115.00'	141.16'	132.46'	S 73°42'30"	70°19'39"
L17	N 59°35'43"	W 11.69'	C17	725.00'	112.27'	112.16'	S 42°58'51"	8°52'21"
L18	N 70°54'23"	W 35.95'	C18	70.00'	120.15'	105.93'	N 83°24'42"	98°20'34"
L19	N 19°38'16"	W 3.25'	C19	225.00'	58.34'	58.18'	N 41°40'06"	14°51'22"
L20	N 59°35'43"	W 6.29'	C20	175.00'	60.39'	60.09'	N 58°58'56"	19°46'18"
L21	N 03°24'39"	E 7.57'	C21	10.00'	16.60'	14.76'	N 21°19'17"	95°05'36"
L22	N 41°55'16"	W 30.18'	C22	70.00'	40.77'	40.20'	N 42°54'37"	33°22'12"
L23	N 48°04'44"	E 22.50'	C23	110.00'	44.92'	44.51'	N 47°53'50"	70°19'39"
L24	N 41°55'16"	W 29.03'	C24	420.00'	123.21'	122.77'	N 27°47'43"	16°48'29"
L25	N 48°04'44"	E 20.00'	C25	180.00'	32.06'	32.01'	N 18°05'48"	10°12'14"
L26	N 41°55'16"	W 14.82'	C26	220.00'	90.52'	89.89'	N 11°24'39"	23°34'32"
L27	N 48°04'44"	E 22.50'	C27	180.00'	43.19'	43.09'	N 06°29'59"	13°44'54"
L28	N 70°47'29"	E 30.68'	C28	220.00'	64.44'	64.21'	N 04°58'49"	16°46'56"
L29	N 49°05'47"	E 0.69'	C29	10.00'	15.41'	13.93'	N 40°44'18"	88°17'56"
L30	N 70°54'23"	E 35.95'	C30	277.50'	47.19'	47.13'	N 89°45'35"	9°44'36"
L31	N 01°15'45"	W 11.31'	C31	277.50'	127.15'	126.04'	S 72°14'31"	26°15'13"
L32	N 39°12'26"	W 22.50'	C32	222.00'	86.81'	86.26'	S 70°11'31"	22°21'13"
L33	N 60°47'34"	E 25.00'	C33	10.00'	9.98'	9.57'	S 52°52'02"	57°12'10"
L34	N 39°12'26"	W 14.46'	C34	50.00'	99.57'	83.91'	S 81°18'49"	114°05'44"
L35	N 62°30'16"	W 112.98'	C35	50.00'	36.40'	35.51'	N 20°46'50"	41°42'56"
L36	N 39°12'26"	W 22.50'	C36	50.00'	69.66'	64.16'	N 39°59'26"	79°49'56"
L37	N 50°47'34"	W 25.00'	C37	50.00'	51.28'	49.07'	S 70°42'44"	58°46'03"
L38	N 39°12'26"	W 22.50'	C38	10.00'	9.98'	9.57'	S 69°55'48"	57°12'10"
L39	N 11°37'01"	E 0.01'	C39	177.50'	52.71'	52.52'	N 72°57'40"	17°00'55"
L40	N 79°47'45"	W 27.52'	C40	177.50'	16.54'	16.53'	N 61°47'03"	5°20'18"
L41	N 81°35'44"	W 5.37'	C41	322.50'	116.73'	116.09'	N 69°29'03"	20°44'11"
L42	N 05°19'43"	W 0.00'	C42	322.50'	85.89'	85.63'	N 87°28'58"	15°15'32"
L43	N 77°50'19"	W 48.82'	C43	177.50'	79.48'	78.82'	N 82°17'03"	25°39'22"
L44	N 77°50'19"	W 48.82'	C44	177.50'	119.53'	117.29'	N 50°09'51"	38°35'02"
L45	N 47°25'00"	E 0.00'	C45	172.50'	99.67'	98.25'	N 47°25'02"	33°05'25"
L46	N 72°50'19"	W 48.82'	C46	172.50'	92.75'	91.62'	N 79°21'47"	30°48'05"
L47	N 77°50'19"	W 48.82'	C47	177.50'	16.58'	16.57'	S 87°54'45"	5°21'07"
L48	N 77°50'19"	W 48.82'	C48	177.50'	58.56'	58.29'	N 79°57'39"	18°54'06"
L49	N 10.00'	10.46'	C49	10.00'	10.46'	9.99'	N 40°32'15"	59°56'43"
L50	N 57°16'29"	W 93.29'11"	C50	50.00'	81.52'	77.99'	N 57°16'29"	93°29'11"
L51	N 37°50'24"	W 24.59'	C51	375.00'	24.60'	24.59'	N 37°19'41"	3°45'29"
L52	N 130.00'	28.62'	C52	130.00'	28.62'	28.57'	N 56°11'47"	12°36'57"
L53	N 70.00'	21.63'	C53	70.00'	21.63'	21.55'	N 58°44'32"	17°42'28"
L54	N 172.50'	102.77'	C54	50.00'	102.77'	85.40'	S 17°21'48"	117°8'17"
L55	N 375.00'	104.68'	C55	375.00'	104.68'	104.34'	N 09°15'35"	15°59'39"
L56	N 375.00'	119.07'	C56	375.00'	119.07'	118.57'	N 26°21'11"	18°11'32"
L57	N 65.00'	26.54'	C57	65.00'	26.54'	26.36'	N 47°53'50"	23°23'46"
L58	N 375.00'	245.19'	C58	375.00'	245.19'	240.84'	N 17°28'06"	37°27'42"
L59	N 50.00'	72.97'	C59	50.00'	72.97'	66.57'	S 83°05'55"	15°59'39"
L60	N 10.00'	9.63'	C60	10.00'	9.63'	9.28'	N 82°40'44"	55°10'26"
L61	N 222.50'	11.99'	C61	222.50'	11.99'	11.99'	S 71°16'41"	3°05'15"
L62	N 180.00'	46.16'	C62	180.00'	46.16'	46.03'	S 49°56'49"	45°44'59"
L63	N 175.00'	103.66'	C63	175.00'	103.66'	102.15'	N 53°56'13"	33°56'21"
L64	N 175.00'	59.92'	C64	175.00'	59.92'	59.63'	N 80°42'58"	19°37'09"
L65	N 10.00'	12.37'	C65	10.00'	12.37'	11.60'	N 55°04'54"	70°53'16"
L66	N 115.00'	80.20'	C66	115.00'	80.20'	78.58'	N 39°37'00"	39°57'27"
L67	N 172.50'	108.72'	C67	172.50'	108.72'	106.93'	S 45°07'38"	36°06'33"
L68	N 172.50'	113.76'	C68	172.50'	113.76'	111.70'	S 82°04'22"	37°46'52"
L69	N 225.00'	40.07'	C69	225.00'	40.07'	40.02'	S 15°05'48"	10°12'14"
L70	N 65.00'	115.20'	C70	65.00'	115.20'	100.71'	S 63°46'09"	101°32'57"
L71	N 115.00'	68.54'	C71	115.00'	68.54'	67.53'	N 82°31'46"	34°08'47"
L72	N 10.00'	6.30'	C72	10.00'	6.30'	6.20'	S 82°54'52"	36°05'53"
L73	N 222.50'	77.25'	C73	222.50'	77.25'	76.86'	S 74°48'41"	19°53'31"
L74	N 10.00'	14.20'	C74	10.00'	14.20'	13.03'	S 44°05'03"	81°20'47"
L75	N 175.00'	51.26'	C75	175.00'	51.26'	51.08'	S 04°58'49"	16°46'56"
L76	N 225.00'	53.99'	C76	225.00'	53.99'	53.86'	S 06°29'50"	13°44'54"
L77	N 175.00'	72.01'	C77	175.00'	72.01'	71.50'	S 11°24'39"	23°34'32"
L78	N 10.00'	15.71'	C78	10.00'	15.71'	14.14'	N 03°04'44"	90°00'00"
L79	N 180.00'	15.05'	C79	180.00'	15.05'	15.05'	S 44°19'01"	4°47'30"
L80	N 180.00'	46.16'	C80	180.00'	46.16'	46.03'	S 14°49'37"	14°41'51"
L81	N 110.00'	110.68'	C81	110.00'	110.68'	115.46'	S 39°08'10"	63°18'38"
L82	N 180.00'	75.64'	C82	180.00'	75.64'	75.09'	S 58°45'08"	24°04'42"
L83	N 110.00'	115.33'	C83	110.00'	115.33'	110.12'	N 86°06'36"	60°04'15"
L84	N 10.00'	11.44'	C84	10.00'	11.44'	10.83'	N 88°50'46"	65°32'36"
L85	N 180.00'	113.75'	C85	180.00'	113.75'	111.87'	S 40°16'39"	36°12'33"
L86	N 110.00'	46.13'	C86	110.00'	46.13'	45.09'	N 46°06'38"	24°01'48"
L87	N 180.00'	47.13'	C87	180.00'	47.13'	46.99'	N 41°35'45"	15°00'03"
L88	N 130.00'	136.13'	C88	130.00'	136.13'	129.99'	N 79°05'42"	59°59'49"
L89	N 130.00'	134.99'	C89	130.00'	134.99'	129.00'	S 41°09'36"	59°29'35"
L90	N 110.00'	110.68'	C90	110.00'	110.68'	97.20'	S 37°38'02"	52°26'28"
L91	N 420.00'	151.44'	C91	420.00'	151.44'	150.58'	S 09°03'52"	20°39'13"
L92	N 420.00'	117.24'	C92	420.00'	117.24'	116.86'	S 09°15'35"	15°59'39"
L93	N 420.00'	42.10'	C93	420.00'	42.10'	42.08'	S 20°07'42"	5°44'35"
L94	N 10.00'	15.71'	C94	10.00'	15.71'	14.14'	S 05°47'34"	90°00'00"
L95	N 420.00'	118.81'	C95	420.00'	118.81'	118.41'	S 31°06'13"	16°12'26"
L96	N 100.00'	30.91'	C96	100.00'	30.91'	30.78'	S 58°44'32"	17°42'28"
L97	N 100.00'	22.02'	C97	100.00'	22.02'	21.97'	S 56°11'47"	12°36'57"
L98	N 10.00'	15.71'	C98	10.00'	15.71'	14.14'	S 84°12'26"	90°00'00"
L99	N 225.00'	41.18'	C99	225.00'	41.18'	41.12'	N 00°05'08"	10°29'00"
L100	N 150.00'	81.34'	C100	150.00'	81.34'	80.91'	N 11°02'37"	23°28'45"
L101	N 10.00'	18.52'	C101	10.00'	18.52'	15.98'	N 24°17'25"	106°05'49"
L102	N 110.00'	36.89'	C102	110.00'	36.89'	36.71'	N 67°43'56"	19°12'48"

E LINE AND CURVE TABLE

SCALE= NTS

Project No: 486519  
 Drawing Title: C-4.5 SITE DETAILS  
 LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN  
 HENDERSON COUNTY NORTH CAROLINA  
 Planning • Engineering • Surveying • Environmental Services •  
 BROOKS ENGINEERING ASSOCIATES  
 17 Affington Street  
 Asheville, N.C. 28801  
 Phone: 1-828-232-4700  
 Fax: 1-828-232-1331  
 www.lbrooksea.com  
 PERMIT SET  
 BROOKS ENGINEERING ASSOCIATES  
 NORTH CAROLINA  
 PROFESSIONAL ENGINEER  
 LICENSE NO. 3125  
 REVISIONS/SUBMISSIONS  
 TRC SUBMITTAL  
 No. 1  
 Date 5/7/19

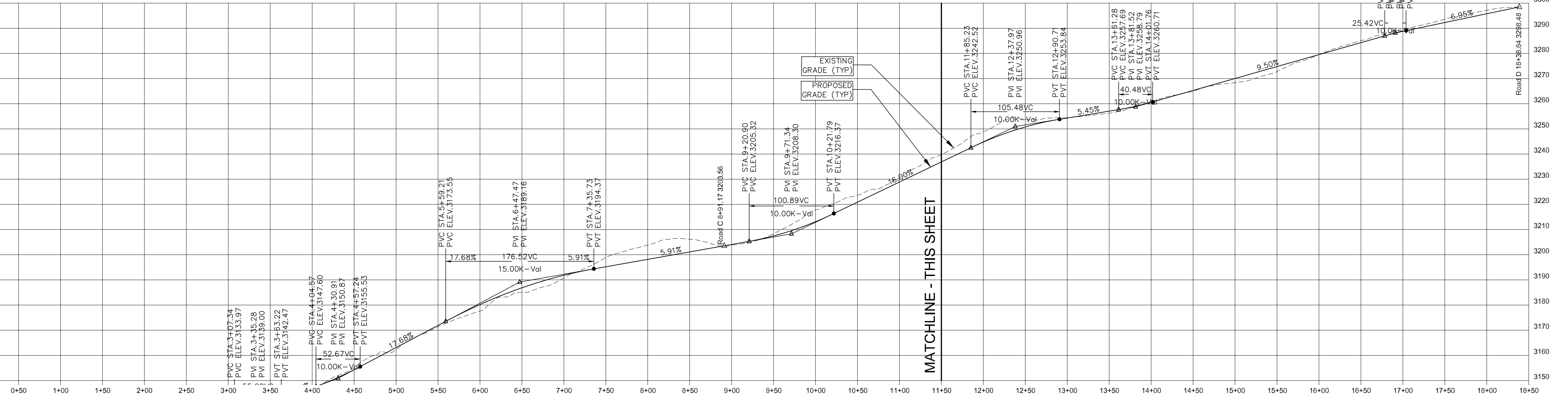


# MOUNTAIN GROVE LN - PROFILE

SCALE:  
 H: 1"=60'  
 V: 1"=20'

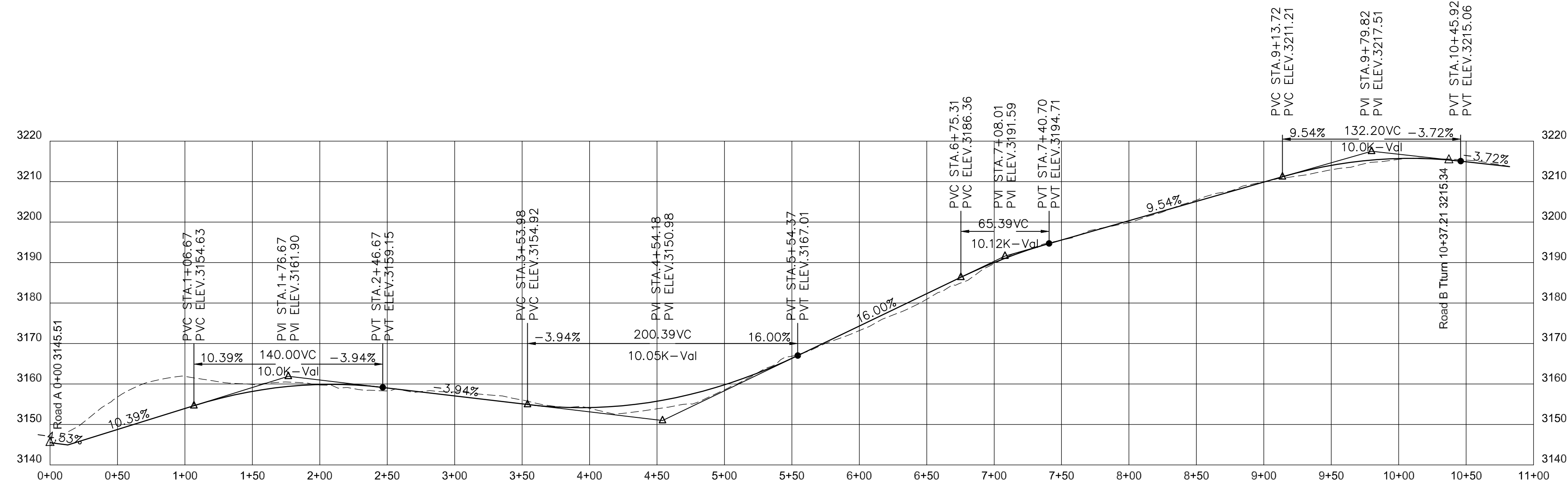
MATCHLINE - THIS SHEET

MATCHLINE - THIS SHEET

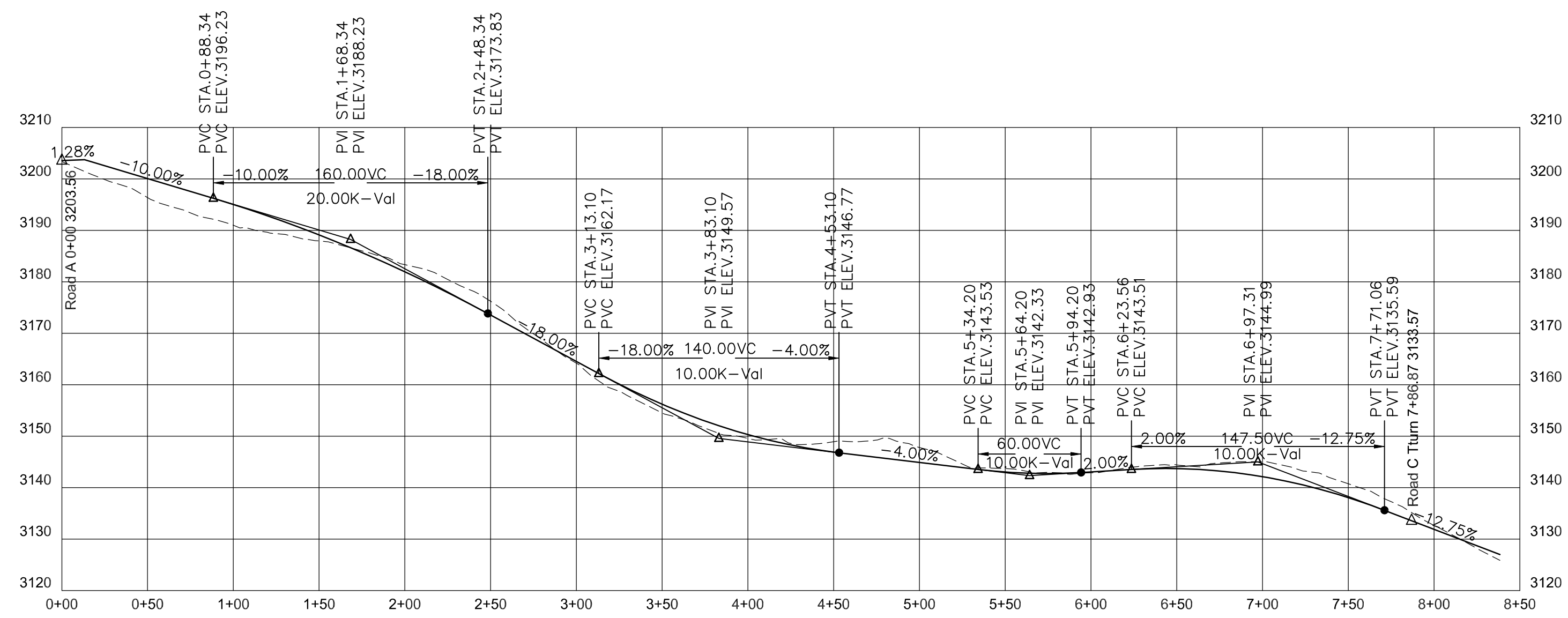


Project No: <b>486519</b>	LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN HENDERSON COUNTY NORTH CAROLINA	Reviewer: MCB Scale: AS NOTED Date: 5/7/19	Design: TMM Drawn: E/JH Checked: TMM	17 Arlington Street Asheville, N.C. 28801 Phone: 1-828-232-4700 Fax: 1-828-232-1331 www.brookssea.com	No. 1 REVISIONS/SUBMISSIONS TRC SUBMITTAL Date 5/7/19	
 <b>BROOKS</b> ENGINEERING ASSOCIATES Planning • Engineering • Surveying • Environmental Services •		 NORTH CAROLINA PROFESSIONAL ENGINEER License No. 3725		 NORTH CAROLINA PROFESSIONAL ENGINEER License No. 3725		<b>PERMIT SET</b>

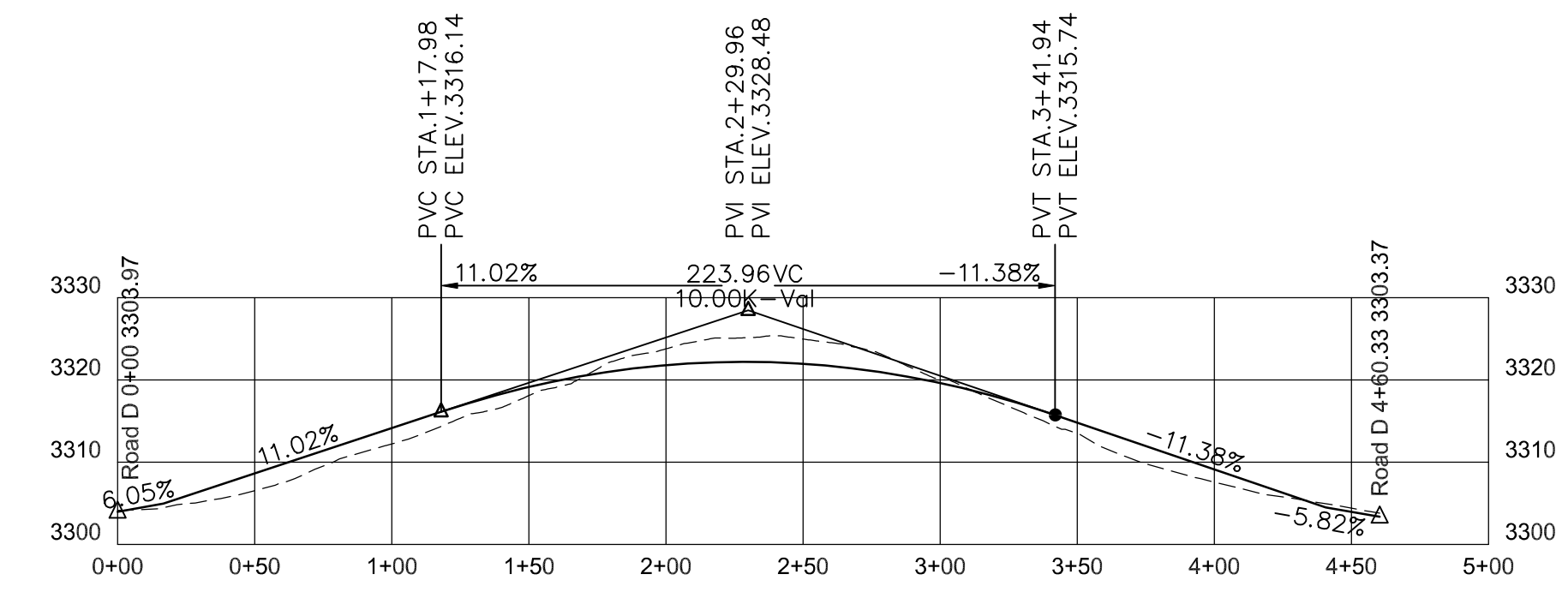
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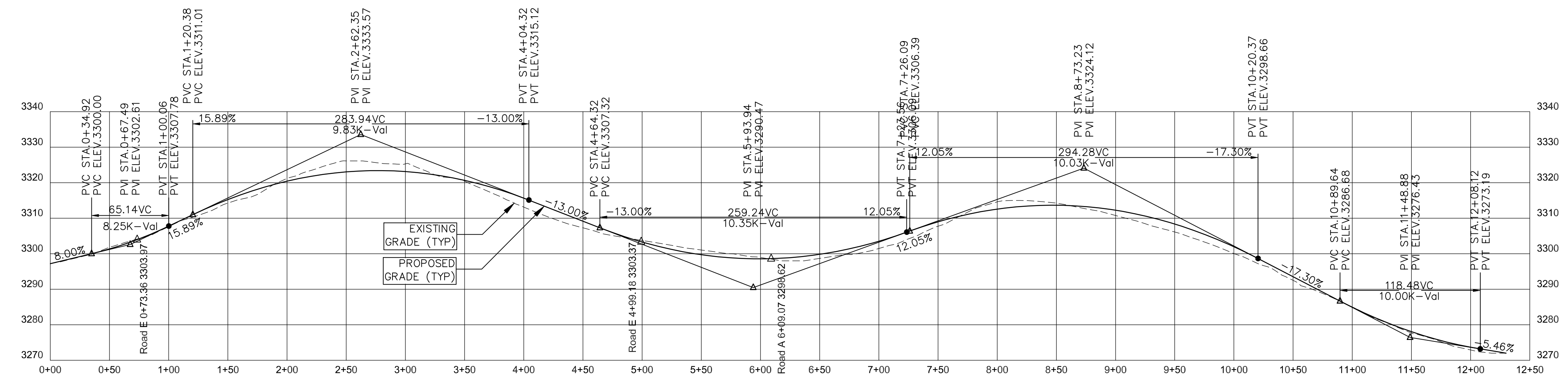
**TRILIUM GARDEN TRAIL - PROFILE**



**SPRING SONG LN - PROFILE**

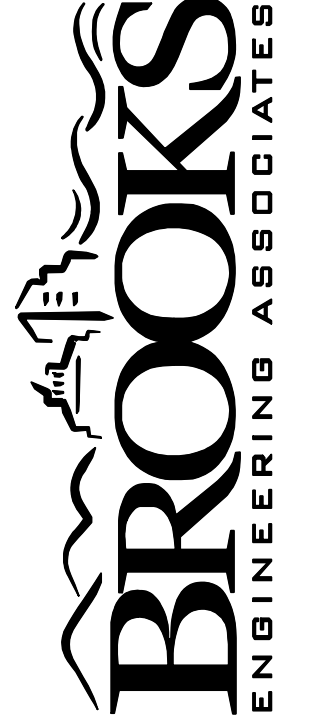


**LUNA RIDGE DR (S) - PROFILE**



**LUNA RIDGE DR - PROFILE**

SCALE:  
H: 1"=60'  
V: 1"=20'

Project No: <b>486519</b>	Drawing Title: <b>C-4.7</b>	LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN NORTH CAROLINA HENDERSON COUNTY	 <b>BROOKS</b> ENGINEERING ASSOCIATES Planning • Engineering • Surveying • Environmental Services •	Designer: TMM Drafter: EJH Checker: TMM	Reviewer: MCB Scale: AS NOTED Date: 5/7/19	17 Arlington Street Asheville, N.C. 28801 Phone: 1-828-232-4700 Fax: 1-828-232-1331 www.brookssea.com
				REVISIONS/SUBMISSIONS No. 1 TRC SUBMITTAL	Date 5/7/19	

**PERMIT SET**

NORTH CAROLINA  
ENGINEERING ASSOCIATION  
LICENSED PROFESSIONAL ENGINEER  
NO. 3125

Revision/Submission number with a triangle indicates changes made on this sheet.

**GRADING AND STORMWATER LEGEND**

- EXIST. BOUNDARY
- EXIST. STREAM
- EXIST. STREAM BUFFER
- EXIST. ADJOINER
- EXIST. RIGHT OF WAY
- EXIST. EDGE OF GRAVEL DRIVE
- EXIST. OVERHEAD UTILITIES
- EXIST. POWER POLE
- EXIST. UNDERGRND UTILITIES
- EXIST. STORM DRAIN
- PROP. PAVED ROAD
- PROP. LOT LINE
- PROP. R.O.W.
- NEW OUTLET PROTECTION
- LIMITS OF DISTURBANCE
- PROPOSED STORM PIPE

ES WATKINS  
570, PG. 665  
9662-82-5460

UNTAIN  
TEAD, LLC  
109, PG. 1  
2017 10878  
62-82-9325

**STORM AND EROSION NOTES**

PROPERTY SIZE: 203.27 ACRES  
 PROPERTY STEEPER THAN 60%: 22.25 AC (10.9%)  
 PROJECT DENSITY: 0.17 UNITS / ACRE  
 IMPERVIOUS SUMMARY:  
 ROADS: 3.20 ACRES  
 HOUSES & DRIVES (7,000 / LOT): 5.46 ACRES  
 TOTAL: 8.66 ACRES (4.3%)

**EROSION CONTROL NOTES:**  
 1. SEE SHEET C-5.1 FOR STABILIZATION TIME FRAMES.  
 2. EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE AND AN AMENDED PLAN BE SUBMITTED AND APPROVED SHOWING MODIFIED EROSION CONTROL DEVICES.

**STORMWATER NOTES:**  
 1. ALL STREAMS SHALL HAVE A 30' SETBACK FOR NEW BUILT-UPON AREAS.  
 2. ALL PIPE SHALL BE DOUBLE-WALL HOPE WITH PROPER STONE BEDDING AND SHALL HAVE A MINIMUM COVER OF 30".  
 3. ALL FILL SLOPES SHALL BE COMPACTED FULL DEPTH TO NOT LESS THAN 95 PERCENT MAXIMUM DENSITY (STANDARD PROCTOR), SHALL BE PLACED ON A SURFACE CLEAR OF GROWTH AND DEBRIS AND BE PROPERLY BENCHED AND DRAINED.  
 4. ALL SLOPES GREATER THAN 3:1 AND TALLER THAN 10 FEET SHALL BE SEEDED AND COVERED WITH MATTING AS SHOWN IN THE PLANS.  
 5. AN APPROVED GRADING PERMIT IS REQUIRED FOR ANY BORROW OR WASTE SITE PRIOR TO INITIATION OF ANY LAND DISTURBING ACTIVITY.

\*ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF DETAILS, SPECIFICATIONS, AND OTHER DEVELOPMENT ORDINANCES OF HENDERSON CO.

**DEVELOPMENT DATA**

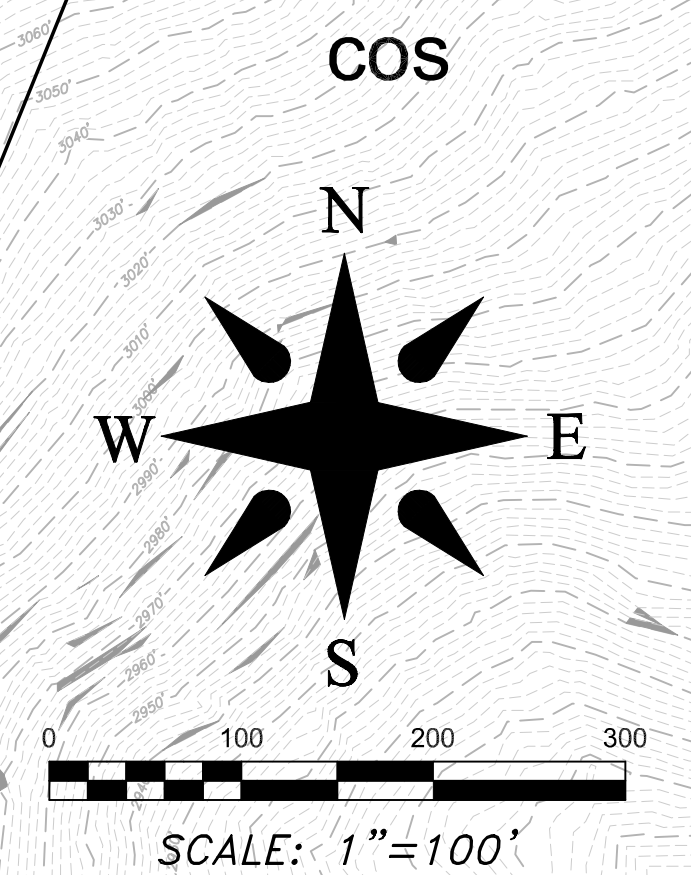
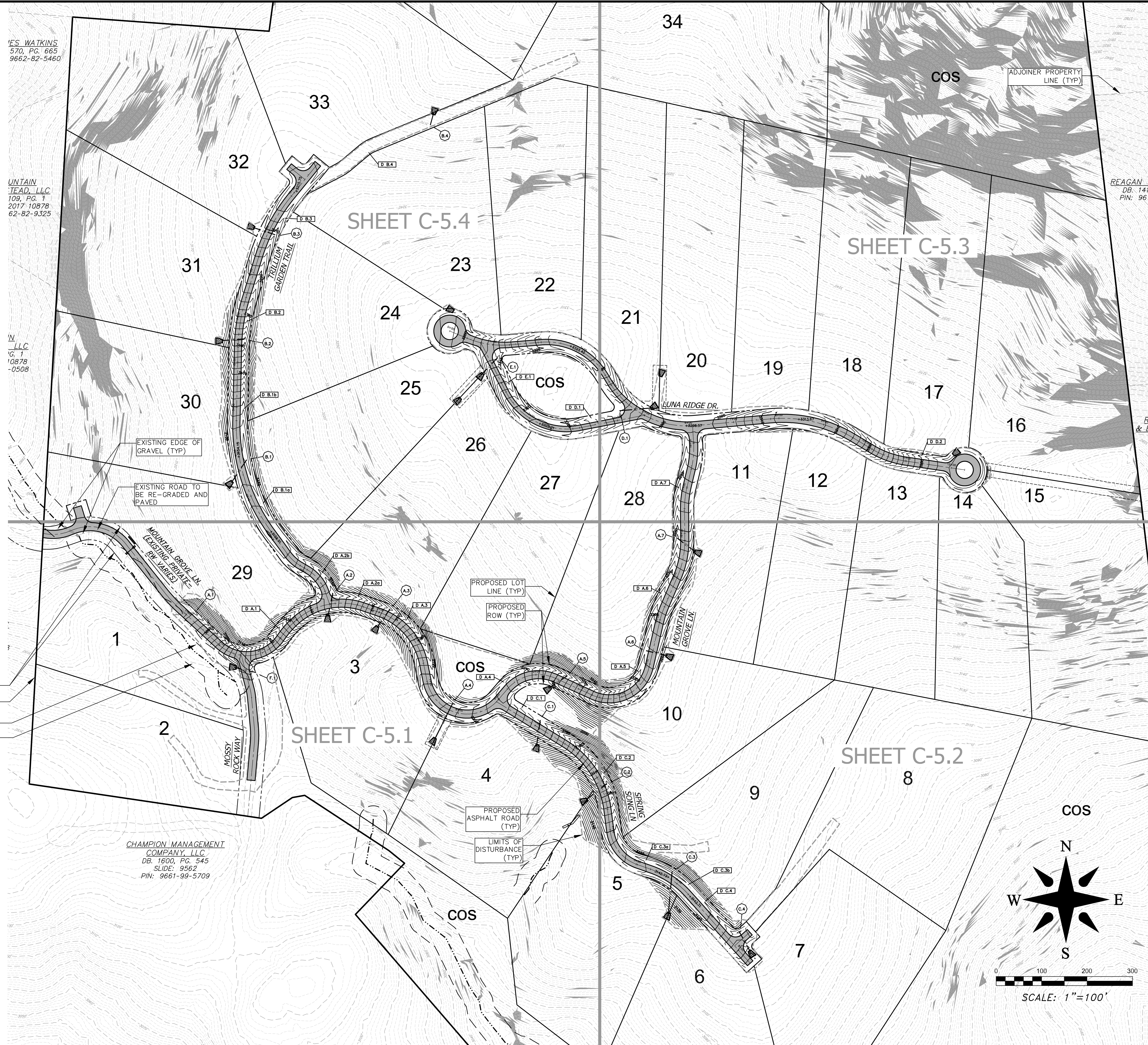
PROPERTY ADDRESS: CLARK GAP DR  
 PIN NUMBER: 9672012875  
 PROPERTY SIZE: 203.27 ACRES  
 ZONING REVIEW: HENDERSON COUNTY  
 EROSION CONTROL REVIEW: HENDERSON COUNTY  
 STORMWATER REVIEW: HENDERSON COUNTY  
 ZONING CLASSIFICATION: R-3  
 PROPOSED NUMBER OF UNITS: 34  
 PROPOSED DENSITY: 0.17 units / acre  
 PROPOSED LINEAR FEET OF ROAD: 5,800'  
 PORTIONS OF LOTS 7, 8, 14, 15, & 16 ARE WITHIN 1/2 MILE OF A FARMLAND PRESERVATION DISTRICT.  
 WATER AND SEWER WILL BE PROVIDED BY INDIVIDUAL WELLS AND SEPTIC SYSTEMS.  
 PUBLIC WATER AND SEWER SYSTEMS ARE APPROXIMATELY 1.5 MILES FROM THE SITE.

PROPERTY OWNER: MOUNTAIN ASSET PLANNING, LP  
 CONTACT: RICHARD ANDERSON  
 ADDRESS: 27 GLEN COVE DR  
 ADDRESS 2: ARDEN, NC 28704  
 DEVELOPER: TERRA FIRMA MANAGEMENT, INC.  
 CONTACT: ANDY BAKER  
 ADDRESS: 120 HIGH HICKORY TRAIL  
 ADDRESS 2: SWANNANOVA, NC 28778  
 EMAIL: ANDY@TFM-CAROLINA.COM  
 PHONE: 616-402-0367  
 ENGINEER: BROOKS ENGINEERING  
 CONTACT: JOHN KINNAIRD  
 ADDRESS: 17 ARLINGTON ST  
 ADDRESS 2: ASHEVILLE, NC 28801  
 EMAIL: JKINNAIRD@BROOKSEA.COM  
 PHONE: 828-232-4700

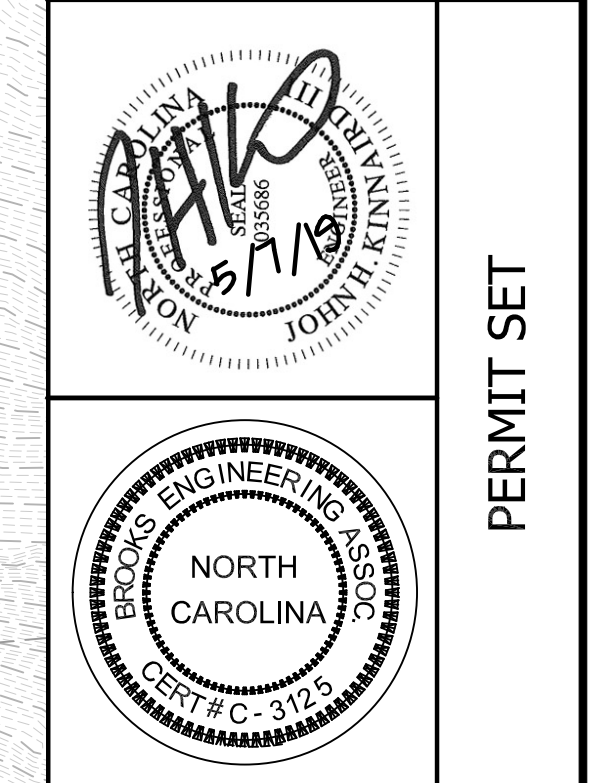
CHAMPION MANAGEMENT  
 COMPANY, LLC  
 DB: 1600, PG. 545  
 SLIDE: 9562  
 PIN: 9661-99-5709

EXISTING ROW (TYP)  
 EXISTING BOUNDARY (TYP)  
 EXISTING STREAM (TYP)  
 30' STREAM BUFFER (TYP)

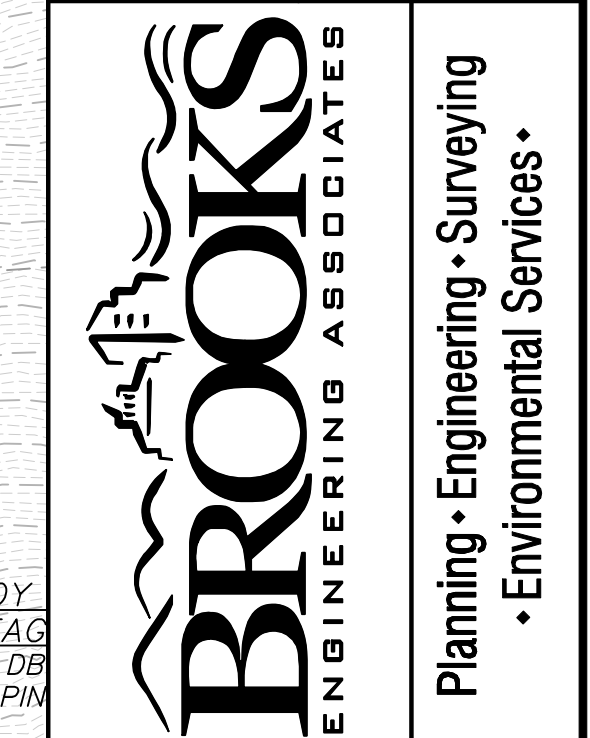
PROPOSED LOT LINE (TYP)  
 PROPOSED ROW (TYP)  
 PROPOSED ASPHALT ROAD (TYP)  
 LIMITS OF DISTURBANCE (TYP)



Date	5/7/19
REVISIONS/SUBMISSIONS	TRC SUBMITTAL
No.	1



Revised by: MCB  
 Scale: AS NOTED  
 Drawn: E/JH  
 Checked: TMM  
 Date: 5/7/19  
 17 Arlington Street  
 Asheville, N.C. 28801  
 Phone: 1-828-232-4700  
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 www.brooksea.com

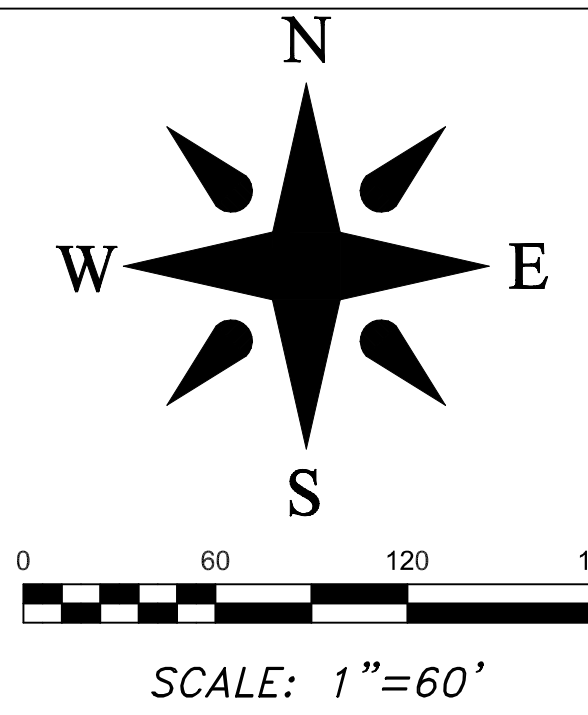


Project No:	486519
Drawing Title:	LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN GRADING, EROSION AND STORMWATER PLAN
Location:	HENDERSON COUNTY NORTH CAROLINA

Revision/Submission number with a triangle indicates changes made on this sheet.

**GRADING AND STORMWATER LEGEND**

---	EXIST. BOUNDARY
---	EXIST. STREAM
---	EXIST. STREAM BUFFER
---	EXIST. ADJOINER
---	EXIST. RIGHT OF WAY
---	EXIST. EDGE OF GRAVEL DRIVE
---	EXIST. OVERHEAD UTILITIES
---	EXIST. POWER POLE
---	EXIST. UNDERGRD UTILITIES
---	EXIST. STORM DRAIN
---	PROP. PAVED ROAD
---	PROP. STORM PIPE
---	PROP. LOT LINE
---	PROP. R.O.W.
---	NEW OUTLET PROTECTION
---	LIMITS OF DISTURBANCE
---	TEMPORARY INLET PROTECTION
---	PROPOSED EG SLOPE MATTING



**STORM AND EROSION NOTES**

PROPERTY SIZE: 203.27 ACRES  
 PROPERTY STEEPER THAN 60%: 22.25 AC (10.9%)  
 PROJECT DENSITY: 0.17 UNITS / ACRE

**IMPERVIOUS SUMMARY:**  
 ROADS: 3.20 ACRES  
 HOUSES & DRIVES (7,000 / LOT): 5.46 ACRES  
 TOTAL: 8.66 ACRES (4.3%)

**EROSION CONTROL NOTES:**  
 1. SEE SHEET C-5.1 FOR STABILIZATION TIME FRAMES.  
 2. EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE AND AN AMENDED PLAN BE SUBMITTED AND APPROVED SHOWING MODIFIED EROSION CONTROL DEVICES.

**STORMWATER NOTES:**  
 1. ALL STREAMS SHALL HAVE A 30' SETBACK FOR NEW BUILT-UPON AREAS.  
 2. ALL PIPE SHALL BE DOUBLE-WALL HDPE WITH PROPER STONE BEDDING AND SHALL HAVE A MINIMUM COVER OF 30".  
 3. ALL FILL SLOPES SHALL BE COMPACTED FULL DEPTH TO NOT LESS THAN 95 PERCENT MAXIMUM DENSITY (STANDARD PROCTOR), SHALL BE PLACED ON A SURFACE CLEAR OF GROWTH AND DEBRIS AND BE PROPERLY BENCHED AND DRAINED.  
 4. ALL SLOPES GREATER THAN 3:1 AND TALLER THAN 10 FEET SHALL BE SEEDED AND COVERED WITH MATTING AS SHOWN IN THE PLANS.  
 5. AN APPROVED GRADING PERMIT IS REQUIRED FOR ANY BORROW OR WASTE SITE PRIOR TO INITIATION OF ANY LAND DISTURBING ACTIVITY.

\*ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF DETAILS, SPECIFICATIONS, AND OTHER DEVELOPMENT ORDINANCES OF HENDERSON CO.

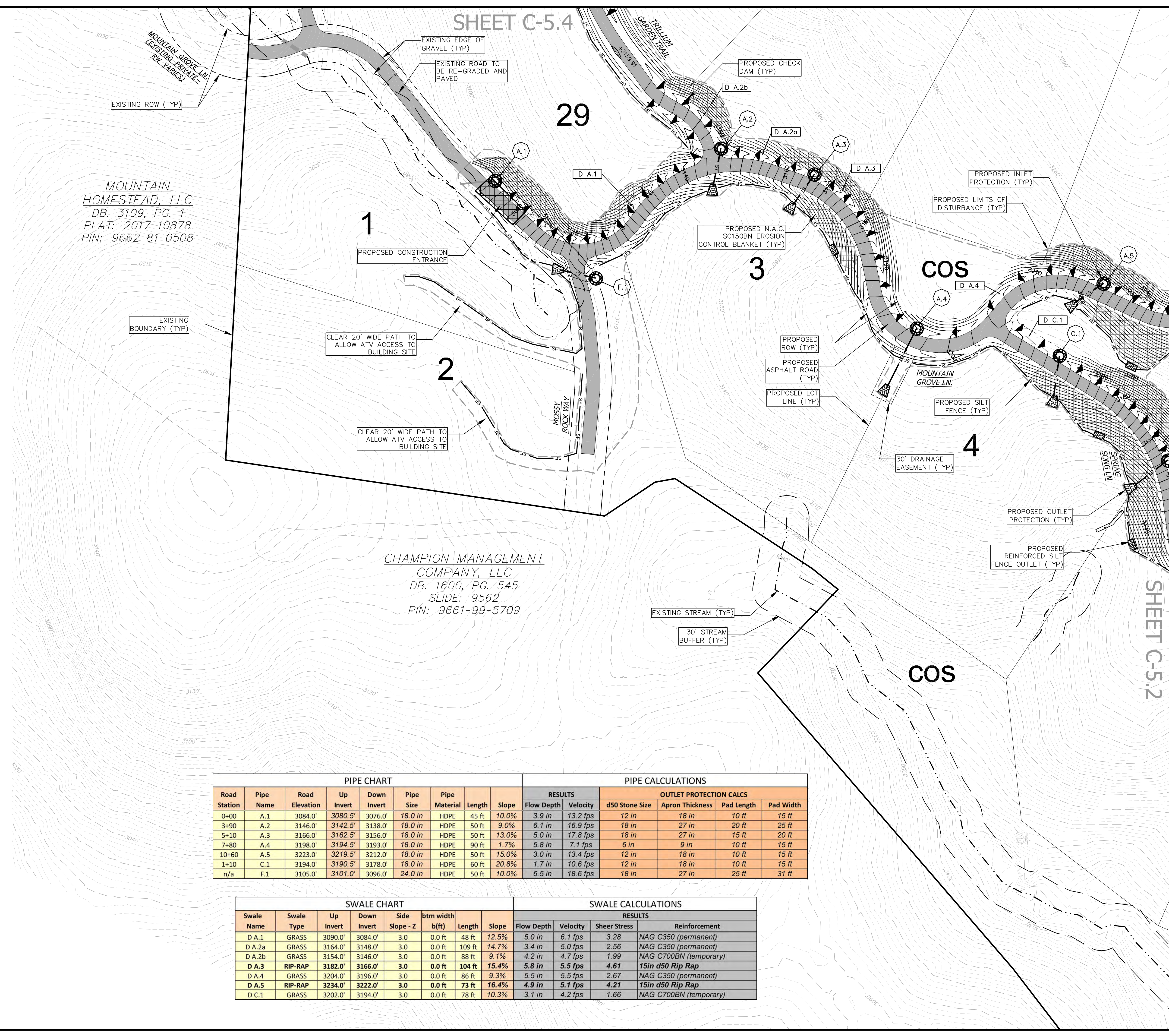
**DEVELOPMENT DATA**

PROPERTY ADDRESS: CLARK GAP DR  
 PIN NUMBER: 9672012875  
 PROPERTY SIZE: 203.27 ACRES  
 ZONING REVIEW: HENDERSON COUNTY  
 EROSION CONTROL REVIEW: HENDERSON COUNTY  
 STORMWATER REVIEW: HENDERSON COUNTY  
 ZONING CLASSIFICATION: R-3  
 PROPOSED NUMBER OF UNITS: 34  
 PROPOSED DENSITY: 0.17 units / acre  
 PROPOSED LINEAR FEET OF ROAD: 5,809'  
 PORTIONS OF LOTS 7, 8, 14, 15, & 16 ARE WITHIN 1/2 MILE OF A FARMLAND PRESERVATION DISTRICT.  
 WATER AND SEWER WILL BE PROVIDED BY INDIVIDUAL WELLS AND SEPTIC SYSTEMS.  
 PUBLIC WATER AND SEWER SYSTEMS ARE APPROXIMATELY 1.5 MILES FROM THE SITE.

PROPERTY OWNER: MOUNTAIN ASSET PLANNING, LP  
 CONTACT: RICHARD ANDERSON  
 ADDRESS: 27 GLEN COVE DR  
 ADDRESS 2: ARDEN, NC 28704

DEVELOPER: TERRA FIRMA MANAGEMENT, INC.  
 CONTACT: ANDY BAKER  
 ADDRESS: 120 HIGH HICKORY TRAIL  
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 EMAIL: ANDY@TFMCAROLINA.COM  
 PHONE: 616-402-0367

ENGINEER: BROOKS ENGINEERING  
 CONTACT: JOHN KINNAIRD  
 ADDRESS: 17 ARLINGTON ST  
 ADDRESS 2: ASHEVILLE, NC 28801  
 EMAIL: JKINNAIRD@BROOKSEA.COM  
 PHONE: 828-232-4700



MOUNTAIN HOMESTEAD, LLC  
 DB: 3109, PG. 1  
 PLAT: 2017-10878  
 PIN: 9662-81-0508

CHAMPION MANAGEMENT COMPANY, LLC  
 DB: 1600, PG. 545  
 SLIDE: 9562  
 PIN: 9661-99-5709

PIPE CHART										PIPE CALCULATIONS				
Road Station	Pipe Name	Road Elevation	Up Invert	Down Invert	Pipe Size	Pipe Material	Length	Slope	Flow Depth	Velocity	d50 Stone Size	Apron Thickness	Pad Length	Pad Width
0+00	A.1	3084.0'	3080.5'	3076.0'	18.0 in	HDPE	45 ft	10.0%	3.9 in	13.2 fps	12 in	18 in	10 ft	15 ft
3+90	A.2	3146.0'	3142.5'	3138.0'	18.0 in	HDPE	50 ft	9.0%	6.1 in	16.9 fps	18 in	27 in	20 ft	25 ft
5+10	A.3	3166.0'	3162.5'	3156.0'	18.0 in	HDPE	50 ft	13.0%	5.0 in	17.8 fps	18 in	27 in	15 ft	20 ft
7+80	A.4	3198.0'	3194.5'	3193.0'	18.0 in	HDPE	90 ft	1.7%	5.8 in	7.1 fps	6 in	9 in	10 ft	15 ft
10+60	A.5	3223.0'	3219.5'	3212.0'	18.0 in	HDPE	50 ft	15.0%	3.0 in	13.4 fps	12 in	18 in	10 ft	15 ft
1+10	C.1	3194.0'	3190.5'	3178.0'	18.0 in	HDPE	60 ft	20.8%	1.7 in	10.6 fps	12 in	18 in	10 ft	15 ft
n/a	F.1	3105.0'	3101.0'	3096.0'	24.0 in	HDPE	50 ft	10.0%	6.5 in	18.6 fps	18 in	27 in	25 ft	31 ft

SWALE CHART								SWALE CALCULATIONS				
Swale Name	Swale Type	Up Invert	Down Invert	Side Slope - Z	btm width b(ft)	Length	Slope	Flow Depth	Velocity	Sheer Stress	Reinforcement	
D A.1	GRASS	3090.0'	3084.0'	3.0	0.0 ft	48 ft	12.5%	5.0 in	6.1 fps	3.28	NAG C350 (permanent)	
D A.2a	GRASS	3164.0'	3148.0'	3.0	0.0 ft	109 ft	14.7%	3.4 in	5.0 fps	2.56	NAG C350 (permanent)	
D A.2b	GRASS	3154.0'	3146.0'	3.0	0.0 ft	88 ft	9.1%	4.2 in	4.7 fps	1.99	NAG C700BN (temporary)	
D A.3	RIP-RAP	3182.0'	3166.0'	3.0	0.0 ft	104 ft	15.4%	5.8 in	5.5 fps	4.61	15in d50 Rip Rap	
D A.4	GRASS	3204.0'	3196.0'	3.0	0.0 ft	86 ft	9.3%	5.5 in	5.5 fps	2.67	NAG C350 (permanent)	
D A.5	RIP-RAP	3234.0'	3222.0'	3.0	0.0 ft	73 ft	16.4%	4.9 in	5.1 fps	4.21	15in d50 Rip Rap	
D C.1	GRASS	3202.0'	3194.0'	3.0	0.0 ft	78 ft	10.3%	3.1 in	4.2 fps	1.66	NAG C700BN (temporary)	

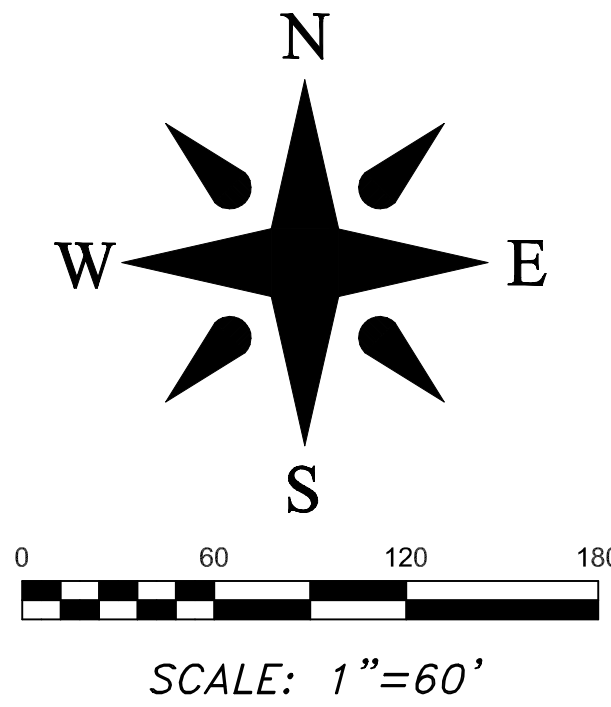
Date	5/7/19
REVISIONS/SUBMISSIONS	TRC SUBMITTAL
No.	1
Design	TCM
Drawn	EJH
Checked	TMM
Scale	AS NOTED
Review	MCB
Date	5/7/19
Planning • Engineering • Surveying • Environmental Services •	
Project No:	486519
Drawing Title:	C-5.1
LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN HENDERSON COUNTY NORTH CAROLINA	
GRADING, EROSION AND STORMWATER PLAN	
PERMIT SET	
17 Arlington Street Asheville, N.C. 28801 Phone: 1-828-232-4700 Fax: 1-828-232-1331 www.brooksea.com	

File Location: L:\2019 Projects\486519 TFM\_Hudson Mountain\Eng\486519-CIVIL-BASE.dwg



**GRADING AND STORMWATER LEGEND**

---	EXIST. BOUNDARY
---	EXIST. STREAM
---	EXIST. STREAM BUFFER
---	EXIST. ADJUNCTION
---	EXIST. RIGHT OF WAY
---	EXIST. EDGE OF GRAVEL DRIVE
E-OU	EXIST. OVERHEAD UTILITIES
E-U	EXIST. UNDERGRND UTILITIES
---	EXIST. STORM DRAIN
---	PROP. PAVED ROAD
---	PROP. STORM PIPE
---	PROP. LOT LINE
---	PROP. R.O.W.
---	NEW OUTLET PROTECTION
---	LIMITS OF DISTURBANCE
---	TEMPORARY INLET PROTECTION
---	PROPOSED EC SLOPE MATTING



**STORM AND EROSION NOTES**

PROPERTY SIZE: 203.27 ACRES  
 PROPERTY STEEPER THAN 60%: 22.25 AC (10.9%)  
 PROJECT DENSITY: 0.17 UNITS / ACRE  
 IMPERVIOUS SUMMARY:  
 ROADS: 3.20 ACRES  
 HOUSES & DRIVES: 17,000 / LOT; 5.46 ACRES  
 TOTAL: 8.66 ACRES (4.3%)

**EROSION CONTROL NOTES:**  
 1. SEE SHEET C-5.1 FOR STABILIZATION TIME FRAMES.  
 2. EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE AND AN AMENDED PLAN BE SUBMITTED AND APPROVED SHOWING MODIFIED EROSION CONTROL DEVICES.

**STORMWATER NOTES:**  
 1. ALL STREAMS SHALL HAVE A 30' SETBACK FOR NEW BUILT-UPON AREAS.  
 2. ALL PIPE SHALL BE DOUBLE-WALL HDPE WITH PROPER STONE BEDDING AND SHALL HAVE A MINIMUM COVER OF 30".  
 3. ALL FILL SLOPES SHALL BE COMPACTED FULL DEPTH TO NOT LESS THAN 95 PERCENT MAXIMUM DENSITY (STANDARD PROCTOR), SHALL BE PLACED ON A SURFACE CLEAR OF GROWTH AND DEBRIS AND BE PROPERLY BENCHED AND DRAINED.  
 4. ALL SLOPES GREATER THAN 3:1 AND TALLER THAN 10 FEET SHALL BE SEEDED AND COVERED WITH MATTING AS SHOWN IN THE PLANS.  
 5. AN APPROVED GRADING PERMIT IS REQUIRED FOR ANY BORROW OR WASTE SITE PRIOR TO INITIATION OF ANY LAND DISTURBING ACTIVITY.

\*ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF DETAILS, SPECIFICATIONS, AND OTHER DEVELOPMENT ORDINANCES OF HENDERSON CO.

**DEVELOPMENT DATA**

PROPERTY ADDRESS: CLARK GAP DR  
 PIN NUMBER: 9672012875  
 PROPERTY SIZE: 203.27 ACRES  
 ZONING REVIEW: HENDERSON COUNTY  
 EROSION CONTROL REVIEW: HENDERSON COUNTY  
 STORMWATER REVIEW: HENDERSON COUNTY  
 ZONING CLASSIFICATION: R-3  
 PROPOSED NUMBER OF UNITS: 34  
 PROPOSED DENSITY: 0.17 units / acre  
 PROPOSED LINEAR FEET OF ROAD: 5,809'  
 PORTIONS OF LOTS 7, 8, 14, 15, & 16 ARE WITHIN 1/2 MILE OF A FARMLAND PRESERVATION DISTRICT. WATER AND SEWER WILL BE PROVIDED BY INDIVIDUAL WELLS AND SEPTIC SYSTEMS.  
 PUBLIC WATER AND SEWER SYSTEMS ARE APPROXIMATELY 1.5 MILES FROM THE SITE.

PROPERTY OWNER: MOUNTAIN ASSET PLANNING, LP  
 CONTACT: RICHARD ANDERSON  
 ADDRESS: 27 GLEN COVE DR  
 ADDRESS 2: ARDEN, NC 28704  
 DEVELOPER: TERRA FIRMA MANAGEMENT, INC.  
 CONTACT: ANDY BAKER  
 ADDRESS: 120 HIGH HICKORY TRAIL  
 ADDRESS 2: SWANNANOVA, NC 28778  
 EMAIL: ANDY@TFM-CAROLINA.COM  
 PHONE: 616-402-0367  
 ENGINEER: BROOKS ENGINEERING  
 CONTACT: JOHN KINNAIRD  
 ADDRESS: 17 ARLINGTON ST  
 ADDRESS 2: ASHEVILLE, NC 28801  
 EMAIL: JKINNAIRD@BROOKSEA.COM  
 PHONE: 928-232-4700

SWALE CHART								SWALE CALCULATIONS			
Swale Name	Swale Type	Up Invert	Down Invert	Side Slope - Z	btm width	Length	Slope	Flow Depth	Velocity	Shear Stress	Reinforcement
D A.7	GRASS	3290.0'	3278.0'	3:0	0.0 ft	142 ft	8.5%	5.9 in	5.7 fps	2.58	NAG C350 (permanent)
D D.1	GRASS	3320.0'	3308.0'	3:0	0.0 ft	134 ft	9.0%	3.6 in	4.1 fps	1.68	NAG C700BN (temporary)
D D.2	GRASS	3290.0'	3274.0'	3:0	0.0 ft	110 ft	14.5%	4.0 in	5.8 fps	3.00	NAG C350 (permanent)

PIPE CHART								PIPE CALCULATIONS						
Road Station	Pipe Name	Road Elevation	Up Invert	Down Invert	Pipe Size	Pipe Material	Length	Slope	Flow Depth	Velocity	d50 Stone Size	Apron Thickness	Pad Length	Pad Width
15+80	A.7	3278.0'	3274.5'	3268.0'	18.0 in	HDPE	50 ft	13.0%	3.8 in	14.9 fps	12 in	18 in	10 ft	15 ft
4+60	D.1	3308.0'	3304.5'	3302.0'	18.0 in	HDPE	65 ft	3.8%	3.8 in	8.1 fps	6 in	9 in	10 ft	15 ft



REAGAN YOUNGBLOOD  
 DB: 1415, PG. 361  
 PIN: 9672-22-0353

REAGAN, SAMANTHA,  
 & BRITNEY YOUNGBLOOD  
 DB: 1267, PG. 604  
 PIN: 9672-21-2880

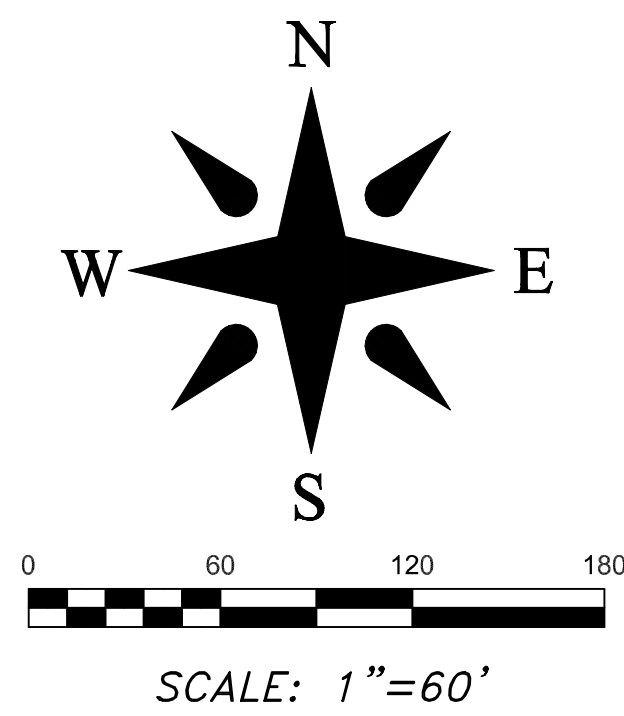
Project No: 486519	Drawing Title: C-5.3	LUNA RIDGE SUBDIVISION DEVELOPMENT PLAN HENDERSON COUNTY	 BROOKS ENGINEERING ASSOCIATES NORTH CAROLINA Planning • Engineering • Surveying • Environmental Services •	Reviewer: MCB Scale: AS NOTED Designer: TMM Drawn: E.J.H. Checked: TMM	Date: 5/7/19 REVISIONS/SUBMISSIONS No. 1 TRC SUBMITTAL
				17 Arlington Street Asheville, N.C. 28801 Phone: 1-828-232-4700 Fax: 1-828-232-1331 www.brooksea.com	PERMIT SET  NORTH CAROLINA ENGINEER License No. 3125

File Location: L:\2019 Projects\486519\_TPM\_Hatch Mountain\DWG\486519-CIVIL-BASE.dwg



**GRADING AND STORMWATER LEGEND**

- EXIST. BOUNDARY
- EXIST. STREAM
- EXIST. STREAM BUFFER
- EXIST. ADJONES
- EXIST. RIGHT OF WAY
- EXIST. EDGE OF GRAVEL DRIVE
- E-OU EXIST. OVERHEAD UTILITIES
- E-U EXIST. POWER POLE
- E-U EXIST. UNDERGRND UTILITIES
- EXIST. STORM DRAIN
- PROP. PAVED ROAD
- ST PROP. STORM PIPE
- PROP. LOT LINE
- PROP. R.O.W.
- NEW OUTLET PROTECTION
- LIMITS OF DISTURBANCE
- TEMPORARY INLET PROTECTION
- PROPOSED EC SLOPE MATTING



**STORM AND EROSION NOTES**

- PROPERTY SIZE: 203.27 ACRES  
 PROPERTY STEEPER THAN 60%: 22.25 AC (10.9%)  
 PROJECT DENSITY: 0.17 UNITS/ACRE
- IMPERVIOUS SUMMARY:  
 ROADS: 3.20 ACRES  
 HOUSES & DRIVES (7,000 / LOT): 5.46 ACRES  
 TOTAL: 8.66 ACRES (4.3%)
- EROSION CONTROL NOTES:  
 1. SEE SHEET C-5.1 FOR STABILIZATION TIME FRAMES.  
 2. EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE AND AN AMENDED PLAN BE SUBMITTED AND APPROVED SHOWING MODIFIED EROSION CONTROL DEVICES.
- STORMWATER NOTES:  
 1. ALL STREAMS SHALL HAVE A 30' SETBACK FOR NEW BUILT-UPON AREAS.  
 2. ALL PIPE SHALL BE DOUBLE-WALL HDPE WITH PROPER STONE BEDDING AND SHALL HAVE A MINIMUM COVER OF 30".  
 3. ALL FILL SLOPES SHALL BE COMPACTED FULL DEPTH TO NOT LESS THAN 95 PERCENT MAXIMUM DENSITY (STANDARD PROCTOR), SHALL BE PLACED ON A SURFACE CLEAR OF GROWTH AND DEBRIS AND BE PROPERLY BENCHED AND DRAINED.  
 4. ALL SLOPES GREATER THAN 3:1 AND TALLER THAN 10 FEET SHALL BE SEEDED AND COVERED WITH MATTING AS SHOWN IN THE PLANS.  
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- \*ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF DETAILS, SPECIFICATIONS, AND OTHER DEVELOPMENT ORDINANCES OF HENDERSON CO.

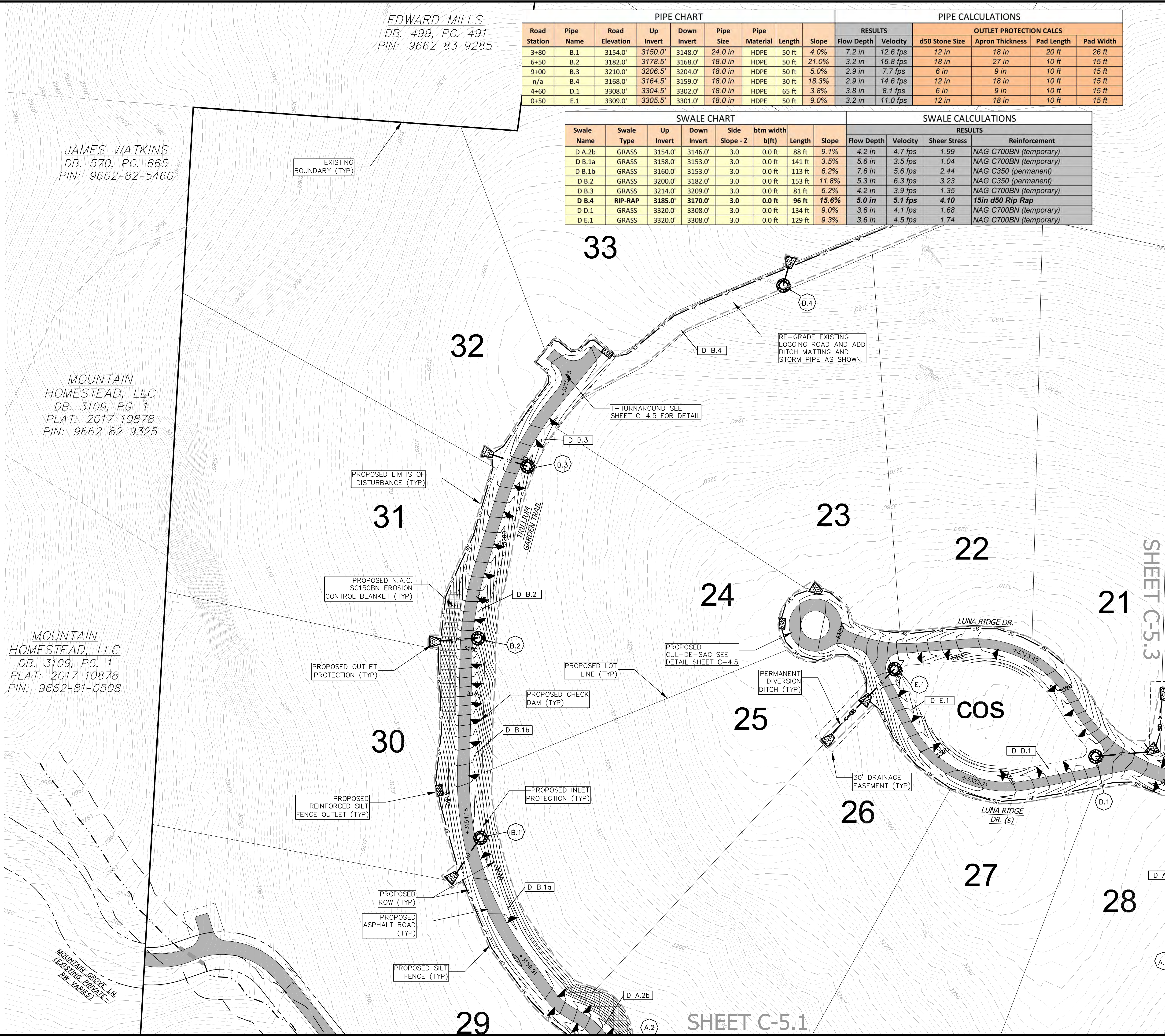
**DEVELOPMENT DATA**

PROPERTY ADDRESS: CLARK GAP DR  
 PIN NUMBER: 9672012875  
 PROPERTY SIZE: 203.27 ACRES  
 ZONING REVIEW: HENDERSON COUNTY  
 EROSION CONTROL REVIEW: HENDERSON COUNTY  
 STORMWATER REVIEW: HENDERSON COUNTY  
 ZONING CLASSIFICATION: B-3  
 PROPOSED NUMBER OF UNITS: 34  
 PROPOSED DENSITY: 0.17 units/acre  
 PROPOSED LINEAR FEET OF ROAD: 5,809'  
 PORTIONS OF LOTS 7, 8, 14, 15, & 16 ARE WITHIN 1/2 MILE OF A FARMLAND PRESERVATION DISTRICT. WATER AND SEWER WILL BE PROVIDED BY INDIVIDUAL WELLS AND SEPTIC SYSTEMS.  
 PUBLIC WATER AND SEWER SYSTEMS ARE APPROXIMATELY 1.5 MILES FROM THE SITE.

PROPERTY OWNER: MOUNTAIN ASSET PLANNING, LP  
 CONTACT: RICHARD ANDERSON  
 ADDRESS: 27 GLEN COVE DR  
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DEVELOPER: TERRA FIRMA MANAGEMENT, INC.  
 CONTACT: ANDY BAKER  
 ADDRESS: 120 HIGH HICKORY TRAIL  
 ADDRESS 2: SWAINANOVA, NC 28778  
 EMAIL: ANDY@TFM-CAROLINA.COM  
 PHONE: 616-402-0367

ENGINEER: BROOKS ENGINEERING  
 CONTACT: JOHN KINNAIRD  
 ADDRESS: 17 ARLINGTON ST  
 ADDRESS 2: ASHEVILLE, NC 28801  
 EMAIL: JKINNAIRD@BROOKSEA.COM  
 PHONE: 828-232-4700



EDWARD MILLS  
 DB. 499, PG. 491  
 PIN: 9662-83-9285

JAMES WATKINS  
 DB. 570, PG. 665  
 PIN: 9662-82-5460

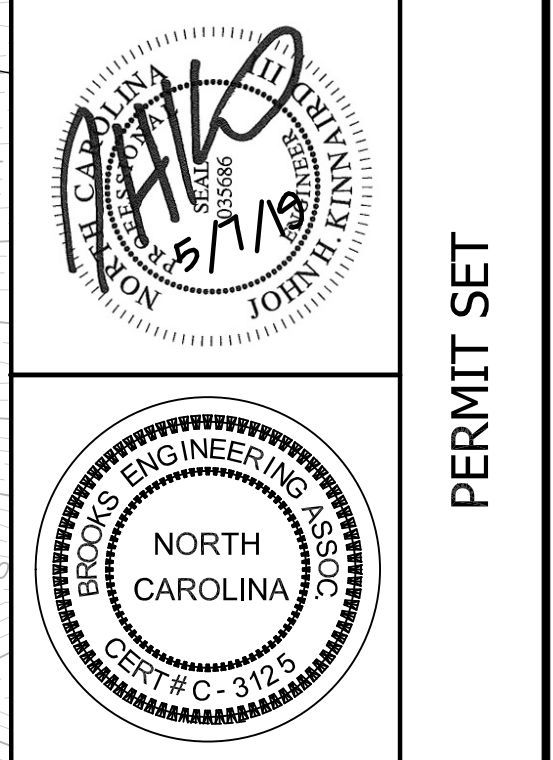
MOUNTAIN HOMESTEAD, LLC  
 DB. 3109, PG. 1  
 PLAT: 2017 10878  
 PIN: 9662-82-9325

MOUNTAIN HOMESTEAD, LLC  
 DB. 3109, PG. 1  
 PLAT: 2017 10878  
 PIN: 9662-81-0508

PIPE CHART										PIPE CALCULATIONS					
Road Station	Pipe Name	Road Elevation	Up Invert	Down Invert	Pipe Size	Pipe Material	Length	Slope	Flow Depth	Velocity	d50 Stone Size	Apron Thickness	Pad Length	Pad Width	
3+80	B.1	3154.0'	3150.0'	3148.0'	24.0 in	HDPE	50 ft	4.0%	7.2 in	12.6 fps	12 in	18 in	20 ft	26 ft	
6+50	B.2	3182.0'	3178.5'	3168.0'	18.0 in	HDPE	50 ft	21.0%	3.2 in	16.8 fps	18 in	27 in	10 ft	15 ft	
9+00	B.3	3210.0'	3206.5'	3204.0'	18.0 in	HDPE	50 ft	5.0%	2.9 in	7.7 fps	6 in	9 in	10 ft	15 ft	
n/a	B.4	3168.0'	3164.5'	3159.0'	18.0 in	HDPE	30 ft	18.3%	2.9 in	14.6 fps	12 in	18 in	10 ft	15 ft	
4+60	D.1	3308.0'	3304.5'	3302.0'	18.0 in	HDPE	65 ft	3.8%	3.8 in	8.1 fps	6 in	9 in	10 ft	15 ft	
0+50	E.1	3309.0'	3305.5'	3301.0'	18.0 in	HDPE	50 ft	9.0%	3.2 in	11.0 fps	12 in	18 in	10 ft	15 ft	

SWALE CHART										SWALE CALCULATIONS			
Swale Name	Swale Type	Up Invert	Down Invert	Slope - Z	Side b(ft)	Length	Slope	Flow Depth	Velocity	Shear Stress	Reinforcement		
D A.2b	GRASS	3154.0'	3146.0'	3.0	0.0 ft	88 ft	9.1%	4.2 in	4.7 fps	1.99	NAG C700BN (temporary)		
D B.1a	GRASS	3158.0'	3153.0'	3.0	0.0 ft	141 ft	3.5%	5.6 in	3.5 fps	1.04	NAG C700BN (temporary)		
D B.1b	GRASS	3160.0'	3153.0'	3.0	0.0 ft	113 ft	6.2%	7.6 in	5.6 fps	2.44	NAG C350 (permanent)		
D B.2	GRASS	3200.0'	3182.0'	3.0	0.0 ft	153 ft	11.8%	5.3 in	6.3 fps	3.23	NAG C350 (permanent)		
D B.3	GRASS	3214.0'	3209.0'	3.0	0.0 ft	81 ft	6.2%	4.2 in	3.9 fps	1.35	NAG C700BN (temporary)		
D B.4	RIP-RAP	3185.0'	3170.0'	3.0	0.0 ft	96 ft	15.6%	5.0 in	5.1 fps	4.10	15in d50 Rip Rap		
D D.1	GRASS	3320.0'	3308.0'	3.0	0.0 ft	134 ft	9.0%	3.6 in	4.1 fps	1.68	NAG C700BN (temporary)		
D E.1	GRASS	3320.0'	3308.0'	3.0	0.0 ft	129 ft	9.3%	3.6 in	4.5 fps	1.74	NAG C700BN (temporary)		

Date	5/7/19
REVISIONS/SUBMISSIONS	TRC SUBMITTAL
No.	1



Designated: TMM  
 Drawn: E.J.H.  
 Checked: TMM

Reviewed: MCB  
 Scale: AS NOTED  
 Date: 5/7/19

17 Arlington Street  
 Asheville, N.C. 28801  
 Phone: 1-828-232-4700  
 Fax: 1-828-232-1331  
 www.brooksea.com

**BROOKS ENGINEERING ASSOCIATES**  
 Planning • Engineering • Surveying  
 • Environmental Services •

Project No: 486519  
 Drawing Title: C-5.4  
 LUNA RIDGE SUBDIVISION  
 DEVELOPMENT PLAN  
 HENDERSON COUNTY  
 NORTH CAROLINA  
 GRADING, EROSION AND STORMWATER PLAN

SHEET C-5.1

SHEET C-5.3

**General Notes**  
All seeding to be in accordance with NCDEQ STD #6.11  
The kinds of seed and fertilizer, and the rates of application of seed, fertilizer and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

All Roadway Areas		
March 1-August 31		September 1-February 28
50 lbs Tall Fescue		50 lbs Tall Fescue
10 lbs Centipede		10 lbs Centipede
25 lbs Bermudagrass (hulled)		35 lbs Bermudagrass (hulled)
500 lbs Fertilizer		500 lbs Fertilizer
4000 lbs Limestone		4000 lbs Limestone

Waste and Borrow Locations		
March 1-August 31		September 1-February 28
75 lbs Tall Fescue		75 lbs Tall Fescue
25 lbs Bermudagrass (hulled)		35 lbs Bermudagrass (hulled)
500 lbs Fertilizer		500 lbs Fertilizer
4000 lbs Limestone		4000 lbs Limestone

On cut and fill slopes 2:1 or steeper, Centipede shall be applied at the rate of 5 lbs/acre and add 20 lbs of Sericea Lespedeza from January 1-December 31

**Fertilizer Topdressing**  
Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 grade and shall be applied at the rate of 500 lbs/acre. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis and as directed.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 500 lbs/acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

**Soil Prep**  
Preparation for primary/permanent stabilization shall not begin until construction and utility work within the preparation area is complete. However, it may be necessary to prepare for nurse crops prior to completion of construction and installation of utilities.

All areas to be seeded or planted shall be tilled a depth of 12". Ripping consists of creating fissures in a criss-cross pattern over the entire surface area, utilizing an implement that will not glaze the side walls of the fissures. Site preparation that does not comply with these documents shall not be acceptable. The depth of soil preparation may be established as a range based on the approval of the reviewing state or local agency. Once tilled or ripped according to the approved plan, all areas are to be returned to the approved final grade. pH modifiers and/or other soil amendments can be added during the soil preparation procedure or as described below.

Till or disc the prepared areas to be seeded to a minimum depth of four (4) inches. Remove stones larger than three (3) inches on any side, sticks roots and other extraneous materials that surface. If not incorporated during the soil preparation process, add pH modifier and fertilizers. Spread up to 6" of excess topsoil over the entire area if available. Re-compact the area utilizing a cultipacker roller. The finished grade shall be a smooth even soil surface with a loose, uniformly fine texture. All ridges and depressions shall be removed and filled to provide the approved surface drainage. Seeding of graded areas is to be done immediately after finished grades are obtained and seedbed preparation is completed.

**Planting**  
Prepare the seed bed as described in above in soil preparation. Apply seed at rates specified on the plans, and/or as recommended above, with a cyclone seeder, press type spreader, drill, or hydroseeder on and/or into the prepared bed. Incorporate the seed into the seed bed as specified. Provide finished grades as specified on the approved plan and carefully culti-pack the seedbed as terrain allows. Mulch immediately.

**A PERMANENT SEEDING** SCALE= NTS

**TEMPORARY SEEDING**

**General Notes**  
All seeding to be in accordance with NCDEQ STD #6.10

Species	Rate (lb/acre)	Season	Seeding Dates
Rye (grain)	120	Winter/Spring/Fall	1/1-5/1,8/15-12/30
Annual lespedeza (Kobe)	50	Winter/Spring	1/1-5/1
German Millet	40	Summer	5/1-8/15

Omit annual lespedeza when duration of temporary cover is not to extend beyond June. A small-stemmed Sudangrass may be substituted for German millet at a rate of 50 lb/acre.

**Soil Amendments**  
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.

For fall seeding, use 1000 lb/acre 10-10-10 fertilizer  
**Mulch**  
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool.  
**Maintenance**  
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

For fall, repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extent temporary cover beyond June 15, overseed with 50 lb/ acre Kobe lespedeza in late February or early March

**WETLAND SEEDING**

**General Notes**  
Recommended application rate: 20-25 lbs/acre

Species	Common Name	Percent
Bidens aristosa	Showy tic	7
Carex vulpinoidea	Fox sedge	12
Dichanthelium clandestinum	Deer tong	8
Elymus riparius	Riverbank	20
Juncus effusus, NC Ecotype	Soft rush	4
Panicum dichotomiflorum	Smooth pa	14
Panicum rigidulum	Redtop pa	8
Panicum virgatum	Switchgra	23
Polygonum pensylvanicum	Pennsylv	2
Sparganium americanum	Eastern b	2
	TOTAL	100

**B TEMPORARY & WETLAND SEEDING** SCALE= NTS

**INLET PROTECTION**

Inspect inlets at least weekly and after each significant (1/2 inch or greater) rainfall event. Clear the mesh wire of any debris or other objects to provide adequate flow for subsequent rains. Take care not to damage or undercut the wire mesh during sediment removal. Replace stones as needed

**TEMPORARY CONSTRUCTION ENTRANCE**

Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2-inch 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.

**SILT FENCE**  
Inspect sediment fences at least 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 to 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.

**OUTLET PROTECTION**

Inspect riprap outlet structures weekly and after significant (1/2 inch or greater) rainfall events to see if any erosion around or below the riprap has taken place, or if stones have been dislodged. Immediately make all needed repairs to prevent further damage.

**CHECK DAM**

Inspect check dams and channels at least weekly and after each significant (1/2 inch or greater) rainfall event and repair immediately. Clean out sediment, straw, limbs, or other debris that could clog the channel when needed.

Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam. Correct all damage immediately. If significant erosion occurs between dams, additional measures can be taken such as, installing a protective riprap liner in that portion of the channel (Practice 6.31, Riprap-line and Paved Channels).

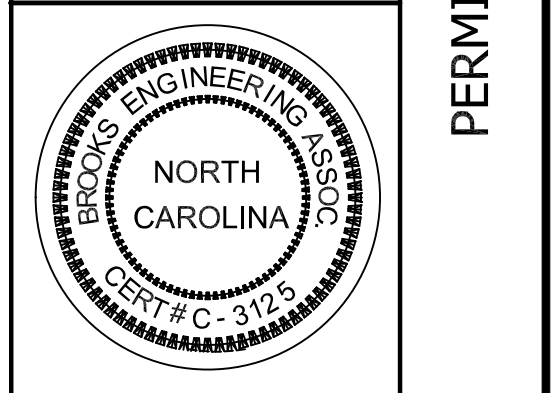
Remove sediment accumulated behind the dams as needed to prevent damage to channel vegetation, allow the channel to drain through the stone check dam, and prevent large flows from carrying sediment over the dam. Add stones to dams as needed- to maintain design height and cross section.

**DITCH**

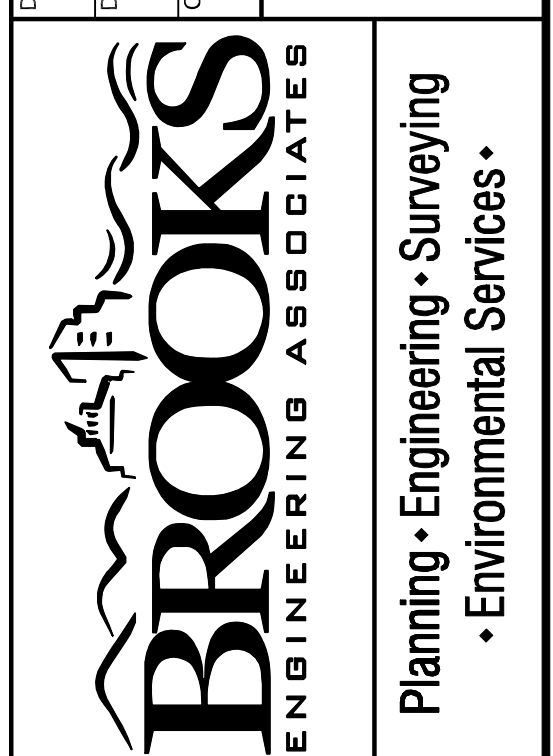
Inspect temporary diversions once a week and after every rainfall. Immediately remove sediment from the flow area and repair the diversion ridge. Carefully check outlets and make timely repairs as needed. When the area protected is permanently stabilized, remove the ridge and the channel to blend with the natural ground level and appropriately stabilize it.

**SKIMMER BASIN**

Date	5/7/19
REVISIONS/SUBMISSIONS	TRC SUBMITTAL
No.	1



Review: MCB  
Scale: AS NOTED  
Date: 5/7/19  
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Asheville, N.C. 28801  
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LUNA RIDGE SUBDIVISION  
DEVELOPMENT PLAN  
NORTH CAROLINA  
ENDERSON COUNTY

Project No: 486519  
Drawing Title: EROSION CONTROL DETAILS  
C-5.5

PERMIT SET

**CONSTRUCTION SEQUENCE**

- Obtain a Land Disturbing Permit from HENDERSON COUNTY
- Have a licensed survey delineate the limits of disturbance.
- Install tree protection fencing as shown on the plans.
- Call the engineer at 828-232-4700 to schedule pre-construction meeting at least 48 hours prior to project activation.
- Install rain gauge on site.
- Install Construction Entrance / Exits.
- Install all perimeter devices such as silt fence.
- The two previous activities are the first land disturbing activities. Stabilize disturbed areas immediately with stone or temporary seeding.
- Install all temporary sediment traps and basins.
- Have the site inspected by the engineer prior to proceeding.
- Install runoff conveyance systems including: stabilized streambanks, channels, and temporary diversions.
- Begin clearing and grubbing of the site. Clear borrow and stockpile areas only as needed. Mark trees to delineate buffer zones.
- Begin mass grading the site. Install temporary slope drains as shown on the plans.
- During mass grading, begin to install permanent runoff conveyance systems such as storm drainage, inlets, ditches, and permanent diversions.
- Install storm drainage system and inlet and outlet protection devices simultaneously.
- Stabilize site as areas are brought to finished grade or work is delayed. Provide permanent or temporary vegetation in accordance with the schedule provided on the plans.
- Construct buildings (if applicable) and install utilities and paving. Additional Erosion Control measures may be necessary for these activities.
- Provide permanent vegetation for the remainder of the site upon completion of construction activities.
- Once a good stand of vegetation is established, remove and stabilize sediment traps and bring site to final grading and storm conveyance conditions.
- Remove all temporary measures upon site stabilization and call for final inspection.

**SITE STABILIZATION TIMEFRAMES**

The contractor shall stabilize all areas that have been brought to final grade, or where construction has stopped or been delayed for any reason. Adhere the schedule below.

SITE AREA DESCRIPTION	STABILIZATION TIME FRAME	STABILIZATION TIME FRAME EXCEPTIONS
Perimeter dikes, swales, ditched and slope	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)

**D CONSTRUCTION SEQUENCE & SIGHT STABILIZATION** SCALE= NTS

**Major Elements of DWQ Construction General Permit**

August 4, 2011

This document contains the major elements of the recently-revised North Carolina Division of Water Quality (DWQ) Construction General Permit (NCG01) with emphasis placed on those elements that differ from the previous permit (expiration on August 2, 2011). Since the summary list below cannot contain details of every change, the complete Permit should be used to assure full implementation. See: <http://portal.ncdenr.org/web/wq/ws/su/construction>

1) Ground Stabilization*	2) Building Wastes Handling																		
<table border="1"> <thead> <tr> <th>Site Area Description</th> <th>Stabilization Time Frame</th> <th>Stabilization Time Frame Exceptions</th> </tr> </thead> <tbody> <tr> <td>Perimeter dikes, swales, ditches and slopes</td> <td>7 days</td> <td>None</td> </tr> <tr> <td>High Quality Water (HQW) Zones</td> <td>7 days</td> <td>None</td> </tr> <tr> <td>Slopes steeper than 3:1</td> <td>7 days</td> <td>If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed.</td> </tr> <tr> <td>Slopes 3:1 or flatter</td> <td>14 days</td> <td>7-days for slopes greater than 50 feet in length</td> </tr> <tr> <td>All other areas with slopes flatter than 4:1</td> <td>14 days</td> <td>None (except for perimeters and HQW Zones)</td> </tr> </tbody> </table>	Site Area Description	Stabilization Time Frame	Stabilization Time Frame Exceptions	Perimeter dikes, swales, ditches and 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 feet in length	All other areas with slopes flatter than 4:1	14 days	None (except for perimeters and HQW Zones)	<ul style="list-style-type: none"> <li>No paint or liquid wastes in stream or storm drains</li> <li>Dedicated areas for demolition, construction and other wastes must be located 50' from storm drains and streams unless no reasonable alternatives available.</li> <li>Earthen-material stockpiles must be located 50' from storm drains and streams unless no reasonable alternatives available.</li> <li>Concrete materials must be controlled to avoid contact with surface waters, wetlands, or buffers.</li> </ul>
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<p>* Extensions of time may be approved by the permitting authority based on weather or other site-specific conditions that make compliance impracticable." (Section II.B(2)(b))</p>	<p>The major change in the Permit from the previous one is the shorter times to apply ground stabilization such as mulch, wheat straw, or grasses. The NC laws and rules relating to the Sediment Act require, in most places, ground stabilization within 21 days. Based on the new EPA requirements and 9-months' work with a permit advisory group, CTAG, the Division and EPA-developed permit, now contains requirements for ground cover within 14, and in some places, 7 days.</p>																		
3) Discharges to Federally-listed Waters																			
<ul style="list-style-type: none"> <li>Requirements are the same as in previous permit.</li> <li>The permit allows reduction from the 20 acre minimum if the Director of DWQ determines that other BMPs provide equivalent protection.</li> </ul>																			

**E MAJOR ELEMENTS OF DWQ CONSTRUCTION PERMIT** SCALE= NTS

**Major Elements of DWQ Construction General Permit- Continued**

August 4, 2011

4) Inspections	5) Implementation of New Permit Conditions
<ul style="list-style-type: none"> <li>Same weekly inspection requirements</li> <li>Same rain gauge &amp; inspections after 0.5" rain event</li> <li>Inspections are only required during "normal business hours"</li> <li>Inspection reports must be available on-site during business hours unless a site-specific exemption is approved.</li> <li>Records must be kept for 3 years and available upon request.</li> <li>Electronically-available records may be substituted under certain conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Projects permitted under the previous permit can continue to follow the previously-permitted conditions.</li> <li>Complete applications received prior to August 3, 2011 can follow conditions of approved application.</li> <li>Applications received after August 2, 2011 must comply with new permit conditions.</li> </ul>
6) Conditions in Erosion & Sedimentation Control Plans*	
<ul style="list-style-type: none"> <li>Designation on the plans where the 7 and 14-day ground stabilization requirements of the NPDES permit apply</li> <li>Designation on the plans where basins that comply with the surface-withdrawal requirements of the NPDES permit are located.</li> </ul>	
7) Building Wastes Handling	
<ul style="list-style-type: none"> <li>No paint or liquid wastes in stream or storm drains</li> <li>Dedicated areas for demolition, construction and other wastes located 50' from storm drains and streams unless no reasonable alternatives are available.</li> <li>Earthen-material stockpiles located 50' from storm drains unless no reasonable alternatives available.</li> <li>Concrete materials must be controlled to avoid contact with surface waters, wetlands, or buffers.</li> </ul>	
8) Sediment Basins	
<ul style="list-style-type: none"> <li>Outlet structures must withdraw from basin surface unless drainage area is less than 1 acre.</li> <li>Use only DWQ-approved flocculants.</li> </ul>	

\* In order for the E&SC Plan to satisfy the conditions of the Construction General permit, it must identify areas where the ground stabilization requirements apply and the location of the basins where the surface-withdrawal requirements apply.

Document prepared by the Division of Water Quality

**C EROSION CONTROL MEASURES MAINTENANCE NOTES** SCALE= NTS



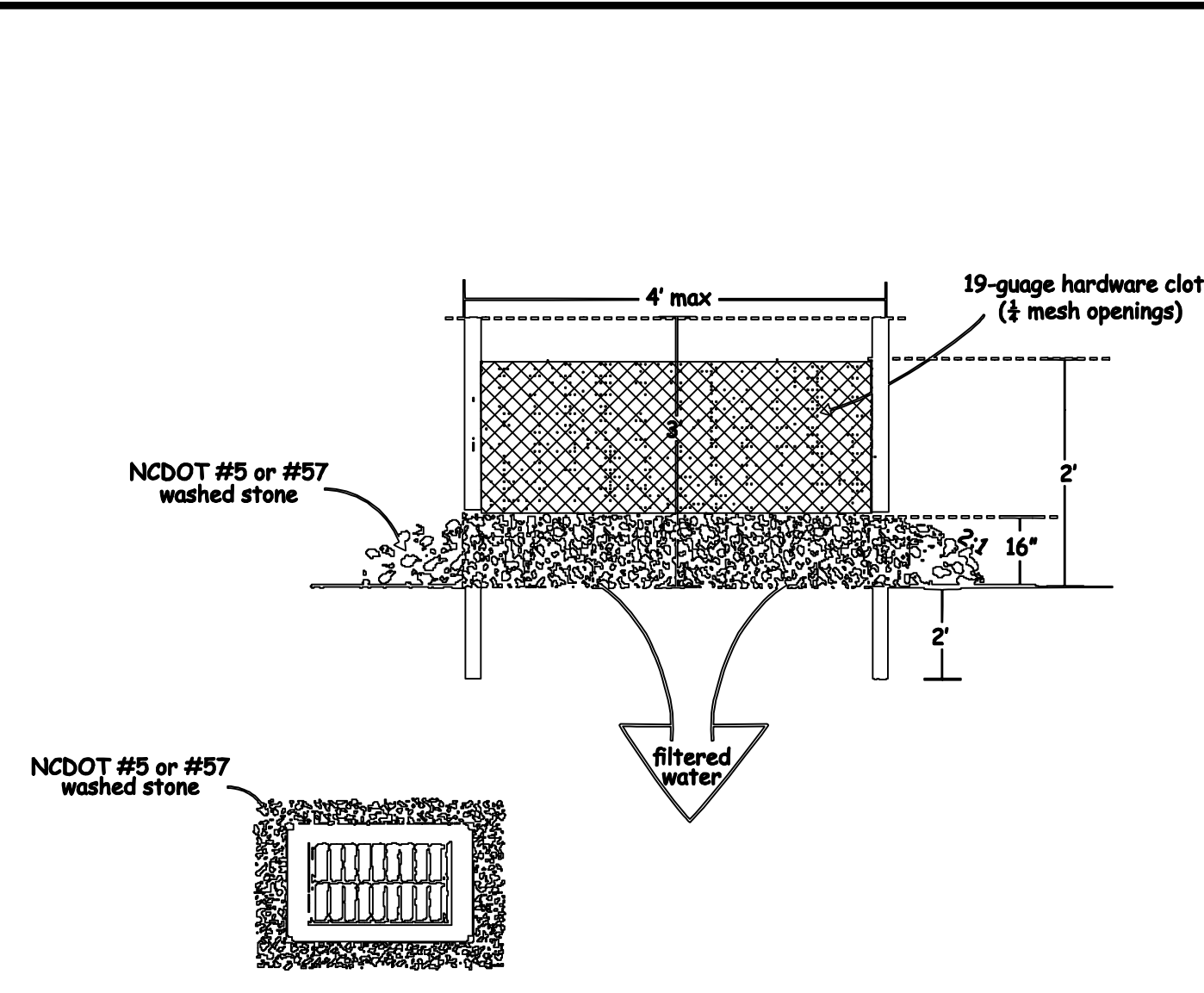


Figure 6.51a Hardware cloth and gravel inlet protection

**Design Criteria**

1. Uniformly grade a shallow depression approaching the inlet.
2. Drive 5-foot steel posts 2 feet into the ground surrounding the inlet. Space posts evenly around the perimeter of the inlet, a maximum of 4 feet apart.
3. Surround the post with wire mesh hardware cloth. Secure the wire mesh to the steel posts at the top, middle, and bottom. Placing a 2-foot flap of the wire mesh under the gravel for anchoring is recommended.
4. Place clean gravel (NC DOT #5 or #57 stone) on a 2:1 slope with a height of 16 inches around the wire, and smooth to an even grade.
5. Once the contributing drainage area has been stabilized, remove accumulated sediment, and establish final grading elevations.
6. Compact the area properly and stabilize it with groundcover.

**Maintenance**

Inspect at weekly and after each significant (1/2 inch or greater) rainfall event. Clear mesh wire of any debris or other objects to provide adequate flow for subsequent rains. Take care not to damage or undercut the wire mesh during sediment removal. Replace stone as needed.

**A INLET PROTECTION** SCALE= NTS

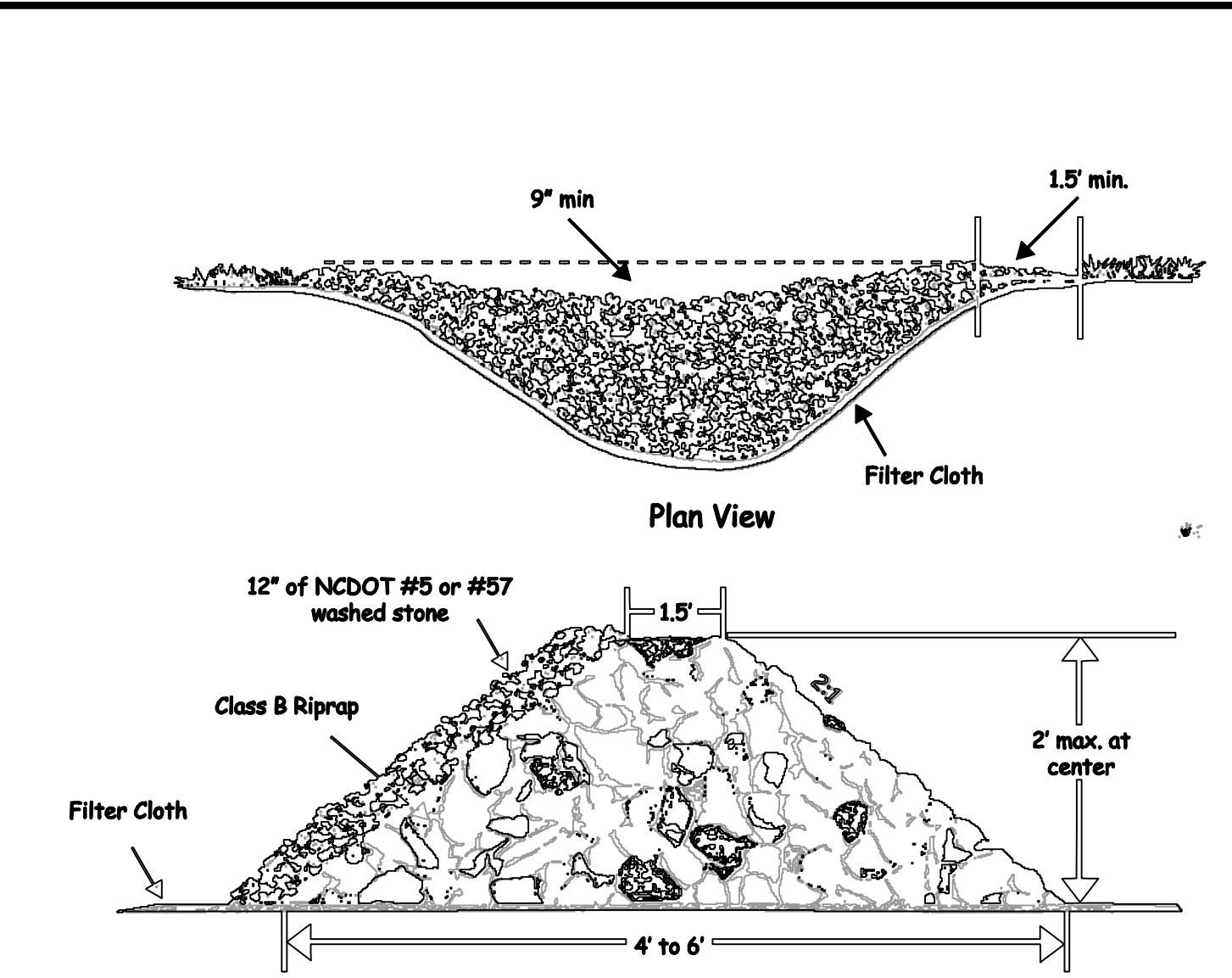


Figure 6.55a Rock pipe inlet protection

**Construction Specifications**

- The drainage area is limited to one-half acre.
- Keep a maximum height of 2 feet at the center of the dam.
- Keep the center of the check dam at least 9 inches lower than the outer edges at natural ground elevation.
- Keep the side slopes of the dam at 2:1 or flatter.
- Ensure that the maximum spacing between dams places the toe of the upstream dam at the same elevation as the top of the downstream dam (Figure 6.83a).
- Stabilize outflow areas along the channel to resist erosion.
- Use NC DOT Class B stone and line the upstream side of the dam with NC DOT #5 or #57 stone.
- Key the stone into the ditch banks and extend it beyond the abutments a minimum of 1.5 feet to avoid washouts from overflow around the dam.

**MAINTENANCE**

Inspect check dams and channels at least weekly and after each significant (1/2 inch or greater) rainfall event and repair immediately. Clean out sediment, straw, limbs, or other debris that could clog the channel when needed.

Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam. Correct all damage immediately. If significant erosion occurs between dams, additional measures can be taken such as, installing a protective riprap liner in that portion of the channel (Practice 6.31, Riprap-line and Paved Channels).

Remove sediment accumulated behind the dams as needed to prevent damage to channel vegetation, allow the channel to drain through the stone check dam, and prevent large flows from canying sediment over the dam. Add stones to dums as needed to maintain design height and cross section.

**B CHECK DAM** SCALE= NTS

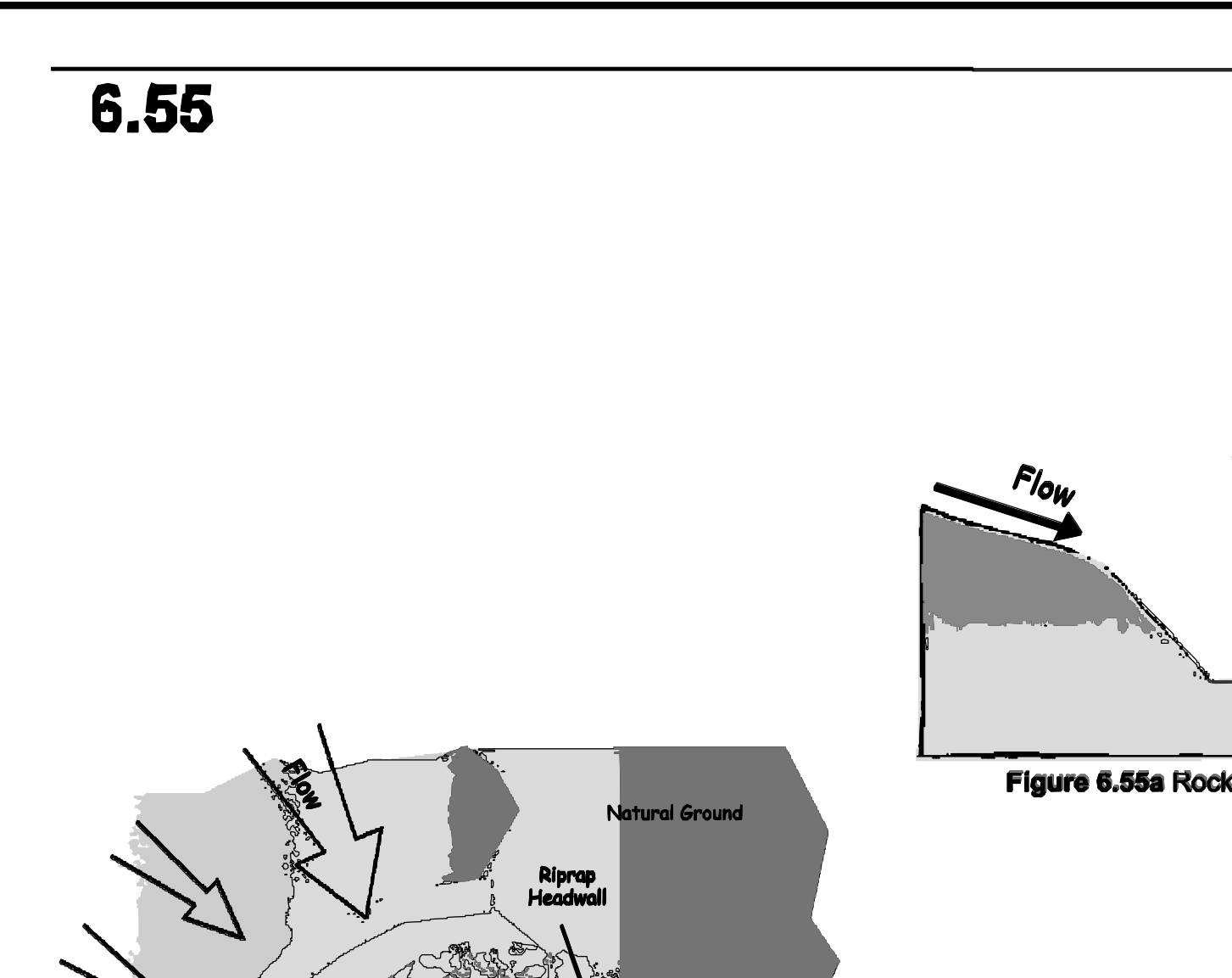


Figure 6.55b Rock pipe inlet protection

**Construction Specifications**

1. Clear the area of all debris that might hinder excavation and disposal of spoil.
2. Install the Class B or Class 1 riprap in a semi-circle 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 the shoulder of the embankment or diversions.
3. A 1 foot thick layer of NC DOT #5 or #57 stone should be placed on the outside slope of the 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 rock pipe inlet protection at least weekly and after each significant (1/2 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 the 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 (Surface Stabilization).

**C ROCK PIPE INLET PROTECTION** SCALE= NTS

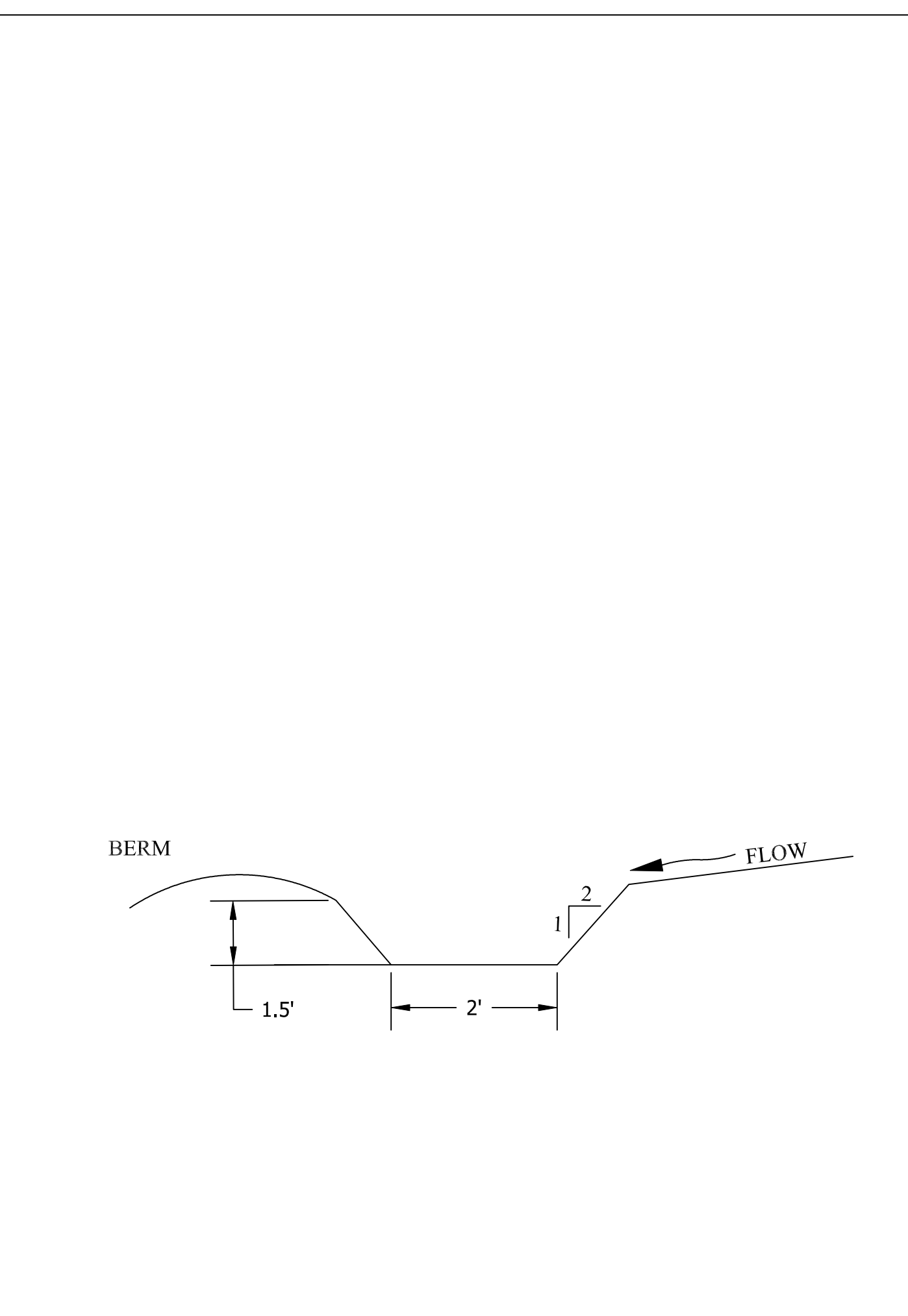


Figure 6.51b Permanent diversion swale

**D PERMANENT DIVERSION SWALE** SCALE= NTS

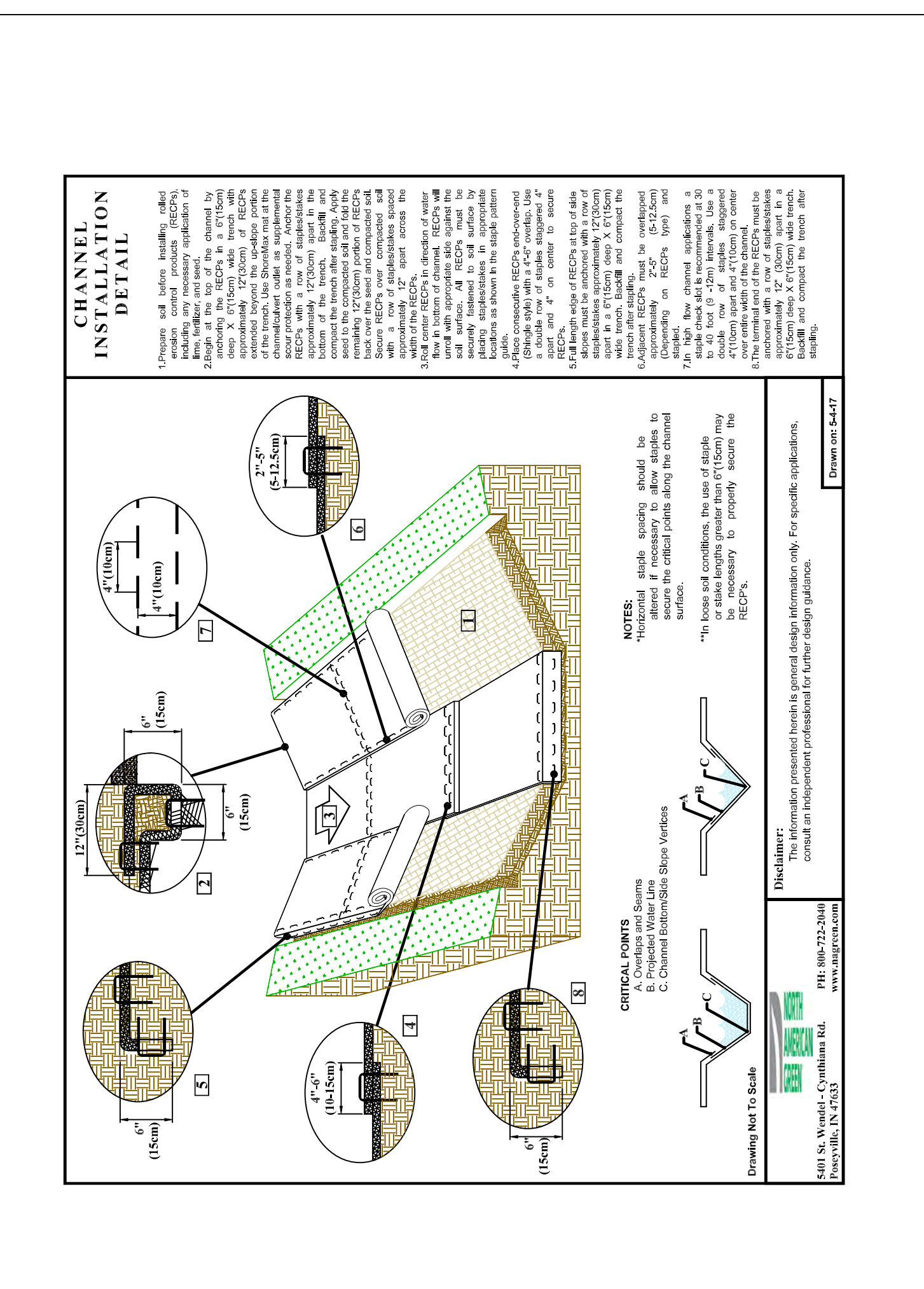


Figure 6.51c Swale matting

**E SWALE MATTING** SCALE= NTS

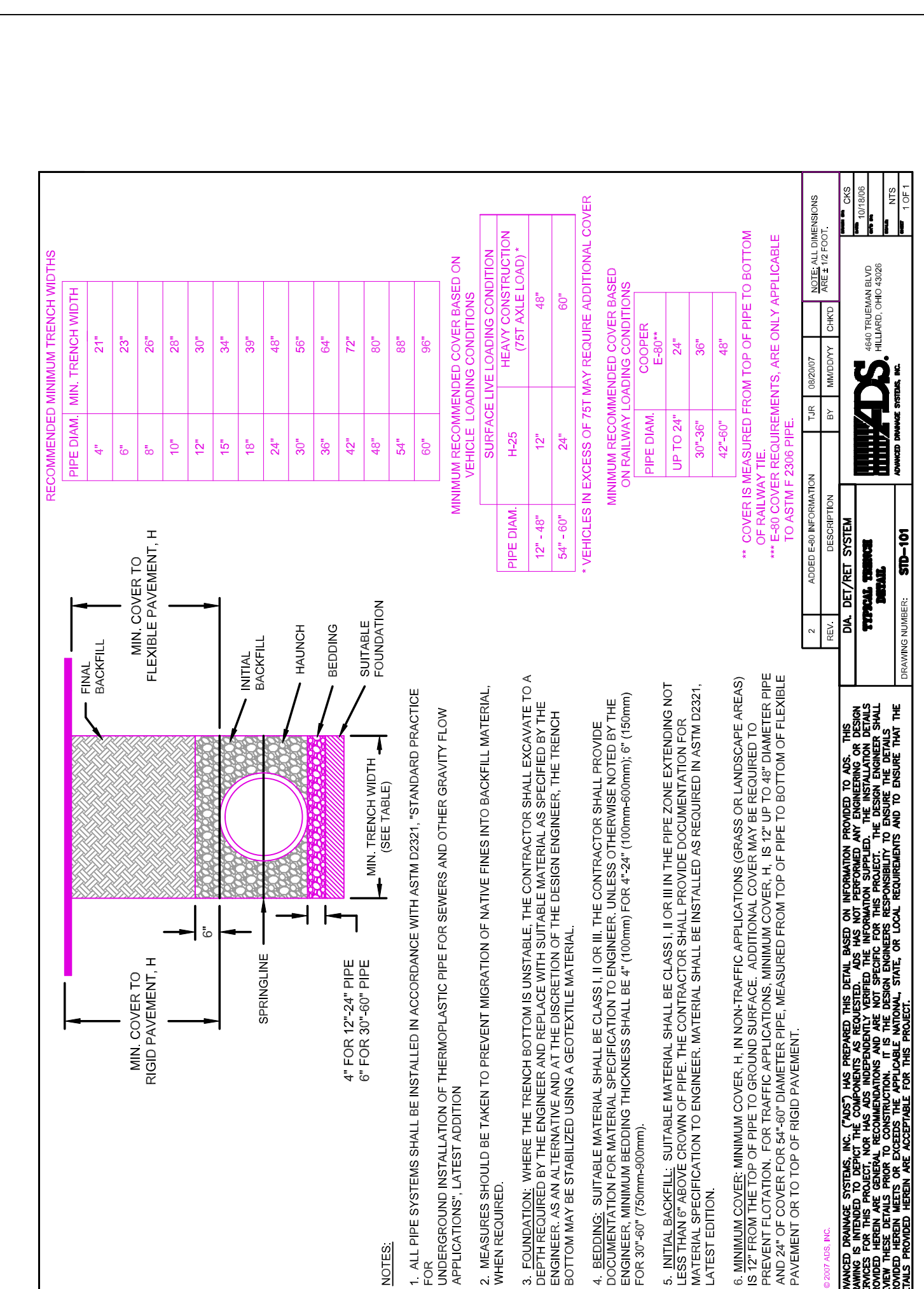


Figure 6.51d HDPE pipe bedding

**F HDPE PIPE BEDDING** SCALE= NTS

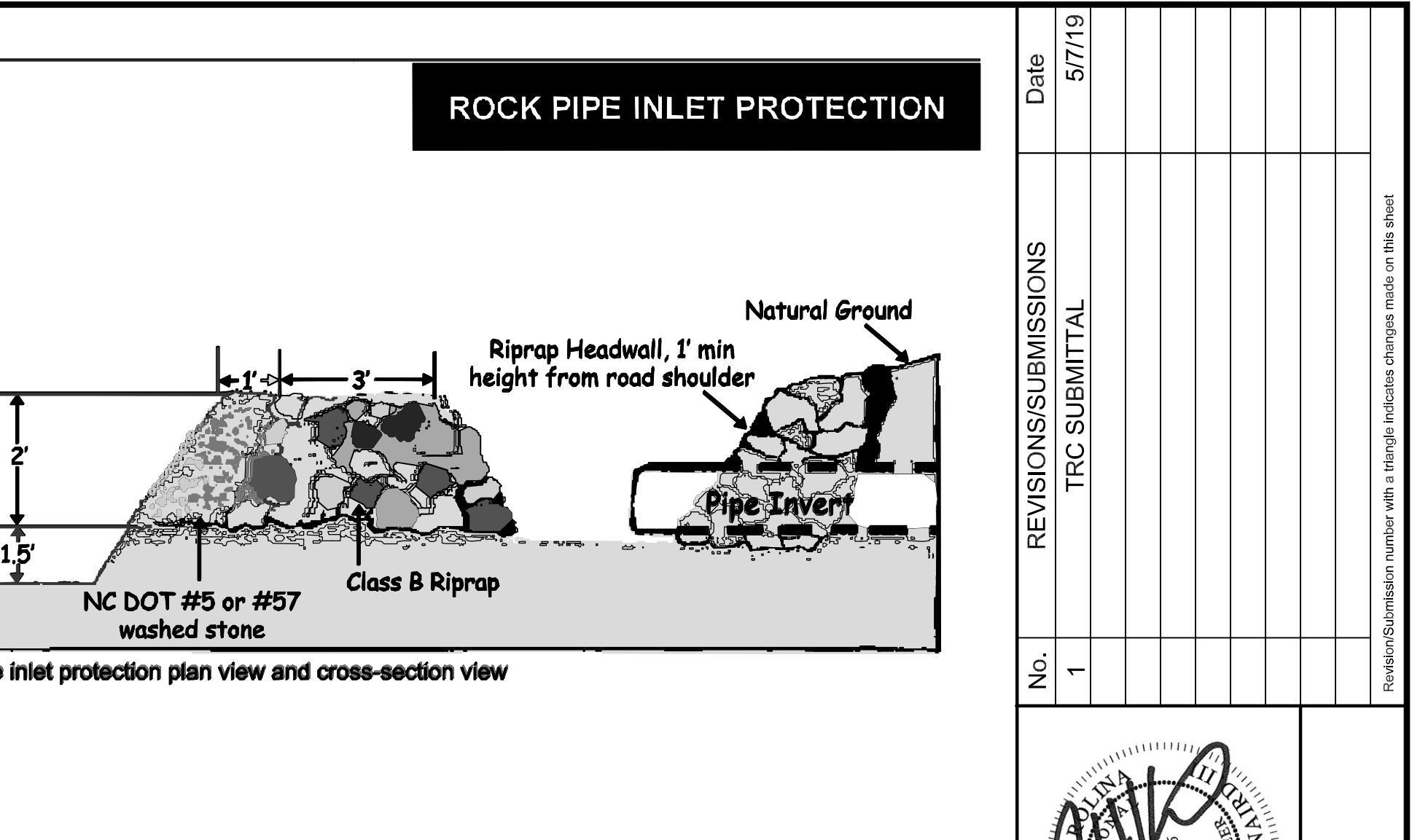


Figure 6.51e NAG SC150BN slope matting

**Construction Specifications**

1. Clear the area of all debris that might hinder excavation and disposal of spoil.
2. Install the Class B or Class 1 riprap in a semi-circle 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 the shoulder of the embankment or diversions.
3. A 1 foot thick layer of NC DOT #5 or #57 stone should be placed on the outside slope of the 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 rock pipe inlet protection at least weekly and after each significant (1/2 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 the 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 (Surface Stabilization).

**G NAG SC150BN SLOPE MATTING** SCALE= NTS

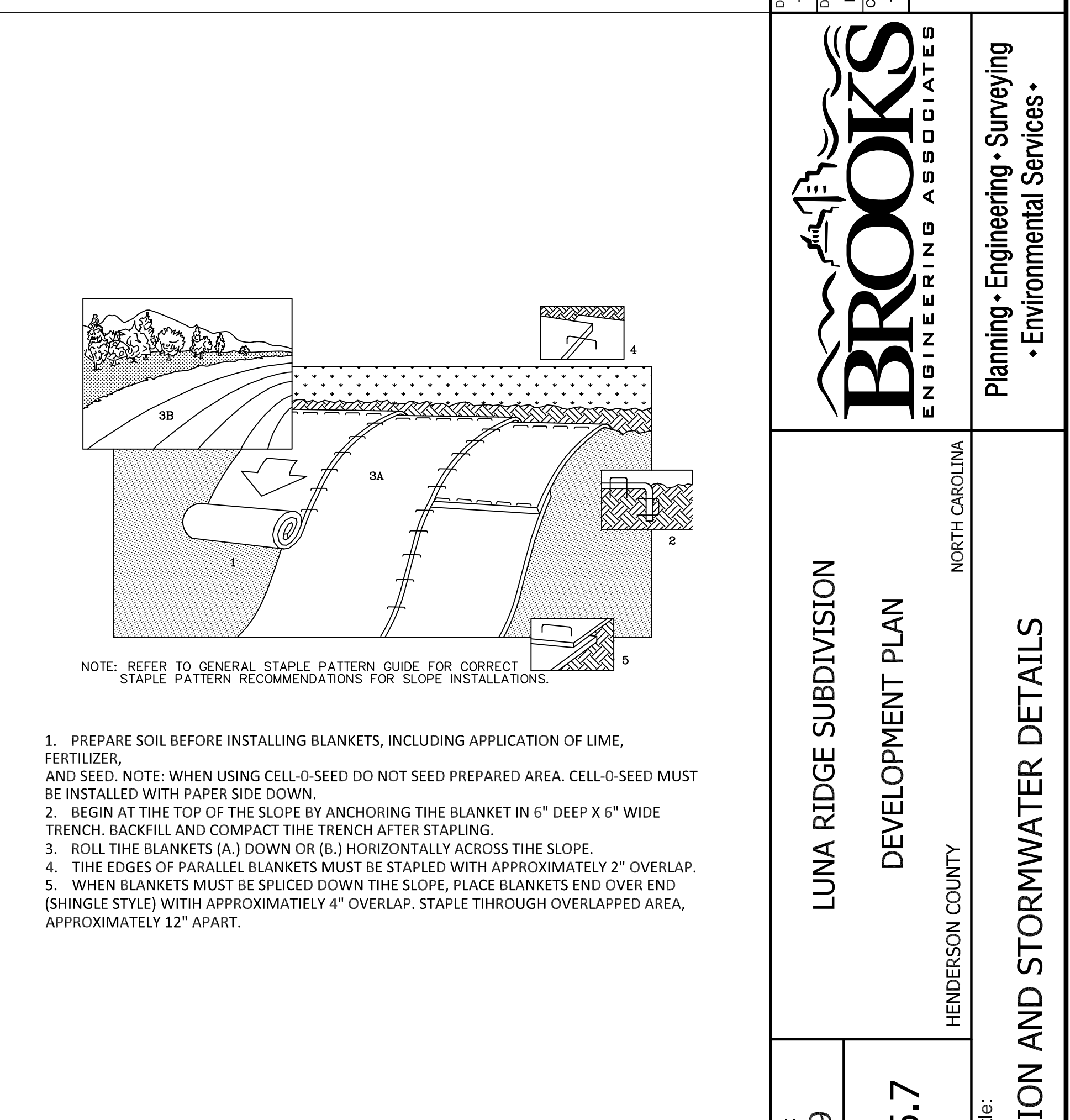


Figure 6.51f HDPE pipe bedding

**F HDPE PIPE BEDDING** SCALE= NTS

**PERMIT SET**

Project No: 486519  
 Development Plan  
 Erosion and Stormwater Details

Design: TMM  
 Drawn: E.J.H.  
 Checked: TMM  
 Review: MCB  
 Scale: AS NOTED  
 Date: 5/7/19

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REVISIONS/SUBMISSIONS

No.	Date	REVISIONS/SUBMISSIONS
1	5/7/19	TRC SUBMITTAL