



Mecklenburg County Land Development Standards Manual (MCLDSM)

Revised 5/2/2022



Mecklenburg County Land Development Standards Manual

Mecklenburg County (Including ETJ) Land Development

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MECKLENBURG COUNTY LAND DEVELOPMENT STANDARDS SPECIFICATIONS AND SPECIAL PROVISION NOTES

The following specifications and special provisions are intended to be used in conjunction with Mecklenburg County Land Development Standard Drawings, NCDOT Roadway Standard Drawings, NCDOT Asphalt Quality Management System (QMS) Manual, NCDOT Standard Specifications for Roads and Structures, and the stamped approved plans for all development within the Mecklenburg County and the Town ETJ unless otherwise directed by the Public Works Director/Town Engineer. The Towns of Huntersville and Pineville have adopted their own Land Development Standards Manual, which should be used in those respective jurisdictions.

I. STREETS AND ALLEYWAYS

A. GENERAL NOTES

1. All streets are either public or private. Public or private streets that are maintained by a Town, POA or HOA, including alleyways, must comply with these regulations. All other streets must comply with the stamped approved plans.
2. All work and materials shall conform to the latest edition of the North Carolina Department of Transportation Standard Specifications for Roads and Structures *unless otherwise specified in this manual*.
3. Public streets located within a Town's ETJ will require approval from Mecklenburg County (MC), Town and NCDOT. Public streets will need to be accepted for maintenance by NCDOT prior to maintenance bonds being released. Public streets within Town Limits will require approval from County/Town and be dedicated to the Town prior to release of the bond(s).
4. If a project connects to an existing Town maintained road, the Design Engineer will need to coordinate an on-site pre-submittal meeting with the Town, MC, and Owner to determine if any repairs will be needed to the roadway or obtain Town approval if repairs are not warranted. Any pre-existing condition of the roadway, such as asphalt failure, shall be documented by the owner/owner's Geotechnical Engineer prior to construction. The pre-submittal meeting will also determine if mill and overlay will be required and how much. All repair areas, method of repair, and mill and overlay will be included on the approved

plans. All street repairs must meet sections G and H below. Pre-existing asphalt failure will require a minimum of full depth asphalt repair (5.5”) prior to overlay and/or release of the bond(s).

5. All precautions must be taken to protect an existing Town maintained road. Any damage caused by construction activity will require a minimum of full depth asphalt repair (5.5”). The Town and MC will mark the areas to be repaired and will follow sections G and H below.
6. Proof rolls should be scheduled 48 hours in advance with the Mecklenburg County Land Development Inspector “County Inspector” and will be conducted on all curb, subgrade, stone base, and chemically stabilized base. Proof rolls will not be conducted on surfaces that are not to grade, impacted by weather (too wet or dry, frozen ground), not properly compacted, or any other unsuitable conditions as deemed by the County Inspector, Town or the Geotechnical Engineer. Proof rolls will not be conducted in the rain and when the ground is frozen. Proof rolls will be conducted with a minimum 15-ton ticketed truck or more if there has been a history of non-compliance. If safety is an issue, a full-sized motor grader can be used if approved by the County Inspector. Owners/contractors are required to pre-proof roll and work out any issues with the Geotechnical Engineer prior to scheduling with the County Inspector. There shall be no deflection or pumping to pass inspection. Pumping, deflection or not being prepared for the proof roll is a failed inspection and is subject to re-inspection fees.
7. Third Party Geotechnical Engineer/staff will be required at all proof rolls and during paving operations. Mecklenburg County and Towns are 100% pass/fail and cannot make recommendations for remediation. Third Party Geotechnical Engineers can make recommendations for remediation if approved by the County Inspector and/or Town. The Geotechnical Engineer will also need to certify the roadways; therefore, attendance is required. If the Geotechnical Engineer/staff is not present, the proof roll will be rescheduled, and a reinspection fee will be required.
8. Density testing will be required every 200 feet or a minimum of 3 per road for subgrade, stone base, chemically stabilized base, and asphalt. Density test could be required for curb if unsuitable material is present, as determined by the County, Town or Geotechnical Engineer/staff. Electronic density testing reports are required to be provided to the County and maintained by the County in the Electronic Plans Management system. Third Party Geotechnical Engineering reports shall include project name, date, weather, type of inspection, station numbers and/or site map of each test location, layer/material tested, type of test used, percent moisture, percent density (wet and dry), required percent density, and pass/fail. All digital reports and tests shall be sent to the County Inspector (24 hours in advance for proof rolls and 72 hours after paving operations are complete). The

person performing the inspection and/or testing shall be competent and be able to provide Quality Control and preferred to be a certified QMS Roadway Technician. All tests shall be performed by developer at no cost to the County or Towns.

9. Subgrade - compacted to at least 100% of the maximum dry density as determined by AASHTO T 99 as modified by NCDOT.
10. Chemically treated subgrade (lime or cement) - compacted to at least 97% of the maximum dry density as determined by AASHTO T 99 as modified by NCDOT. Report must include weather conditions and number of curing days.
11. Aggregate-stabilized subgrade - compacted to at least 100% of the maximum dry density as determined by AASHTO T 99 as modified by NCDOT.
12. Aggregate Base Course (ABC) - compacted to at least 100% of the maximum dry density as determined by AASHTO T 180 as modified by NCDOT.
13. Cement-treated Base Course (CTBC) - compacted to at least 97% of the maximum dry density as determined by AASHTO T 180 as modified by NCDOT.
14. Asphalt – Density shall be in accordance to the latest QMS for Asphalt Pavements. Asphalt reports shall include proper use of tack, asphalt type, asphalt temperature, ambient temperature, surface temperature before and after laydown of asphalt, and total layer thickness of asphalt (checked frequently and across all travel lanes).
15. Full Depth Reclamation (FDR) and Chemically Stabilized Bases will require written recommendations by the Geotechnical Engineer and must be approved by the County Inspector and Public Works Director/Town Engineer prior to starting. FDR (Section 541) and Chemically Stabilized Bases (Sections 540 and 542) must follow the most recent addition of NCDOT Standards Specifications for Roads and Structures. Chemically stabilized subgrade or base reports shall include weather, application rates, mixing and compaction methods used, number of curing days, optimal moisture, and compaction tests. If approved as an alternate pavement, then depth testing will be required. The Geotechnical Engineer must certify alternate pavement designs and FDR by using the County's *Engineer's Certification for Chemically Stabilized Bases*.
16. All asphalt cuts shall be made with a saw when preparing street surfaces for patching or widening strips.

17. Paper joints shall be used to seal the ends of an asphalt pour so that future extensions can be made without causing rough joints.
18. When placing asphalt against existing surfaces, a straight edge shall be used to prevent “humping” at that location.
19. Stone shall be primed if paving is not complete within seven days following stone base approval.
20. Surfaces shall be tacked when asphalt is being placed over existing asphalt streets or adjoining concrete, storm drain and sanitary sewer structures. The surfaces must be thoroughly cleaned and dry before applying tack coat. Tack coats must be applied at the proper rate and have a uniform coverage across the mat to be paved (no corn rows). The tack should break prior to placing trucks on tack and beginning the paving operation. See the NCDOT Standard Specifications for Roads and Structures and the QMS Asphalt Manual for additional requirements.
21. In rolling and hilly terrains, sweeping of the stone base and/or application of a tack coat may be required near intersections. These requirements will be established by the County/NCDOT Inspector based on field conditions.
22. ALL concrete used for streets, curb and gutter, sidewalks and drainage structures, etc. shall have a minimum compressive strength of 3600 PSI at 28 days. This requirement shall be provided regardless of any lesser compressive strength specified in the North Carolina Department of Transportation Standard Specifications for Roads and Structures. The contractor shall prepare concrete test cylinders in accordance with Section 1000 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures at the direction of the project inspector. All equipment and cylinder molds shall be furnished by the contractor. It shall be the responsibility of the contractor to protect the cylinders until such time as they are transported for testing. Testing for projects shall be performed by an independent testing lab, at no cost to the County. The contractor shall provide equipment and perform tests on concrete for a maximum slump and air content as defined in Section 1000 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures. These tests shall be performed at a frequency established by the inspector. Materials failing to meet specifications shall be removed by the contractor.
23. All concrete shall be cured with 100% Resin Base, white pigmented curing compound which meets ASTM Specifications C-309, Type 1, applied at a uniform rate at one (1) gallon to 400 square feet. Apply curing compound no more than 30 minutes after newly placed concrete. Mechanically operated equipment application rate is 0.0067 gal/sf.

24. All curb and gutter shall be backfilled with soil approved by the Inspector within 48 hours after construction to prevent erosion.
25. All backfill shall be non-plastic in nature, free from roots, vegetative matter, waste, construction material or other objectionable material. Said material shall be capable of being compacted by mechanical means and the material shall have no tendency to flow or behave in a plastic manner under the tamping blows or proof rolling.
26. Materials deemed by the Geotechnical Engineer and/or County Inspector as unsuitable for backfill purposes shall be removed and replaced with select backfill material.
27. All trenches in the street right-of-way shall be backfilled with suitable material immediately after the pipe is laid. The fill around all pipe shall be placed in layers not to exceed six (6) inches and each layer shall be compacted thoroughly. For Storm Drainage, see Backfill under Storm Drainage section.
28. Under no circumstances shall water be permitted to rise in un-backfilled trenches after the pipe has been placed.
29. Compaction requirements shall be attained by the use of mechanical compaction methods. Each six (6) inch layer of backfill shall be placed loose and thoroughly compacted into place.
30. Straight forms shall not be used for forming curb and gutter in curves.
31. All excess concrete on the front edge (lip) of gutter shall be removed when curb and gutter is poured with a machine.
32. All subgrade shall be compacted to 100% of the maximum density obtainable with the Standard Proctor Test to a depth of eight (8) inches, and a density of 95% Standard Proctor for depths greater than eight (8) inches. All tests shall be performed by developer at no cost to Mecklenburg County.
33. A canvas cover or other suitable cover shall be required for transporting plant mix asphalt during cool weather when the following conditions are present:

- a) Air temperature is below 60 degrees F.
 - b) Length of haul from plant to job is greater than five (5) miles.
 - c) Other occasions at the Inspector's discretion when a combination of factors indicates that material should be covered in order to assure proper placement temperature.
34. Concrete or asphalt shall not be placed until the air temperature measured at the location of the paving operation is at 35 degrees F and rising by 10:00 a.m. Concrete or paving operations should be suspended when the air temperature is 40 degrees F and descending. The contractor shall protect freshly placed concrete or asphalt in accordance with Sections 420 (Concrete Structures), 600 (Asphalt Bases and Pavements), and 700 (Concrete Pavements and Shoulders) of the North Carolina Department of Transportation Standard Specifications when the air temperature is at or below 35 degrees F and the concrete has not obtained an age of 72 hours. (Exception: asphalt concrete surface course placed on paved surfaces. See the most current NCDOT Superpave Manual for minimum air temperature requirements.)
35. The contractor shall maintain two-way traffic at all times when working within existing streets. The contractor shall place and maintain signs, danger lights, and barricades and furnish watchmen or flagmen to direct traffic in accordance with the latest edition Work Area Traffic Control Handbook (WATCH). Work in the right-of-way of state system streets may require additional traffic control provisions, refer to NCDOT Work Zone Traffic Control Program and/or MUTCD.
36. The contractor shall do that which is necessary to control erosion and to prevent sedimentation damage to all adjacent properties and streams in accordance with the appropriate Mecklenburg County Erosion and Sedimentation Control Ordinance.
37. Roadside ditches shall conform to NCDOT standards unless otherwise specified by Town along Town maintained roads.
38. A Professional Engineer (PE) certification of roadway construction will be required, stating construction was performed in accordance with the design standards.

B. STANDARDS OF STREET DESIGN

Note: Use of Hilly Terrain criteria is NOT permitted without PRIOR approval of the County Engineer.

Note: Design standards that apply for the ETJ are taken from the latest edition of the NCDOT design manual *Subdivision Roads*. Any revisions to *Subdivision Roads* will supersede the design standards given in the Mecklenburg County Land Development Standards for ETJ streets. However, under no circumstances shall an NCDOT/ETJ standard be less restrictive than what is required by the Mecklenburg County.

1. PUBLIC STREETS

		<u>Level</u>	<u>Rolling</u>	<u>Hilly</u>
a. Minimum Sight Distance	Local	-----See AASHTO-----		
	Collector	-----See AASHTO-----		
b. Maximum Grade (%)	Local	6	10	12
	Collector	4	8	10
c. Minimum Radius (ft)	Local	250	See Town	90
	Collector	350	See Town	175
d. Design Speed	Local	25	25	20
	Collector	30	30	25
e. K Values (Crest/Sag)	Local	28/35	20/20	15/20
	Collector	40/45	28/35	20/20
f. Minimum tangent	Local	50	50	50
between Horizontal curves	Collector	100	100	100
(NO REVERSE CURVES)				

Note: Provisions of adequate stopping sight distance may require use of larger K values than the minimums listed above. Stopping sight distance for wet pavements shall follow the latest edition of *AASHTO – Geometric Design of Highways and Streets*. Mecklenburg County and/or the town reserves the right to prescribe more stringent sight distance standards and/or means to achieve adequate sight distance than these listed above.

2. INTERSECTIONS

Criteria is for any proposed street (public or private) that ties into public streets

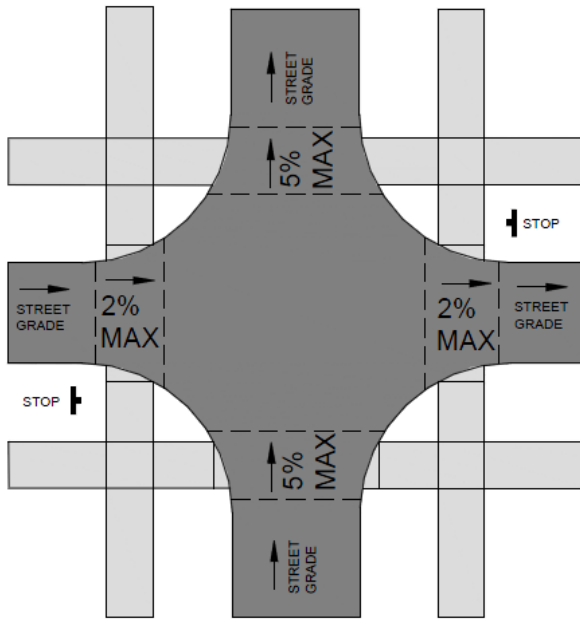
	<u>Level/Rolling</u>	<u>Hilly</u>
a. Terrain Classification	0-15%	15% + (Existing Land Grades)

b. Maximum Street Grade at Intersections

STOP or YIELD Condition: Vertical alignment is 2% maximum through the crosswalk areas (marked or unmarked). Outside the crosswalk areas the vertical alignment is 5% maximum within 100 feet of intersection.

THROUGH MOVEMENT Condition: Vertical alignment is 5% maximum through the crosswalk areas. Where feasible, it is recommended that the vertical alignment for a through-movement street also be set at 2% maximum through crosswalk areas (marked or unmarked).

Preferred option: Design intersections with a max. 2% street grade through the crosswalk area of all legs of the intersection. This will provide a level intersection where the required sidewalks, curb ramps, and street crossings can be constructed with the use of CLDSM standard details included in the plans. Special attention to drainage design is warranted to ensure that these intersections drain properly. For intersections with street grades greater than 2% in any direction it is strongly recommended that the sidewalks, curb ramps, and street crossings be included as part of the design process and site-specific details of the designs and any alternate layouts shall be included in plans as appropriate.



c. Midblock Pedestrian Street Crossings: At midblock crossings, the cross slope of the pedestrian street crossing is allowed to equal the street grade.

d. Minimum Angle of Intersection is 75 degrees.

e. Min. Curb & R/W Radius (when intersecting streets have different classification, use the more restrictive)

	<u>Level/Rolling</u>	<u>Hilly</u>
Local	25*	25*
Collector	30*	30*

*-See Town for additional requirements

Curb Radii for Local Street Intersections

<u>From/To</u>	<u>R/Narrow</u>	<u>R/Medium</u>	<u>R/Wide</u>	<u>C/Narrow</u>	<u>C/Wide</u>	<u>Industrial</u>
R/Narrow	35					
R/Medium	20	15				
R/Wide	25	15	10			
C/Narrow	30	15	25	35		
C/Wide	15	15	15	30	10	
Industrial	30	25	15	25	25	50

R= Residential

C= Commercial

f. Minimum Intersection Separation.

Along local streets 125 feet.

Along collector streets 200 feet

Along thoroughfares to be determined by NCDOT

Intersection offsets/separation from a thoroughfare, at signalized intersections, or at intersections that may become signalized in the future may need to be greater than these minimums and will be determined by NCDOT on a case by case basis.

3. Design criteria for arterial streets shall be established jointly by the County Engineer and the North Carolina Department of Transportation on a case by case basis using the latest edition of the American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highway and Streets and/or NCDOT Roadway Design Manual.
4. Intersection corner – A minimum 35’ x 35’ sight triangle easement (measured along right-of-way lines) shall be provided at each intersection corner of roads. An additional 10’ x 70’ sight triangle easement shall be provided at intersections of roads connecting to NCDOT maintained roadways (measured along right-of-way lines). Driveways (no formal right of way) to serve a single project may be required to provide sight triangle easements as determined on a case by case basis. Other sight distance requirements may be required by NCDOT, the Town or Mecklenburg County at all intersections. Sight lines will be based on NCDOT or AASHTO guidelines.

5. Refer to the NCDOT Subdivision Roads Minimum Construction Manual for development criteria for sites located within the Town's Extraterritorial Jurisdiction (ETJ) within these areas governed by Mecklenburg County Land Development Standards Manual and the NCDOT Subdivision Roads Minimum Construction Standards Manual. The more restrictive standard shall apply.

C. GRADING

1. Proposed street rights-of-way shall be graded to their full width for ditch type streets. Proposed street rights-of-way shall be graded to a minimum of eight (8) feet behind the curb for curb and gutter sections.
2. Fill embankments shall be formed of suitable material placed in successive layers not to exceed more than six (6) inches in depth for the full width of the cross-section, including the width of the slope area. No stumps, trees, brush, rubbish or other unsuitable materials or substances shall be placed in the embankment. Each successive six (6) inch layer shall be thoroughly compacted by the sheepsfoot tamping roller, 10-ton power roller, pneumatic-tired roller, or other methods approved by the County Engineer. Embankments over and around all pipe culverts shall be of select material, placed and thoroughly tamped and compacted as directed by the County Engineer or his representative.

D. ROADWAY BASE

1. All roadways and alleyways shall be constructed with a base course as described on the appropriate Mecklenburg County Land Development Standard Detail Drawing.
2. The material for stone base course shall conform to the requirements of Section 1010, Aggregate for Non-Asphalt Flexible Type Base, and Section 520, Aggregate Base course of the North Carolina Department of Transportation Standard Specifications for Roads and Structures.
3. The stone base shall be compacted to 100% of the maximum density obtainable with the Modified Proctor Test (AASHTO--T180) by rolling with ring or tamping roller or with a pneumatic tired roller with a minimum weight of ten tons. When completed, the base course shall be smooth, hard, dense, unyielding and well bonded. Stone base shall not be segregated.

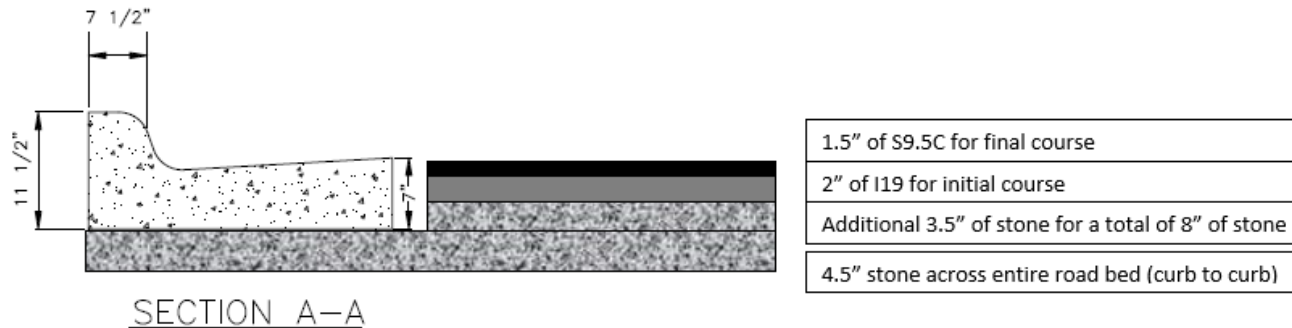
4. An asphalt concrete base course, as specified on the Standard Detail Drawing, may be substituted in lieu of a stone base course.
5. Asphalt base course will only be allowed within widening strips less than five (5) feet in width.

E. ROADWAY INTERMEDIATE AND SURFACE COURSE

1. All public roadways shall be constructed with an intermediate and surface course as described on the appropriate Mecklenburg County Land Development Standard Detail Drawing.
2. All alleyways will require an intermediate and/or asphalt surface course as described by the Mecklenburg County Land Development Standard Detail Drawing or Town detail as shown on the approved plans.
3. Plant mixed asphalt shall conform in all respects to Section 610 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures.
4. **3-Year Rule for Matthews and Mint Hill** -The final lift of asphalt surface course for Residential/Commercial Subdivision Streets shall be installed no later than (3) three years after all the base course has been accepted on a plat or when the development has met the required percentage development occupancy according to Town requirements, whichever comes first. Development occupancy means a certificate of occupancy has been issued. The County will keep track of the base course placement date by using the base course passing proof roll date. All known base failures shall be repaired prior to application of the final lift of asphalt surface course. **The 3-year rule does not apply to Cornelius and Davidson, which will have to meet the Town's Policy for required percentage development occupancy before installing the final asphalt surface course.**

Exception to the 3-year rule – If the Developer/Owner has opted to install an alternative pavement that exceeds the structural numbers of the typical pavement section, then the Developer/Owner can wait until occupancy is met for the final surface course. MC and the Town Engineer/Public Works Director must approve the exception to the 3-year rule. Below is an option for alternative pavement:

Alternative Pavement Option – 8" of stone and 3.5" of asphalt



If using curb machine, 6" of stone is required to account for 1.5" of clipping.

Tack is required along all ridged surfaces (curb, manholes, face of storm drains, other utilities) and between asphalt courses.

5. The County Inspector shall be given a forty-eight (48) hour notification to inspect the intermediate course deficiencies. All deficiency repairs are to be monitored by the Third-Party Geotechnical Engineer, the County Inspector and accepted prior to application of final layer. All asphalt repairs must be done in accordance with Section G and H below and will require full depth asphalt repair (5.5") unless otherwise approved by the Public Works Director/Town Engineer.
6. County Inspectors shall be notified prior to using recycled plant mixes.
7. Failure to meet the above requirements may result in the delay or prevention of street acceptance by the Town or NCDOT.
8. Core samples may be required by the County Inspector and/or Town to determine layer thickness and quantity of materials used. All expenses will be the responsibility of the owner/developer.

F. SIDEWALKS, RAMPS AND DRIVEWAYS

1. Where sidewalks and pedestrian routes within street crossings (including marked and unmarked crosswalks) are provided, they must be constructed so they are accessible to all potential users, including those with disabilities.

The July 26, 2011 “Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way” was written by the US Access Board and is also known as the Public Right-of-Way Accessibility Guidelines or PROWAG. PROWAG provides more specific information than the existing Americans with disabilities Act Accessibilities Guidelines (ADAAG) for transportation facilities within the right-of-way including pedestrian access routes, signals, and parking facilities. The PROWAG requirements are currently in the development and adoption process and have not been officially adopted by the Department of Justice; however, the Federal Highway Administration has issued guidance that the draft version of the PROWAG “are currently recommended best practices and can be considered the state of the practice that could be followed for areas not fully addressed” in the existing ADAAG requirements.

Due to the widespread acceptance of the PROWAG, and their pending adoption in the future, the standards in this manual are based upon the PROWAG requirements. The designer is encouraged to reference the complete PROWAG document for additional information www.accessboard.gov. Buildings and other structures not covered by PROWAG must comply with the applicable requirements of the ADAAG.

2. Sidewalks shall be constructed of not less than 3600 P.S.I. concrete and shall be four (4) inches thick or where a sidewalk crosses a driveway it shall be six (6) inches thick and constructed on an adequately graded base. Subgrade shall be compacted to 95% of the maximum density obtainable with the Standard Proctor Test. The surface of the sidewalk shall be steel trowel and light broom finished and cured with an acceptable curing compound. Tooled joints shall be provided at intervals of not less than five (5) feet and expansion joints at intervals of not more than forty-five (45) feet. The sidewalk shall have a desired lateral slope of 1.5% (2% maximum).

EXAMPLE SIDEWALK CONSTRUCTION DIMENSIONS:		
<u>WIDTH</u>	<u>RISE</u>	<u>CROSS-SLOPE</u>
4'	¾"	1.56%
5'	1"	1.67%
6'	1-1/8"	1.56%
8'	1-½"	1.56%

3. Planting strip adjacent to sidewalk shall be graded to ¼ inch per foot (min.) up to 1 ¼ inch per foot (max.), except where excessive natural grades make this requirement impractical. In such cases, the County Engineer may authorize a suitable grade.
4. Sidewalk widths shall be a minimum of five (5) feet unless otherwise specified. Where necessary, a 5' x 5' sidewalk is required at least every 200' as required by PROWAG for a passing zone unless otherwise provided by residential driveways, intersecting sidewalk, etc.
5. Approval of sidewalk construction plans must be obtained as part of the plan review process. A recorded public sidewalk easement is required for all sidewalk located outside public right-of-way; the width shall be specified by the Town. The sidewalk easement must be recorded with the Mecklenburg County Register of Deeds prior to issuance of a certificate of occupancy for the corresponding building(s).
6. Running slope of all ramps shall be up to 7.5% (8.33% maximum). Ramp length is not required to exceed 15' regardless of the resulting slope, which shall be uniform for the length of the ramp. Curb ramps are required where sidewalks intersect curbing at any street intersection and at Type III driveway connections.
7. Refer to the WATCH Manual, MUTCD (latest edition), and the Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) for construction zone pedestrian routes and signalization and controls for actuators. Curb ramps shall be designed and constructed in accordance with the American Disability Act.

8. Where pedestrian routes are contained within a street or right-of-way, the grade of pedestrian access routes shall not exceed the general grade established for the adjacent street or highway.
9. Accessible ramps are required where sidewalks intersect curbing at any street intersection and curbed driveway connections.

G. BASE COURSE (INITIAL ASPHALT) STREET REPAIR

All street repairs will be marked by the County Inspector and Town. All repairs will require full depth asphalt or alternative approved by the County and Public Works Director/Town Engineer. Full depth asphalt is half the stone base and all the intermediate course. For example, a typical base course pavement section is 8” of ABC and a 1.5” intermediate asphalt course; therefore, full depth asphalt would be 5.5 inches. Street repairs will include but not limited to: Alligator cracking, block cracking (>1/2”), longitudinal and transverse cracking (>1/2”), edge cracks (>1/2”), joint reflection cracks (>1/2”), slippage cracks, potholes, depressions, rutting, shoving, upheaval, moisture/weathering damage, loss of aggregates, raveling, and corrosive fluid spills. All repairs are subject to MC and Town inspections.

1. Structural repair areas must encompass the full travel lane of roadways and alleyways.
2. Minimum base course repair patch size is 10 ft. by 10 ft.
3. Structural repairs to a road failure cannot be within 10 feet of each other, else the entire area requires structural repair.
4. Full Depth Reclamation (FDR) is recommended when 30-40% of the roadway needs repair.

H. SURFACE COURSE (FINAL ASPHALT) STREET REPAIR

All surface repairs will be marked by the County Inspector and Town. The surface course shall be smooth (good rideability), free of defects which include but not limited to: Gouges, corrosive fluid spills, pockmarks, cracks, cuts, excessive joints/seams, construction inconsistencies (i.e. waviness, undulations, signs of thermal application issues, etc.), excessive damage, and excessive aging and/or weathering. Any defect that meets the removal criteria shall be milled a minimum 1.5” (more if the damage exceeds 1.5”) and then a new surface course applied according to the specifications below. All repairs are subject to MC and Town inspections.

1. Overlay patch area must encompass the full travel lane of roadways and entire width of alleyways.
2. Minimum surface course patch size is 10 ft. by 10 ft.
3. Overlay patch area cannot be any closer than 150 feet of each other, else the entire area requires mill and replace.

II. **STORM DRAINAGE**

A. **GENERAL NOTES**

1. All work and materials shall conform to the latest edition of the NCDOT Standard Specifications *unless otherwise specified in this manual*. ALL concrete used for drainage structures shall have a minimum compressive strength of 3600 PSI at 28 days. This requirement shall be provided regardless of any lesser compressive strength specified in the North Carolina Department of Transportation Standard Specifications for Roads and Structures.
2. Meet NCDOT Standard Specifications for Roads and Structures, Section 300-3 for unloading, handling and stockpiling concrete pipe.
3. Prior approval shall be obtained to use pre-cast storm drainage structures in any street right-of-way by the County Engineer and/or Town.
4. Construct non-NCDOT Roadway Standard Drawing endwalls of reinforced concrete or as approved by the County Engineer and/or Town.
5. Pipe shall have a minimum diameter of fifteen (15) inches (eighteen (18) inches minimum on cross drain culverts).
6. Reinforced concrete pipe may be used in all storm drain applications. High Density Polyethylene Pipe (HDPE) may be substituted for pipe diameters of 48 inches or less as approved by Mecklenburg County and/or the Town. Culverts 60 inches in diameter or greater may be Corrugated Aluminized Metal Pipe (CAMP) or aluminum with a minimum 14-gauge metal, subject to approval of County Engineer.

7. If allowed for use by the County Engineer, the Town Public Works Director and NCDOT (Town's ETJ), Corrugated Aluminum Alloy Pipe (CAAP) and other pipe material must follow NCDOT Pipe Material Selection Guide. NCDOT does not allow CAMP within the public right-of-way. HDPE, CAMP and CAAP shall be installed according to NCDOT Standard Drawing 300.01 Flexible Pipe. All pipe shall be manufactured by a producer that is on the NCDOT Approved Producer List for the subject pipe material being supplied. CAMP and CAAP are not recommended for jurisdictional streams.
8. All pipe shall be laid with the bell or groove upgrade and the joint entirely interlocking.
9. For all pipes, wrap geotextile (NCDOT Section 1056 - Type 2) around all pipe joints. Extend geotextile at least 12 inches beyond each side of the joint or band. Secure geotextile against the outside of the pipe by methods approved by the engineer.
10. Meet minimum and maximum cover requirements of NCDOT Standard Drawing 300.01 and NCDOT Pipe Material Selection Guide. Special applications for less than two (2) feet of cover will be reviewed and approved by the County Engineer individually. Storm pipe design that exceeds these criteria may be approved at the discretion of the County Engineer.
11. Pre-installation inspection and acceptance of pipe prior to installation is the responsibility of the Contractor/Installer. Damaged ends, cracks, tears, deformations due to shipping, or manufacturing defects shall be evaluated by the Engineer to determine appropriate action. Materials that can be repaired or must be rejected shall be identified and separated for inspection by the Engineer and inform the County Inspector. Repairs are subject to the Engineer's approval. Any issue of concern or damage to RCP shall be evaluated according to AASHTO R73 "Standard Practice for Evaluation of Precast Concrete Drainage Products." Pre-installation inspection findings shall be subject to inspection by the Engineer and County Inspector.
12. All pipes in storm drain structures shall be flush with the inside wall. Saw cut pipes clean and do not "break" pipes which may cause unwanted cracking and lead to failure.
13. All pipes, structures, dissipators, and flared end sections shall be cleaned out and free of any type of blockage (sediment, stone, trash, debris, trees/woody vegetation, construction materials, etc.). Water shall not back up into pipes and outfalls shall have positive drainage.

14. All storm drain structures over three (3) feet and six (6) inches in height must have steps in accordance with standard details set forth in this manual.
15. The interior surfaces of all storm drainage structures shall be pointed up and smoothed to an acceptable standard using mortar mixed to manufacturer's specifications. There shall be no cracks and no signs of infiltration in the structure.
16. Storm drainage piping shall be placed in a straight alignment at uniform grade. No changes in alignment shall be allowed except at catch basins, manholes, or other junctions that provide appropriate clean out access. The maximum length between access points is 300 linear feet.
 - a. A pipe collar meeting NCDOT standards or standard junction structure is required where pipes from two manufacturers or materials are tied together. Pipes should be on the same grade and alignment and have the same internal diameter where a pipe collar is specified.
17. All frames, grates, rings, covers, etc., must conform to the standards set forth in this manual. Supply covers with a minimum of two and a maximum of six 1" diameter vent holes.
18. All graded creek banks and slopes shall be at a maximum of two (2) feet horizontal to one (1) foot vertical (2:1) and not to exceed 10' without terracing or the slopes shall be designed by a Professional Geotechnical Engineer and approved by the County Engineer on a case by case basis.

B. PIPE VIDEO STANDARDS

Installation of pipes/culverts and structures consisting of the following approved materials (concrete, high density polyethylene – HDPE, and CAAP or CAMP) used for the purpose of conveying stormwater runoff in and out of public rights-of-way, that are eligible for acceptance/maintenance by Mecklenburg County (MC), NCDOT, or Towns of Cornelius, Davidson, Matthews, or Mint Hill, are subject to the following:

1. GENERAL:
 - a) All storm drainage system installation requires a Closed-Circuit Television (CCTV) video inspection as part of the pre-final inspection process. Video must be done once the Town's build out has been met.

- b) All costs associated with these requirements will be the responsibility of the storm drainage system owner (developer, builder, property owner, etc.). Video costs must be included in the performance/construction bond.
- c) National Association of Sewer Service Companies – Pipe Assessment Certification Program (NASSCO-PACP) video, video reports, Engineer’s certification, and deflection confirmation results (flexible pipes must not exceed 5%) must be approved by MC, Town, or representative prior to installing the final surface course of asphalt, unless surface course was installed within one year of base course.
- d) Pipes larger than 48 inches may require manual entry and inspection (confined space regulations may be applicable).
- e) Video inspection must be conducted in a manner that provides an unobstructed view of the entire pipe and storm drain system. The storm drain system must be free of debris and obstructions that impede visibility. Weather conditions must not impede visibility. If there is flow in the pipe, it cannot exceed 5 percent.
- f) Cracks, fractures, and joint separation may require measurements to determine if a minor repair, major repair (Engineer approved), or replacement is required.
- g) Any systems that do not meet the requirements of this section will be rejected and will require rehabilitation or replacement at the discretion of the Owner’s Engineer, Town, NCDOT or MC.
- h) Governing entities may require video of private alleys/roads.

2. VIDEO CONTRACTOR:

- a) All CCTV videos must be performed by a certified NASSCO-PACP professional. The video inspection, reporting, and coding must follow the latest addition of the NASSCO-PACP Manual.
- b) A certified NASSCO-PACP professional (operator) must be on site during collection of data and coding, and that individual’s certification number shall be entered on the Header Section of the video report.

3. POST INSTALLATION:

- a) The Towns and MC require storm drainage systems to be clean, have good alignment, tight joints, no broken or fractured pipes, no infiltration or inflow (I&I) in pipes, joints, or structures. Structures must be pointed up, and built per the approved plans prior to performing video and submittal of CCTV video documents.

- b) All evaluation and acceptance of the installed pipe will be based upon the NCDOT Guidelines for Post Installation Evaluation and Repair of Newly Installed Drainage Pipe.
- c) Pipe/Structure rehabilitation must meet or exceed Industry Standards: American Concrete Pipe Association (ACPA), ASTM, AASHTO, NCDOT or other method approved by the County Engineer.

4. VIDEO REPORT:

- a) The storm drainage system owner will provide the following to MC, Towns, or their representatives:
 - i. Plat, map, or drawing identifying each pipe segment being presented for acceptance with all inlet nodes labeled and corresponding to the accompanying video. For example, start of video is at inlet CB1 to JB2 as shown on accompany drawing. (video map segments should match the approved drawings.)
 - ii. The NASSCO-PACP report shall include each pipe/culvert segment and structures being considered for acceptance. The report shall include still digital photos of any anomalies or defects that were required and not required to be rehabilitated.
- b) MC, Town, or representative, and NCDOT will only review the certified reports (NASSCO-PACP and Engineer's Reports/Certification). MC, Town or representative, and NCDOT will review video upon request.

5. ENGINEER'S REPORT AND CERTIFICATION:

- a) The Owner's Engineer will be responsible for documenting the visual observations of the pipe's current condition, determine if/when rehabilitation needs to be made on the pipe segment and specify the best renewal or repair method per Industry Standards. All NASSCO-PACP defect codes and grades will require recommendations from the Owner's Engineer for rehabilitation, or replacement (if warranted).
- b) The Owner's Engineer's recommendations must be reviewed and approved by MC, Towns, or their representatives before starting rehabilitation or replacement.

C. BACKFILL

- 1. Provide and install pipe-trench backfill per NCDOT standards. Pipe bedding and select backfill material used shall be in accordance with NCDOT Article 1016-3 for Class II (Type I only) or Class III select material. Select backfill shall extend to mid-point (spring line) of the pipe and to 1' above the top of the pipe for all flexible pipe materials.

2. Layers shall not exceed six (6) inches loose and each layer shall be compacted thoroughly. Compaction requirements shall be attained using mechanical compaction methods. Each layer of backfill shall be placed loose and thoroughly compacted in place. Bedding material shall not to be compacted directly below the invert of the pipe. See NCDOT 300.01 for bedding placement for all pipe types.
3. Density tests are required of the haunch and outer bedding every 200' (alternating opposite sides of the pipe). Each layer shall be thoroughly compacted to 95% of the maximum density obtainable with the Standard Proctor Test. 95% or greater is required for all flexible pipe. Digital tests shall be submitted to the County Inspector. A density of 100% Standard Proctor is required for the top eight (8) inches for pipes within roadways or alleyways.
4. All backfill shall be non-plastic in nature, free from roots, vegetative matter, waste, construction material or other objectionable material. Said material shall be capable of being compacted by mechanical means and the material shall have no tendency to flow or behave in a plastic manner under the tamping blows or proof rolling.
5. Materials deemed by the Geotechnical Engineer as unsuitable for backfill purposes shall be removed and replaced with select backfill material. The Geotechnical Engineer must confirm there is suitable material for the foundation and bedding.
6. Backfilling of trenches shall be accomplished immediately after the pipe is laid. Under no circumstances shall water be permitted to rise in un-backfilled trenches after the pipe has been placed. Do not operate heavy equipment over any pipe culvert until the pipe culvert has been properly backfilled, covered, and compacted with at least three (3) feet of an approved material.

D. REINFORCED CONCRETE PIPE (RCP) AND CULVERTS

1. Concrete pipe used within the street right-of-way shall be a minimum of Class III Reinforced Concrete Pipe. Installation of Class IV or higher concrete pipe shall be identified on the approved plans and Storm Drain As-Built Plan. All RCP shall meet AASHTO M 170 for the class pipe called for in the approved plans. All concrete shall be at least 3600 psi.
2. All RCP must have a current certified letter from the pipe manufacturer stating pipes meet or exceed NCDOT, ASTM and AASHTO standards.

3. Joints shall consist of one of the following and should be specified by the design engineer on the approved plans:
 - a. Preformed joint sealant, which conforms to ASTM C 990 Section 6.2 “Butyl Rubber Sealant” and NCDOT 1032-6.F. Joints utilizing preformed joint sealant shall be used in combination with Type 2 filtration geotextile wrap around all RCP pipe joints.
 - b. Rubber (elastomeric) gasket seals in accordance with ASTM C 443, which are in compliance with ASTM C 1619, Class C (unless otherwise required to exceed this specification, as specified by the engineer). Joints shall be produced with single offset spigot or with a confined O-ring groove. Rubber gaskets may be pre-lubricated profile, profile rubber gaskets, or O-ring. Rubber gasket installation shall be per manufacturer’s recommendations. Where rubber gaskets meeting this section are specified, no filtration geotextile wrap is required around the joints for RCP.
4. Fill lift holes with a manufactured soil tight lift hole plug or as approved by the manufacturer. Provide the manufacturers approved method for filling lift holes upon request by the County.
5. The maximum pipe slope for RCP is 10 percent. Provide a special design by a structural engineer for RCP slopes exceeding 10 percent.

E. CORRUGATED ALUMINIZED METAL PIPE (CAMP) AND CORRUGATED ALUMINUM ALLOY PIPE (CAAP)

1. Any installation within the maintenance limits of the Town and/or NCDOT (Town’s ETJ) is subject to the approval of the County Engineer, Town Public Works Director and/or NCDOT. See **NCDOT Pipe Material Selection Guide** for allowable pipe material. NCDOT does not allow CAMP within the public right-of-way.
2. Testing requirements:
 - a. Perform physical pH and resistivity tests on the soil and water at two or more locations along the proposed culvert alignment. Perform additional tests at the request of the pipe manufacturer. Perform pH and resistivity tests on backfill material prior to installation.

- b. Submit manufacturer specifications showing that the physically collected soil- and stream-side pH and resistivity values are appropriate for the selected CAMP or CAAP.
 - i. At a minimum, for CAMP and CAAP to be considered, soil and water samples shall have a pH within the range of $5.0 < \text{pH} < 9.0$ and resistivity of $r > 1500$ ohm-cm.

3. Hydraulic considerations:

- a. CAMP and CAAP can be used where velocities are less than 5 feet per second in both the 2-year and 5-year storm events.
- b. Where velocities are greater than 5 feet per second in the 2-year, field paved a 4-inch thick reinforced concrete invert $2/5$ of the height of the culvert or to 0.5 feet above the flow height of the 2-year storm event, whichever is more restrictive. This requirement applies to both buried and non-buried culvert inverts. Field paving should not be completed until the pipe is backfilled.
 - i. Where bottomless CAMP and CAAP culverts are proposed, the walls of the culvert shall be protected from abrasion by reinforced concrete up to either $2/5$ the height of the culvert or to 0.5 feet above the flow height of the 2-year storm event, whichever is more restrictive.

4. Metal end sections, pipe tees, elbows and reducers are not allowed.

F. HIGH DENSITY POLYETHYLENE PIPE (HDPE)

- 1. Any installation within the maintenance limits of the town is subject to the approval of the Public Works Director/Town Engineer.
- 2. The product used shall be corrugated exterior/smooth interior pipe (Type S), conforming to the requirements of AASHTO Specification M294 (latest edition) for Corrugated Polyethylene Pipe.

3. Bell and spigot joints shall be required on all pipes inside the right-of-way. Bells shall cover at least two full corrugations on each section of pipe. The bell and spigot joint shall have an “O” ring rubber gasket meeting ASTM F477 with the gasket factory installed, placed on the spigot end of the pipe. Pipe joints shall meet all requirements of AASHTO M294.
4. All HDPE pipe installed must be inspected and approved by the County’s Inspector prior to any backfill being placed. The County inspector must be present during the backfilling operation as well.
5. Backfill material used to install HDPE pipe within the street right-of-way shall be Select Material, Class II-IV, as defined by Section 1016-3 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures. Upon submittal of written certification of material suitability by a licensed geotechnical engineer, NCDOT Class I Select Material may be used. All backfill material shall be approved by the County inspector prior to placement of the material within the town street right-of-way.
6. The minimum length of HDPE pipe permitted for use shall be four (4) feet. HDPE flared end sections are not allowed.
7. All HDPE pipe installed shall be third party certified and shall bear the Plastic Pipe Institute’s (PPI) certificate sticker.

G. STANDARDS FOR DESIGN

1. All storm drainage design shall conform to the standards and specifications as provided in the Charlotte-Mecklenburg Storm Water Design Manual, North Carolina Department of Transportation Standards Specifications for Roads and Structures, Mecklenburg County Land Development Standards Manual, or the more restrictive of any standards that conflict.
2. Adequate storm drainage shall be provided throughout the development by means of storm drainage pipes or properly graded channels. All pipes shall be of adequate size and capacity, as approved by the County Engineer, to carry all storm water in its drainage area.
3. In accordance with County Zoning Ordinance, the County Engineer shall review the drainage plan for compliance with the standards contained in the current edition of the Mecklenburg County Land Development Standards Manual and the Charlotte-Mecklenburg Storm Water Design Manual and all other relevant and appropriate standards established by MC.

4. Sub-surface drainage shall be provided where the ground water level is likely to be near the surface. In capillary soils, the water level should be four (4) to six (6) feet below the surface to prevent the rise of moisture into the subgrade. Four (4) inch PVC or HDPE pipe with open joints or perforations shall be used to lower ground water in low areas in the street.
5. The NCDOT Standard Drawings have been accepted as approved standards to be specified for land development projects in the County. See standard #20.00 A, B and C of this manual for a table listing the standards accepted. These standard drawings shall be referenced by NCDOT number or shown on all plans submitted to the County for approval.

III. PLAN REQUIREMENTS

A. GENERAL NOTES

1. All erosion control measures shall conform to the standards set forth in the Mecklenburg County Land Development Standards Manual, North Carolina Erosion and Sediment Control Planning and Design Manual, or the more restrictive of any standards that conflict.
2. All storm drainage design shall conform to the standards and specifications as provided in the Charlotte-Mecklenburg Storm Water Design Manual, Mecklenburg County Land Development Standards Manual, or the more restrictive of any standards that conflict.
3. In areas where the Floodway Regulations are applicable, the Future Conditions Flood Fringe Line, FEMA Flood Fringe Line, Community Encroachment Line, and FEMA Encroachment Line shall be shown on the concept plan, preliminary plan and the final plat. An application for a Floodlands Development Permit shall be submitted to Mecklenburg County Engineering in accordance with the requirements set forth in the City/County Floodway Regulations.
4. Cite all appropriate standard detail numbers for any structures or specifics used within the plans in reference to the most current copy of the Mecklenburg County Land Development Standards Manual.

B. SUBDIVISION PRELIMINARY PLAN

1. The preliminary plan must include, at a minimum, the information described in each Town's Subdivision Ordinance or other applicable ordinance.

2. Storm Drainage Easements shall be provided for all storm drainage pipes and shown on site plans, construction plans and plats with widths as specified by detail #20.30. The following note shall be placed on all grading plans and plats; “The purpose of the storm drainage easement (SDE) is to provide storm water conveyance. Buildings are not permitted in the easement area. Any other objects which impede storm water flow or system maintenance are also prohibited.”
3. A Storm Drainage Easements must extend down stream of flared end sections to an appropriate property line or buffer. Overlapping of storm drainage easements shall be approved by the County Engineer.

C. BOND/SECURITY POLICY – SUBDIVISION IMPROVEMENTS

1. All requests for Performance/Construction Bonds/Securities, Maintenance/Warranty Bonds/Securities, and Bond/Security re-evaluations must be submitted to the Bond Administrator via email. The Bond Administrator will contact the County Inspector for inspections.
2. Prefinal Inspections: The purpose of a prefinal inspection is for the County Inspector, Town, and/or NCDOT to mark deficiencies and what needs to be repaired and/or replaced, prior to the final layer of asphalt being installed. The storm drain as-built survey and certified CCTV video documents must be approved prior to the prefinal inspection. The storm drain as-built survey and CCTV video inspection should be conducted simultaneous. The Engineer’s Certified Video Report will be approved first, followed by the storm drain as-built survey. The Bond Administrator must be notified for a prefinal inspection to start the process to obtain Maintenance/Warranty bonds/securities.
3. Final Inspections: Final inspections are conducted by the County Inspector, Town, and/or NCDOT to verify all repairs/deficiencies were addressed and the site complies with the approved stamped plans. The Bond Administrator will verify that fees have been paid, inspection requests have been submitted, and the Bond Estimate Form has been submitted, prior to the final inspection being conducted.
4. Approval of a subdivision plat will not occur until the improvements required for the area of the plat are constructed and a final inspection has been performed and found to be in conformance with the approved plans, or a bond/security has been posted with the Bond Administrator of the applicable department and all required documents are received in their entirety.

5. For information related to Bonding/Security timeframes please visit the following webpage. [Land Development Project Bonds \(mecknc.gov\)](http://mecknc.gov) The bond/security shall remain in force until the construction is complete and found to be in conformance with plans approved by the Town and Mecklenburg County.
6. One type of bond/security may be replaced by another type of bond/security in certain situations. The amount of the replacement bond/security will be based on the County's estimate of the work remaining. If the estimate of work results in a lower amount, the replacement bond/security will be treated as a reduction. Certain situations will require an increase in a bond/security and in such cases the replacement bond/security shall be required to equal the higher amount.
7. If Mecklenburg County and the Town have different bond/security requirements, the more restrictive shall apply.
8. Bonds/Securities in the form of a Letter of Credit must be drawn on a full-service bank in Mecklenburg County.
9. The applicant will be required to post a maintenance bond/security per Town requirements before the bond/security for completion of subdivision is released.

REFERENCES

1. North Carolina Department of Transportation, most recent edition, Standard Specifications for Roads and Structures
2. North Carolina Department of Transportation, most recent edition, Roadway Standards Drawings
3. City of Charlotte Department of Transportation, most recent edition, Work Area Traffic Control Handbook (WATCH)
4. City of Charlotte Storm Water Services-Mecklenburg County Storm Water Services most recent edition, Charlotte-Mecklenburg Storm Water Design Manual
5. American Association of State Highway and Transportation Officials most recent edition, A Policy on Geometric Design of Highways and Streets
6. North Carolina Department of Transportation, Roadway Design Manual, latest edition
7. North Carolina Department of Environment and Natural Resources most recent edition, Erosion and Sediment Control Planning and Design Manual
8. Charlotte-Mecklenburg BMP Design Manual, latest edition
9. Mecklenburg County Storm Water Services, most recent edition, Administrative Manual for Implementation of the Post-Construction Storm Water Ordinance
10. Mecklenburg County Board of County Commissioners, most recent edition, Mecklenburg County Soil and Sedimentation Control Ordinance
11. Manual of Uniform Traffic Control Devices for Streets and Highways, Federal Highway Administration, latest edition
12. NCDOT Asphalt Quality Management System (QMS), latest edition
13. NCDOT Pipe Material Selection Guide, latest edition
14. Charlotte Land Development Standards Manual, latest edition

MCLDS Revision Log

Revisions Effective November 1, 2016

Standard No.	Name	Description of Revision
11.01	Local Residential Street Typical Section	Revised surface course thickness and elevation change at center line chart
11.03	Divided Residential Street Typical Sections	Revised surface course thickness
11.04	Local Limited Residential Street Typical Section	Revised surface course thickness
11.06	Residential Collector Street Typical Sections	Revised surface course thickness and elevation change at center line charts
11.08	Limited Residential Collector Street Typical Section	Revised surface course thickness and elevation change at center line chart
11.11	Commercial Street Typical Section	Revised intermediate and base course thicknesses
11.12	Commercial Street Divided Typical Section	Revised intermediate and base course thicknesses
11.13	Typical Sections Private Street	Revised surface course thickness
11.50	Cornelius, Davidson and Huntersville Typical Section Residential Street	Revised surface course thickness
11.51	Matthews Typical Section Local Residential Street	Revised surface course thickness and revised notes 1 & 2 under pavement notes
11.52	Pineville Typical Section Local Residential Street	Removed the detail from the Mecklenburg County Land Development Standards because the Town of Pineville has their own details at this time.
11.54	Matthews Typical Section Local Limited Residential Street	Revised surface course thickness and revised pavement notes 1 & 2.
11.55	Matthews Typical Section Residential Collector Street	Revised surface course thickness and revised pavement notes 1 & 2.
11.58	Pineville Residential Cul-De-Sac Detail	Removed the detail from the Mecklenburg County Land Development Standards because the Town of Pineville has their own details at this time.

Revisions Effective November 1, 2016

Additions made to Mecklenburg County Land Development Standards Specifications and Special Provision Notes		
Page	Specifications & Special Provisions:	Description of Revision
11	I. Streets: A. General Notes	Added note 24 about needing to have a Professional Engineer (PE) certification of roadway construction
14	I. Streets: E. Roadway Intermediate and Surface Course	Added note 2 about Density testing required and note 4 about the final lift of asphalt added.
15	I. Streets: G. Base Course Street Repair	Added this new section and 3 notes giving specifics.
15 & 16	I. Streets: H. Surface Course Street Repair	Added this new section and 4 notes giving specifics.