

Substation Access Road Specification

Revised 05/05/06

Width: **14 feet** (minimum) in straight sections
18 feet (minimum) in curved sections
28 feet (minimum) driveway entrance

Maximum Grade: **8% for Crusher Run Rock and 10% for Heavy Duty Asphalt**

Maximum Rate of Change in Slope: **3%**

Inside Turn Radius: **55 feet for inside wheels & 65 feet for outside wheels**
See attached drawing

Maximum Side Slope: **2%**

Road Load Bearing Capability:

Asphalt Drive	-	Heavy Duty Asphalt (NC DOT Standard)
or		
ABC Crusher Run Rock	-	Sub Grade Compaction - 95%
(Un washed)		Stone Compaction - 98%
		Initial Stone Depth - 6 inch
		(Minimum)
		Stone Depth to be maintained at a 3 inch
		minimum level throughout the life of the
		Facility.

Notes:

Any security fence sections that block the access drive will have a minimum gate width of 20 feet (desired 24 feet), must be installed to Duke's minimum guide lines, and located no closer than 80 feet to the Public Road. This will allow the truck operator to park the truck and trailer and unlock the security gate without the end of the trailer sticking out into the Public Road. Duke Energy employees must have 24-hour access to the property; appropriate accommodations must be made for securing the gate with a double lock.

Site Development Requirements;

Preparation of the project site shall include clearing and removing of all trees, stumps, and large rocks within the Road Bed construction area limits. Grubbing shall include the removal of any item that would interfere with the building of the access road. Stream crossing will be allowed only if proper permitting has been obtained and if they are constructed with appropriately sized and placed culverts. The minimum culvert size will be 18 inches and with an appropriate amount of compacted cover soil to handle axle loads listed below. Intake and discharge of culverts shall be armored with oversized washed stone, and streams are to be crossed at right angles. Access road connection to the Public Highway will be at a right angle for at least a minimum of 50 feet. For access roads connections to the Public Highway at less than a right angle, Duke will require review and approval of driveway entrance. During construction of the site the first 50 feet of the access road will be paved with 2"- 3" ballast rock until the soil and access road has been stabilized. Logs, trees tops, stumps, roots, brush, tree trimmings, large rocks, and other materials resulting from grubbing and clearing operations shall be properly disposed of.

Permission and review of burial site by Duke is required if this material is to be disposed on the station property. Structures, buildings, mobile homes and trailers, satellite signal receiver systems and equipment, swimming pools and associated equipment, human graves, billboards, signs, wells, septic tanks or septic systems, absorption pits, storage tanks both above and below ground, garbage, trash, rubble, flammable material, building material, junk, and wrecked or disabled vehicles are not allowed within the road right-of-way limits. Other utilities R/W's, roads, driveways, sewer lines, water lines, vision cable or any other overhead or underground facilities shall not parallel the center line within the road R/W limits, but may cross at angle not less than 30 degrees with the center line and no closer than 20 feet to any Duke Structure. Access roads that cross Duke's transmission R/W's must adhere to all Transmission Line R/W restrictions (see Form 02191- R12-98) as it pertains to, angle of crossing, clearances to wire conductors, and permanent structures and fixtures. Manholes and underground vaults within the road R/W limits must be approved by Duke ET before installation. Fences shall not parallel the centerline within the road R/W but Duke reserves the right to grant or reject the property owner request to cross the access road with a fence. The fence may cross at any

angle not less than 45 degrees with the centerline of the road. If a fence crosses the road R/W, a gate shall be installed and maintained by the property owner per Duke's specifications to allow free access required by Duke's equipment, trucks, and personnel. Fences shall not be attached to any Duke pole or structure. Grading of the access road shall be at least 20 feet from any Duke pole, structure, or tower leg. No vehicles or equipment will be allowed to be parked within the road R/W limits.

Soil Compaction Requirements;

Roadway Road Bed construction Soil Material shall be compacted to a depth of at least 6 inches, using industry acceptable compacting techniques, to 95% of the maximum density in accordance with ASTM - D698 and at +2 percent of the optimum moisture content as determined by ASTM - D1557. Soil backfill shall be deposited in layers not to exceed 6 inches in uncomplicated thickness and shall be compacted to the same density of the graded substation yard. Material for backfield shall be composed of earth free of wood, grass, roots, broken concrete, large stones, trash, or debris of any kind. No tamped, rolled, or otherwise mechanically compacted soil backfield shall be deposited or compacted in water. All soil backfield material shall consist of loose earth having a moisture content such that the required density of the compacted soil will be obtained with the compacting method used. Moisture content shall be distributed uniformly and water for the correction of moisture content shall be added sufficiently in advance so as proper moisture distribution and compacting will be obtained. Final grade elevation shall be established to effectively handle storm water run-off. Run-off shall be directed from the crown of the road bed to the outside perimeter of the with a 1/2 % slope to a point off the road bed which would minimize erosion and sedimentation damage. The Access Road Bed shall be graded such that no depressions shall be left within the access road that will hold water or prevent the proper drainage of the site. No ponding or the flooding of water within the road bed area shall occur. After the Road Bed grade has been established, cover the length of the Road Bed area with 6 inches of un washed ABC Crusher Run Granite Aggregate compacted to 98% Mod Proctor except for during construction - the first 50 feet of Road Bed entrance which will be covered with 2"- 3" unwashed Coarse Granite Aggregate to a depth of 6" compacted to a 98% Mod Proctor. After construction is completed, this area will be covered with un washed ABC Crusher Run Granite Aggregate to a depth of 4" and compacted to a 98% Mod Proctor.

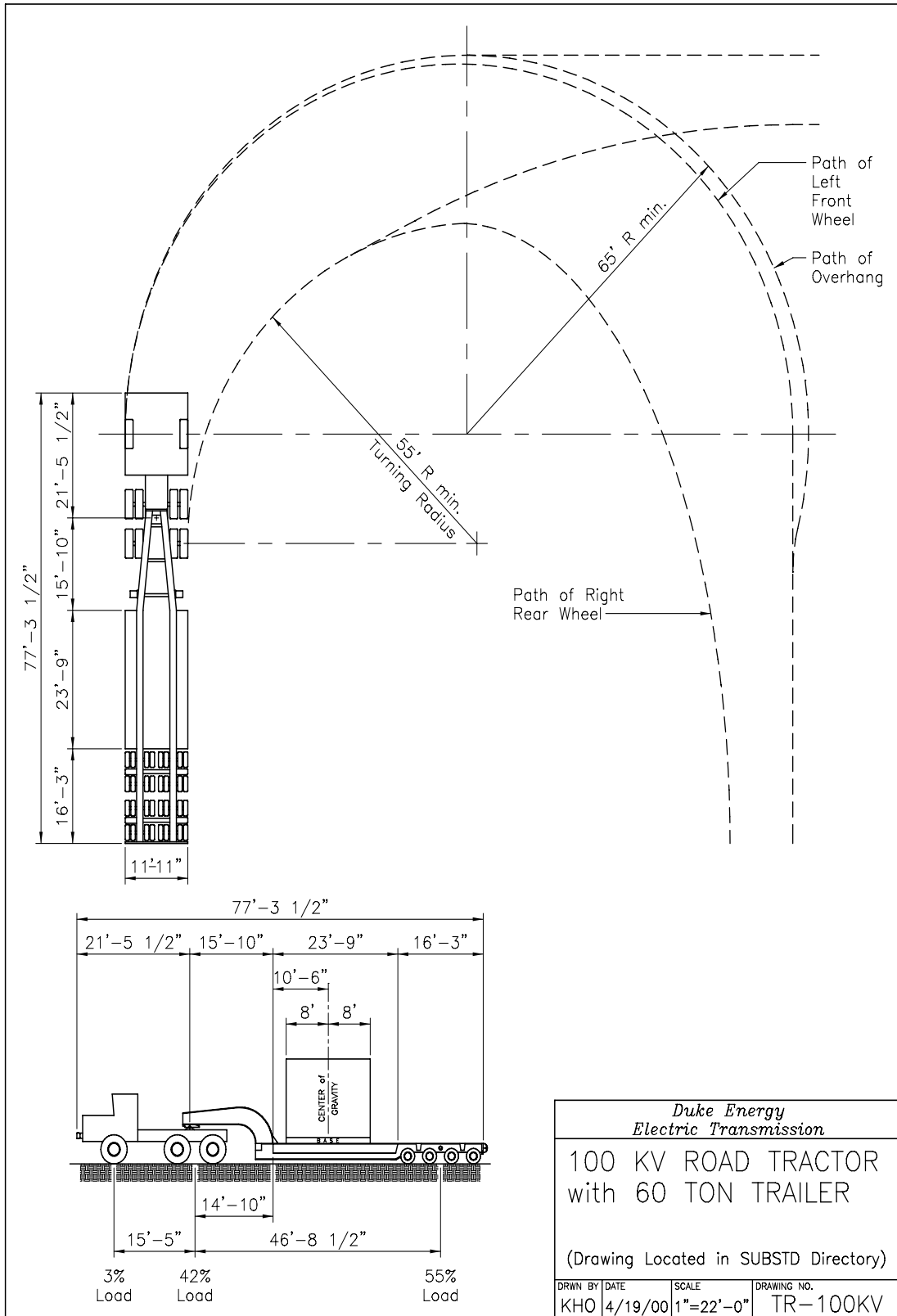
Soil Seeding Requirements;

Sedimentation control, including re-vegetation and permitting, will be covered and required as per Federal, State, County, or City regulations. Soil surface stabilization measures will be completed immediately following the establishment of the Road Bed. Seeding, mulching, matting,

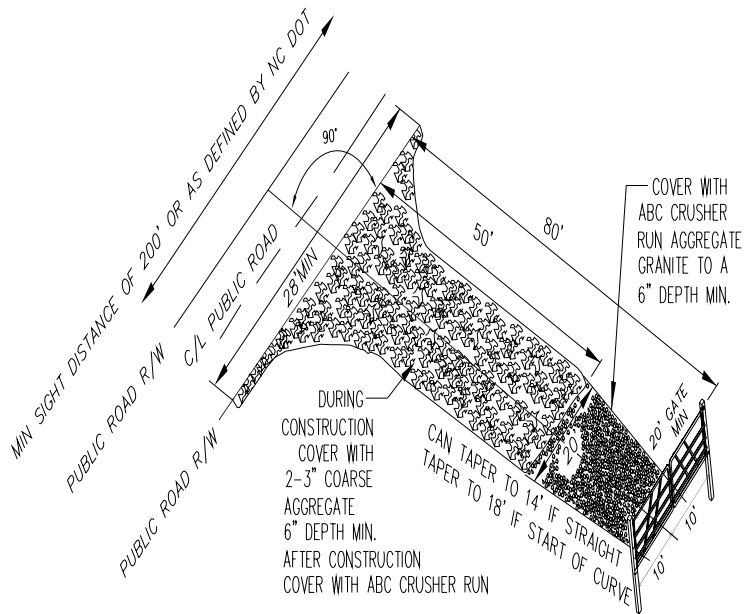
or other soil surface stabilization measures will be placed on the road shoulders and other disturbed areas following initial soil disturbance. Prior to seeding, all disturbed surfaces shall be scarified to a depth of four to six inches to enhance seed germination and help impede storm water runoff. Seeding mixtures will be tailored to site-specific conditions, steepness of slopes, climate, location, time of year, and elevation. Mulch or matting shall be applied to all seeded areas to aid in the establishment of vegetation and help impede soil erosion. Vegetative mulch, typically wheat or oat straw, shall be applied at the rate of 3,000 to 4,000 LBS/ACRE. Ditches on either side of the Road Bed shall be designed and covered with matting and seeding so as to prevent any erosion of soil in the bottom of the ditches.

Axle Loading for Soil Compaction Design;

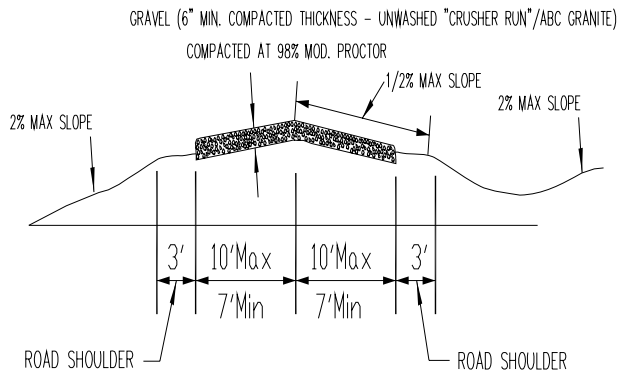
One	axle loads	N.C. 25,000lb ,	S.C. 20,000lb
Two	axle loads	N.C. 50,000lb ,	S.C. 40,000lb
Three	axle loads	N.C. 60,000lb,	S.C. 60,000lb
Four	axle loads	N.C. 60,000lb,	S.C. 80,000lb
Five	axle loads	N.C. 94,500lb,	S.C. 90,000lb
Six	axle loads	N.C. 108,000lb,	S.C. 110,000lb



LOCATION - LOCATE CONSTRUCTION ENTRANCES AND EXITS TO LIMIT SEDIMENT FROM LEAVING THE SITE AND TO PROVIDE MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES
 AVOID STEEP GRADES AND ENTRANCES AT CURVES IN PUBLIC ROADS.

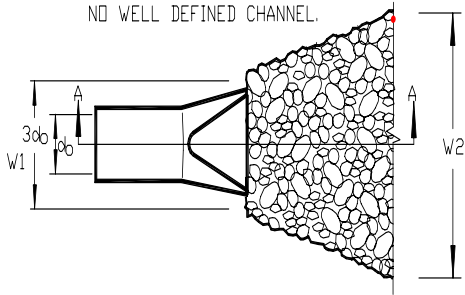


DRIVEWAY ENTRANCE



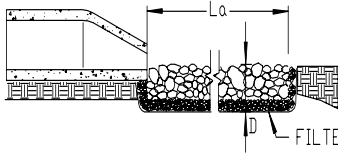
SIDE VIEW of ACCESS ROAD

PIPE OUTLET TO FLAT AREA-
NO WELL DEFINED CHANNEL.



NOTES:

1. L_a IS THE LENGTH OF THE RIP RAP APRON.
2. $D=1.5$ TIMES THE MAXIMUM STONE DIAMETER BUT NOT LESS THAN 6".
3. IN A WELL DEFINED CHANNEL EXTEND THE APRON UP THE CHANNEL BANKS TO AN ELEVATION OF 6" ABOVE THE MAXIMUM TAILWATER DEPTH OR TO THE TOP OF THE BANK, WHICHEVER IS LESS.
4. A FILTER BLANKET OR FILTER FABRIC SHOULD BE INSTALLED BETWEEN THE RIP RAP AND SOIL FOUNDATION.

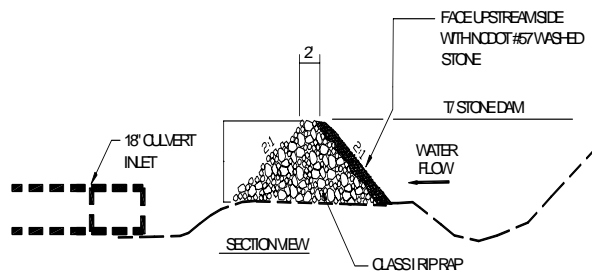
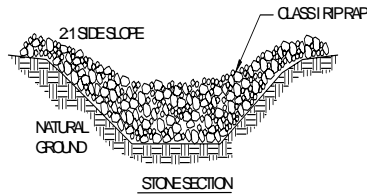
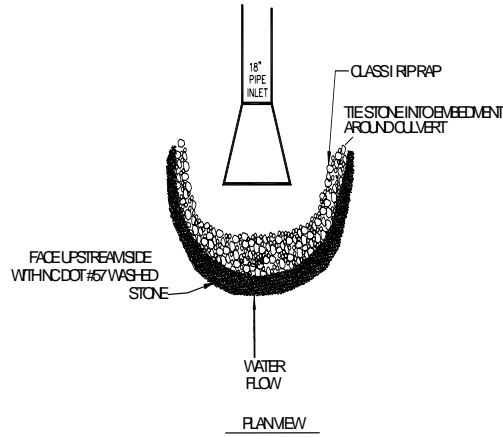


* PIPE TO BE REINFORCED CONCRETE PIPE (RCP)

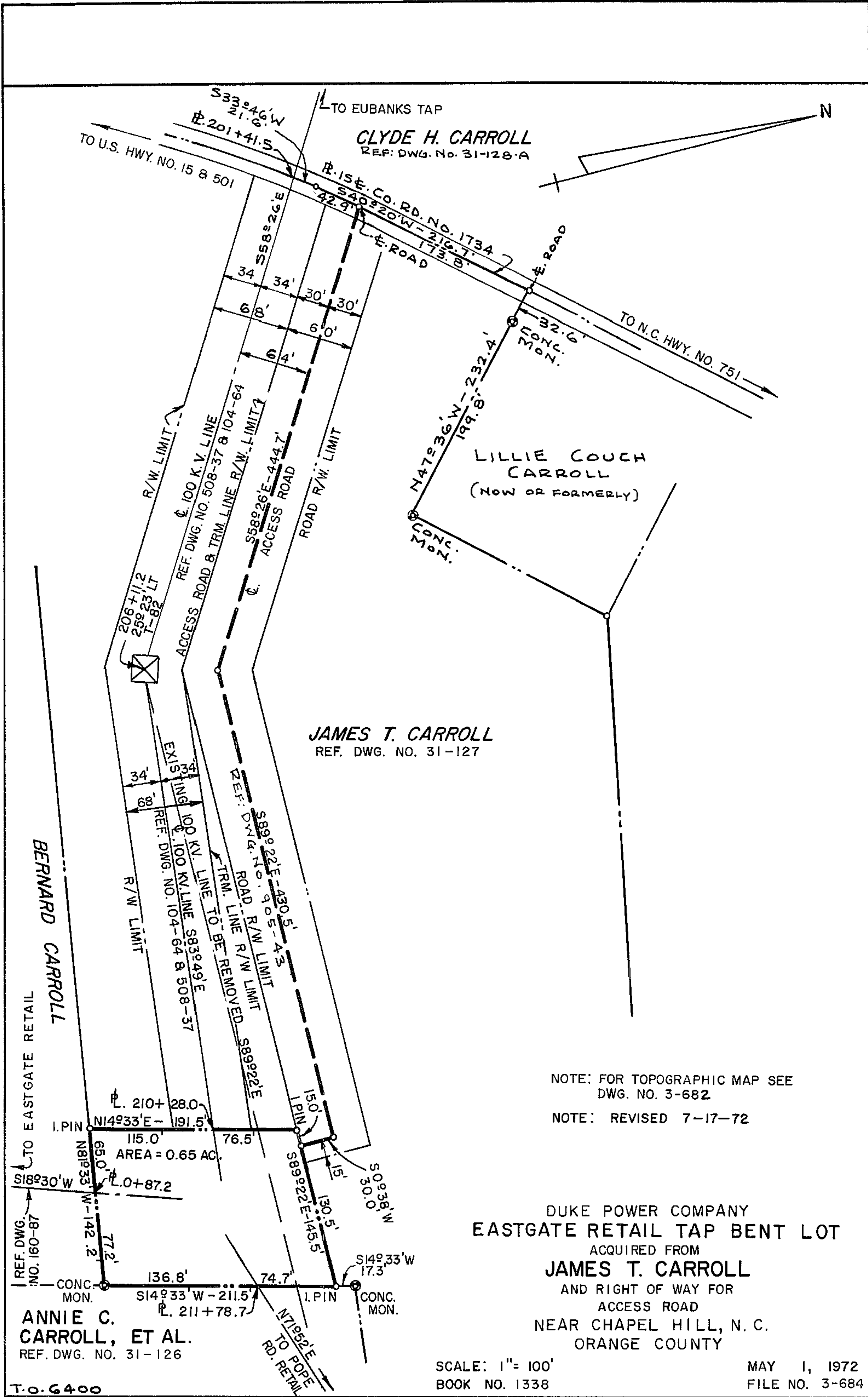
CULVERT (#)	SIZE (DIA.)	L_a ft.	W_1 ft.	W_2 ft.	D in.	INLET ELEV.	OUTLET ELEV.
DISSIPATOR #1 18" RCP CULV.	18"	6'	4.5'	7.5'	12"	623.75'	623.25'

NOTE: ALL RIP RAP TO BE CLASS A

ENERGY DISSIPATOR PAD



CULVERT INLET PROTECTION



CLYDE H. CARROLL
REF: DWG. NO. 31-128-A

LILLIE COUCH CARROLL
(NOW OR FORMERLY)

JAMES T. CARROLL
REF: DWG. NO. 31-127

BERNARD CARROLL

ANNIE C. CARROLL, ET AL.
REF: DWG. NO. 31-126

NOTE: FOR TOPOGRAPHIC MAP SEE
DWG. NO. 3-682

NOTE: REVISED 7-17-72

DUKE POWER COMPANY
EASTGATE RETAIL TAP BENT LOT
ACQUIRED FROM
JAMES T. CARROLL
AND RIGHT OF WAY FOR
ACCESS ROAD
NEAR CHAPEL HILL, N. C.
ORANGE COUNTY

SCALE: 1" = 100'
BOOK NO. 1338

MAY 1, 1972
FILE NO. 3-684

T.O. 6400
(D-2477)