

REQUIREMENTS AND SPECIFICATIONS

FOR

PLAT DEVELOPMENT

(includes Plat Construction Quality Control Provision)

EFFECTIVE

May 27, 2003

(March 5, 2004)

ISSUED BY

**The Board of County Road Commissioners
of the County of Kent**

These published minimum Requirements and Specifications are subject to change without notice by the Board of County Road Commissioners of Kent County. The Board reserves the right to require higher standards where warranted by special conditions.

The following Requirements and Specifications for Plat Development were adopted by the Board and take effect on
May 27, 2003.

The following Plat Construction Quality Control Provision Amending the Requirements and Specifications for Plat Development was adopted by the Board and took effect on
December 9, 2003.

Kent County Road Commission
1500 Scribner Avenue NE
Grand Rapids, MI 49504

John W. Weiss
Chairman

Dale H. Sommers
Vice- Chairman

Ronald D. Sytsma
Member

**REQUIREMENTS AND SPECIFICATIONS
FOR
PLAT DEVELOPMENT**

INDEX

	<u>PAGE</u>
I. PROCEDURE	1
A. PRELIMINARY APPROVAL	1
B. FINAL APPROVAL	1
II. STREET STANDARDS	1
A. INTRODUCTION	1
B. STREET LAYOUT	2
1. GENERAL	2
2. PLAT BOUNDARY	2
3. IMPROVEMENTS	2
C. RIGHT OF WAY	2
1. STREETS	2
2. EASEMENTS	3
D. DESIGN DETAILS	3
1. STANDARD SECTIONS	3
2. STREET GRADES	3
3. ALIGNMENT	3
4. DRAINAGE	4
5. INTERSECTIONS	5
6. RIGHT OF WAY TREATMENT	5
7. NON-COMPLIANCE	6
8. FINAL PLANS	6
E. LOCAL ROAD CONSTRUCTION	6
1. RESPONSIBILITY	6
2. UTILITIES AND GRADING PERMITS	7
3. OTHER THAN NEW PLAT	7
III. GENERAL NOTES	8-10
IV. STANDARD TYPICAL SECTIONS	
-- Standard 30' Bituminous Valley Gutter Section	11
-- 26' Bituminous with 24" Conc. Valley Gutter Section	12
-- Standard Section for Industrial and Commercial Streets	13
-- Intersection Detail for Residential Public Streets with Existing County Primary or Local Roads	14a
-- Residential Intersection Detail in All Public Streets (Residential Areas)	14b
-- Commercial / Industrial Intersection	14c
-- Residential Cul-De-Sac Detail	15
-- Industrial and Commercial Cul-De-Sac Detail	16
-- Local Road Typical Section #1	17
-- Local Road Typical Sections #2 & #3	18
V. VALLEY GUTTER w/CB DETAIL	19
VI. LEFT TURN LANE	20

**REQUIREMENTS AND SPECIFICATIONS
FOR
PLAT DEVELOPMENT**

INDEX (cont.)

VII. STREET NAMING GUIDELINES	21
VIII. SEWER DEPTH REQUIREMENTS	22
IX. GUARD POST/DRAINAGE MARKER POSTS	23
X. UTILITY LOCATIONS	24-25
XI. CONCRETE CURB & GUTTER –DETAIL B2	26
XII. PERMIT TO PLACE	27
APPENDIX A (P/S) - CONSTRUCTION NOTICE	28
APPENDIX B (P/S) - TEMPORARY CONSTRUCTION EASEMENT	29
APPENDIX C (P/S) – REQUIRED DEED & EASEMENT STATEMENT	30
XIII. PLAT CONSTRUCTION QUALITY CONTROL PROVISION	31
MATERIAL & WORKMANSHIP WARRANTY (NEW HOT MIX ASPHALT PUBLIC ROADS)	32-36
APPENDIX A (W) Materials & Workmanship Warranty Appendix for New/Reconstructed Plat Streets	37-40
APPENDIX B (W) Initial Acceptance for Road Structure Warranty	41
APPENDIX C (W) Warranty Bond	42
SPECIAL PROVISION FOR THIRD PARTY ENGINEER SERVICES FOR TESTING MATERIALS AND WORKMANSHIP (NEW HOT MIX ASPHALT PUBLIC ROADS)	43-44
APPENDIX D (W) Memo plat and Street Warranty or Testing Selection	45
XIV. SUPPLEMENTAL DETAILS	
INTERSECTION DETAILING	
Residential 3-Way (Tee)	46 a & b
Residential 4-Way	47 a & b
Residential Elbow	48 a & b
INDUSTRIAL AND COMMERCIAL CUL-DE-SAC (OFFSET)	49
RESIDENTIAL CUL-DE-SAC (OFFSET)	50

REQUIREMENTS AND SPECIFICATIONS

FOR

PLAT DEVELOPMENT

I. PROCEDURE

A. PRELIMINARY APPROVAL

Three copies of a preliminary layout shall be submitted to the Engineering Department showing the proposed plat together with sufficient area surrounding the plat to show its location with reference to all adjoining streets, plats, and property. The Road Commission will return one copy to the developer following the review of the proposed development, and conceptual approval of subsequent phases. A subdivision site report shall be submitted with the preliminary layout that includes at a minimum, a topographic map with five-foot contour intervals, showing the direction of drainage and the proposed road widths of roads under its jurisdiction, or to come under its jurisdiction and all private roads in unincorporated areas. The review will proceed when any additional information is requested and submitted.

After reviewing the preliminary plat, the Engineering Department will compute the Engineering and Inspection Fee and notify the developer of the amount required. The developer shall submit the preliminary fee with each plat in the amount of \$0.40 per lineal foot of frontage of each lot fronting on a street and a fee of \$100.00 for each street name sign to be erected by the Road Commission.

A minimum of \$0.20 per front foot shall be submitted with the preliminary plat and the remainder submitted with the road plans.

If all requirements have been met, the Engineering Department will recommend to the Board of County Road Commissioners that the proposed plat be given "Preliminary Approval" subject to construction of all streets.

The developer will receive direct billings for KCRC oversight during the construction phase.

B. FINAL APPROVAL

When all streets and drainage structures have been constructed to Road Commission standards and under the Road Commission supervision, or a guarantee provided in an amount sufficient to insure completion within one year, necessary easements provided, and all other platting requirements met, the Board of County Road Commissioners will sign the final plat certificate.

II. STREET STANDARDS

A. INTRODUCTION

All platted streets and public streets in condominium development shall be built to Kent County Road Commission Construction Standards.

The developer shall employ a civil engineer, registered in the State of Michigan, to make complete surveys and plans and provide engineering services during construction of all streets. Services will include, but not be limited to, providing inspection results including density and final inspection reports. The certification and source of all materials to be used on the project is to be documented and available upon request. The Kent County Road Commission will be responsible for the inspection of the bituminous surfacing.

B. STREET LAYOUT

1. GENERAL

The street layout shall fit the pattern established by adjacent streets and shall provide for access to abutting land. All existing public roads that terminate at the boundaries must be connected with the street system of the proposed plat. The layout of the streets in the proposed plat shall provide a continuous circuit for travel except, when in the opinion of the Board of County Road Commissioners, the lands to be subdivided are limited in area or are subject to a natural barrier. In some cases cul-de-sacs conforming to the Kent County Road Commission Standards may be used. Cul-de-sac streets more than 800 feet long will require justification and specific approval by the Board of County Road Commissioners.

Any plat having more than 75 lots, 75 living units or a combination of lots and living units in excess of 75, shall have a minimum of two points of access to an existing public street. For any plat which is part of a phased development, any phase of the development having more than 75 lots, 75 living units or a combination of lots and living units in excess of 75 shall have a minimum of two points of access to an existing public street.

For any plat which is part of a phased development or connects to an existing public street shall be provided when the sum total of lots and/or living units is in excess of 75, including the lots and living units accessed by the existing public street. The Engineering Department will review the access in accordance with Section I-A.

Intersections shall not be permitted less than 250 feet apart. Adequate traffic safety shall be provided as approved by the County Engineer in laying out drives and streets in the plat, which enter existing county roads. Intersections of platted streets entering primary roads shall not be permitted less than 660 feet from an existing or proposed intersection. Lots bordering on a primary road shall have access to a platted street and the final plat shall contain a restriction requiring driveways to connect only to the platted street.

2. NAMES

All streets that are extensions of existing streets or roads must carry the names of those in existence. A street name shall not be adopted which duplicates or may be confused with a similarly named street within the county. Other streets shall be given such names as the owner may choose, subject to the approval of the Board of County Road Commissioners. See street naming guidelines page #21

3. PLAT BOUNDARY

Plats that do not connect to any existing public plat or public road will not be approved. Plats fronting on roads whose right of way has been dedicated to the public shall be platted to the existing right of way line. The description of the plat shall be to the centerline of all roads that bound the plat.

Stub streets and/or streets ending with a temporary turnaround shall terminate 10 feet back of the usual plat boundary. The plat boundary shall jog around a 10 foot by 66 foot or 86 foot parcel conveyed to the Kent County Road Commission. This 10 foot parcel will be used for snow storage, placement of guard posts and a road ending sign.

4. IMPROVEMENTS

The developer must improve all streets within the plat and also boundary streets as required under the "Local Road Construction" section of these requirements. The exclusion from the plat of a street that would provide access to future plats will not be permitted. Outlots intended for future streets will not be approved.

C. RIGHT OF WAY

1. STREETS

New platted streets shall have a minimum right of way width of 66 feet in Residential Plats and 86 feet in Commercial-Industrial Plats. Minimum right of way width for existing streets and roads shall be as follows: Primary roads are 120 feet, Local roads on a Section Line or 1/4 Section line are 86 feet. Cul-de-sac right of way shall be 60-foot minimum radius in Residential Plats and 75 foot minimum radius in Commercial-Industrial Plats. Streets shall be centered within the right of way.

2. EASEMENTS

Right of way shall be provided for all drainage courses in and across the property to be platted. The location and width shall be shown on the plat and marked "Drainage Easement" or "Drainage and Underground Utilities Easement". In general "Drainage Easements" shall be a minimum of 20' in width and "Drainage and Underground Utilities Easements" shall be a minimum of 30' in width.

Rights of way or easements to cross shall be provided where newly platted streets cross railroad right of way. Approval must be obtained from the Michigan Department of Transportation for all new crossings. Full width surfacing between the rails and to the ends of the ties, satisfactory to the railroad concerned and the Kent County Road Commission, shall be provided. Advance Railroad warning and cross-buck signs will be placed by the Kent County Road Commission at the expense of the platlor/developer.

D. DESIGN DETAILS

Materials and construction shall comply with the Michigan Department of Transportation's current Standard Specifications for Construction, except where modified by the requirements of the Kent County Road Commission.

1. STANDARD SECTIONS

Street and cul-de-sac design in Residential Plats shall conform to the minimum requirements shown on the Kent County Road Commission Standard Sections "30' Bituminous Valley Gutter" or "26' Bituminous with Concrete Valley Gutter" and "Residential Cul-de-sac". Design in Commercial Industrial Plats shall conform to the minimum requirements shown on the Kent County Road Commission Standards for "Industrial and Commercial Streets"- "33' of 3 1/2" Bituminous with 24" concrete curb and gutter and commercial cul-de-sac".

2. STREET GRADES

- a. Minimum street grade shall be 0.6%. The maximum grade shall be 6.0%.
- b. Permanent cul-de-sacs shall be constructed on a sufficient grade to insure a minimum 1% grade along the flow line of the 36" gutter while maintaining approximately 0.02' per foot crown. The grade on the permanent or temporary cul-de-sac should be 1.5% to 3% in the direction toward or away from the cul-de-sac, for a distance of 150' from its center.
- c. For "T" Intersections the percent grade on the terminated street (immediately adjacent to the through street) should be between -0.6% and -2.0% in the direction away from the through street for a minimum distance of 150 feet, unless the through street is superelevated.

3. ALIGNMENT

- a. Horizontal curves in platted streets, which appear to be continuous, or which appear to be main outlets for future development, shall have a minimum 300' centerline radius. On non-continuous residential streets, 90-degree corners are permissible. In such cases, 35' radius curb and gutter shall be utilized on the inside of the corner, while the 15' valley gutter section shall be continued around the outside.
- b. Vertical street alignment shall be designed to provide minimum stopping sight distance as per current AASHTO standards.

Stopping sight distance in sag vertical curves on platted streets ending in a "T" intersection may be reduced to 30 MPH (200') immediately adjacent to the intersection.

- c. Intersection sight distance, for internal intersections within the plat, shall be in accordance with the current AASHTO design standards for geometric design. Preliminary guidelines are as follows: for 35 mph the sight distance should be a minimum of 475 feet.

4. DRAINAGE

- a. Storm sewers and drainage structures shall be installed. Manhole spacing on storm sewers should not exceed 350'. Catch basins shall be spaced so that the run-off does not exceed the intake capacity of the grate. The length of road run-off should not exceed 350'. Designs incorporating storage ponds to reduce the size of storm sewers may be utilized if approved by the Kent County Drain Commission.
- b. Storm run-off calculations using the Kent County Road Commission formula shall utilize imperviousness factors as follows:

Sand	20%
Sand with some Clay	30%
Sandy Clay	40%
Predominately Clay	50%

The road plans shall include sufficient soil borings to determine soil characteristics. The placement of subbase shall be provided where necessary.

- c. When computing energy gradients for storm sewer systems, a head loss of 0.5' shall be used at each manhole. Ponding within the system shall be limited to a maximum height of 0.5' below the top of grate of catch basins and 0.5' below the top of manhole covers with a minimum grade of .60% or velocity of 2 fps.
- d. Catch basin grates, or their equivalent, shall be used according to the following:

36" Cul-de-sac gutter	Type M-1	EJ#5105
Valley Gutter on Grade	Type C4	EJ#7065
Valley Gutter in a Sag	Type BB-3	EJ#7030
Curb and Gutter on grade	Type K	EJ#7045
Curb and Gutter in a Sag	Type BB	EJ#7030
Curb Radii	Type B2	EJ#7085

- e. Strength classifications for sewer pipe shall be in accordance with the table on page #22 except that the catch basin connections shall be a minimum of C-76-III.

- f. When storm sewer is required on centerline, a separate under drain shall be placed parallel to the storm sewer and carried to the nearest manhole, or edge drain may be placed in lieu of the Sewer Pipe Underdrain on centerline, at each shoulder. Under drain shall be 6" or 8" minimum diameter when used as a parallel facility or edge drain. All 6" and 8" underdrain shall be HDPE perforated pipe with sock, meeting the requirements of AASHTO M-252 and the geotextile shall meet AASHTO M288 requirements.
- g. The storm sewer system shall have a positive outlet into a natural body of water, stream, county drain or other approved drainage facility. Culvert end sections and grouted rock should be used at all outlets, except where a sewer outlets into a flowing stream. Where a sewer outlets into a flowing stream, either a 20' length of corrugated steel pipe with grouted rock or concrete pipe with a Kent County Road Commission standard grouted rockfill headwall should be used, depending on the stream size and shape of the stream bank. The corrugated steel pipe shall be lapped over the concrete pipe approximately 1/2 the length of the last section of concrete pipe. In addition, a manhole may be required near the stream bank with the outlet angling in the direction of the stream flow, depending on the stream characteristics and erosion possibilities.
- h. Drainage marker posts shall be placed at the ends of all culverts and storm sewers 48" or less in diameter.
- i. Where culverts are required to carry a drainage course laterally under a street, the length of culvert shall be from right of way line to right of way line plus side slope length beyond the right of way.
- j. Where excess runoff of surface waters, caused by new plat development, may give adjacent property owners cause to claim damages, the developer of said new plat shall provide the Kent County Drain Commission with an easement in the name of the County of Kent from said property owners to provide for passage of this runoff.
- k. Documents creating a drainage district through the Drain Commission Office must be in place prior to construction approval.

5. INTERSECTIONS

- a. Intersection curbs placed on existing streets shall be 23.5' from the centerline on local roads and 25.5' from the centerline on primary roads. If intersection curb openings are greater in width than the existing street pavement, the work between the curb and existing pavement shall be done to the applicable standard. A minimum deceleration taper of 135' and a minimum acceleration taper of 95' shall be used or a deceleration ratio of 10:1 and an acceleration ratio of 7:1.
- b. A minimum curb opening of 39' face of curb to face of curb shall be used on the platted street at intersections with county primary, section line, and 1/4 section line roads.
- c. Left turn lanes, when required, shall be constructed as shown on the detail on page #20 "Left Turn Lane".
- d. MDOT Type B-2 curb will be required at all intersections

6. RIGHT-OF-WAY TREATMENT

- a. Streets shall be graded and cleared to the full right of way width providing for future sidewalk construction except that a 5' berm and slopes no steeper than 1 on 3 may be permitted within plats where each lot has a minimum frontage of 200' and an area of at least one and one half acres; and also includes a provision prohibiting lot splits to lesser frontage or area herein set forth. Clearing in the above exception, is necessary only within the 5' berm and graded areas.
- b. All graded areas within the right of way shall be seeded, fertilized and mulched within five (5) working days of final grading.
- c. No structures shall be allowed on the right of way. Items such as ever burning gas lights, plat ornamental monuments, flags, plat identification signs and advertising signs are not allowed on the right of way.
- d. Utilities in the right of way shall be shown on the plans.
- e. 7 white treated wood guard posts, equally spaced, shall be placed at the ends of all temporary streets. Each post will have a red reflector with a 3" diameter placed 2'6" above existing ground. The reflector shall be #18 or equivalent.

7. NON-COMPLIANCE

Construction of streets not in accordance with these Requirements and Specifications will not be accepted.

8. FINAL PLANS

A set of permanent reproducible "As-Built" plans of all street improvements constructed shall be submitted to the Kent County Road Commission within 60 days, or within a reasonable amount of time, after completion of the project and a Final acceptance has been issued. A computer disk of the final plat, shall be submitted when the plat is presented to the Board of County Road Commissioners for their signatures.

9. FINAL PLAT

The final plat mylar to be recorded and signed by the Road Commission Board will have to meet one of the following requirements:

- a. All construction is complete and a Final Acceptance form has been signed by the Project Engineer.
- b. When construction is not complete, an estimate from the Engineer, of the bid items remaining to be completed with their bid cost will be submitted to the Road Commission for approval. If the submittal is approved, by the Road Commission, a Letter of Credit or Bond may be obtained by the developer for that amount plus 20% for contingencies. The original guarantee document will remain in the Road Commission files for the duration of the development construction. All Letters of Credit or Bonds will be for a period of one year from the date the Road Commission board will sign the plat, but must have a retirement date no earlier that June of the following year. .

E. LOCAL ROAD CONSTRUCTION

When a proposed plat is bordered by an existing county local road which is not constructed to current standards, that portion of the road which fronts on the plat shall be reconstructed as necessary to improve the road to conform to current standards as shown on the attached "Local Road Typical Section". The amount of work required will vary in accordance with the condition of the existing road.

1. RESPONSIBILITY

- a. When improvement of only one side of the road is required, all costs shall be borne by the developer, including preparation of plans and specifications.
- b. Responsibility for the work when improvement of the entire road is required shall be as follows: All costs shall be borne by the developer, except that if in cooperation with the developer, the township requests construction of the local road by the Kent County Road Commission, the Road Commission may participate in the cost of construction in accordance with current policy.

New platted street intersections involved in the improvement shall be considered as part of the plat and shall not be included in the cost participation. Financial arrangements shall be between the developer and the township, and between the township and the Kent County Road Commission.

The developer shall prepare separate plans, specifications, and a detailed cost estimate for the proposed road improvement and shall bear the costs involved in accomplishing this work.

Upon review and approval of the plans, specifications and cost estimate, if the township requests construction, the Kent County Road Commission will construct the local road improvement with its own forces or by contract with a private construction company.

All new platted streets accessing an existing public road that is gravel, will improve the existing gravel road 200 feet each way from the new intersection. The road will be constructed to the KCRC standard Local Road typical section.

2. UTILITIES AND GRADING PERMITS

Utilities to be relocated shall be shown on the plans. The Road Commission shall handle coordination of utility relocation in the field. In the event a utility exists within a private easement outside the road right of way and the local road construction necessitates the relocation of this utility, the Road Commission shall participate in the cost of this work. Additional relocation costs due to newly platted street intersections connecting to the county road shall be considered as part of the plat and shall not be included in the cost participation. The developer shall obtain grading permits required outside the limits of the developer's property to accommodate road construction.

3. OTHER THAN NEW PLAT

Local roads to be taken over by the Road Commission shall conform to Kent County Road Commission Standards. The standard frontage fee covering engineering review costs will be required for these roads.

III GENERAL NOTES

(To Be Shown on plans)
(5-27-03)

1. The performance of this work shall be governed by the Michigan Department of Transportation current Standard Specifications for Highway Construction except where modified by the requirements of the Kent County Road Commission.
2. Roadway construction shall conform to Kent County Road Commissions Standards as follows:

<u>ITEM</u>	<u>STANDARD PLAN NO.</u>
Concrete Curb and Curb &Gutter	MDOT Det. R-30-D (30-inch)
Catch Basins and Manholes	K-CB-1
Catch Basins and Manhole Covers	K-CBC-1
Driveway Approaches	K-DW-1
Guard Posts, Drainage Marker Post, Bituminous Downspout and Misc. Special Details.	K-SD-1&2

3. The Kent County Road Commission and any affected agency or utility shall be notified a minimum of 3 working days before the start of construction, excluding Saturdays, Sundays and holidays.
4. All necessary permits must be obtained prior to the beginning of work.
5. Traffic signs, barricades, or other devices necessary to insure safety to the public shall be placed prior to the beginning of work.
6. Sod and loam topsoil shall be removed the width of the subgrade and can be wasted outside of the roadway. Treatment of peat marshes shall be in accordance with Michigan Department of Transportation Standard Method A-1.
7. Where unsuitable material is encountered, it shall be excavated the width of the subgrade to a depth of 5' below finished grade and wasted outside the right-of-way. Backfill shall meet granular material CI II requirements.
8. Where unforeseen subsoil conditions warrant it, underdrain or edgedrain, approved by the Kent County Road Commission Engineering Department, shall be placed during construction.
9. Outlets of storm sewers, ditches, and areas where concentrations of runoff occur shall be protected against erosion by sodding, riprap, mulch blankets, or other means approved by the Engineer. End sections are required on all culverts.
10. Drainage marker posts shall be placed at the ends of all culverts and storm sewers 48" or less in diameter.

11. The subgrade and each successive improved layer of material shall be checked for grade and density and approved by the Consulting Engineer prior to placing subsequent layers. The Consulting Engineer shall notify the Kent County Road Commission's Engineering Department that the final aggregate grade has been approved. All bituminous paving will then be coordinated through the Kent County Road Commission's Engineering Department.
12. Aggregate and Class AA Approach shall be placed and compacted in accordance with Kent County Road Commission specifications. All density reports including; embankment (if required), sand subbase (if required) and the aggregate 22A, will be sent to the Kent County Road Commission Engineering Department prior to paving.
13. All graded areas within the right-of-way shall be seeded, fertilized and mulched within five working days of final grading.
14. Catch basin grates shall be used according to the following, with East Jordan Iron Works or equivalent castings:

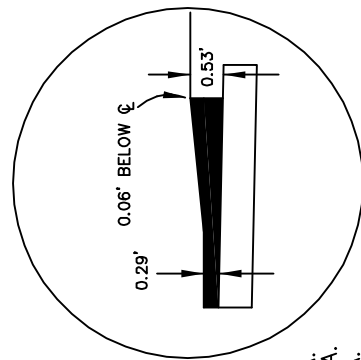
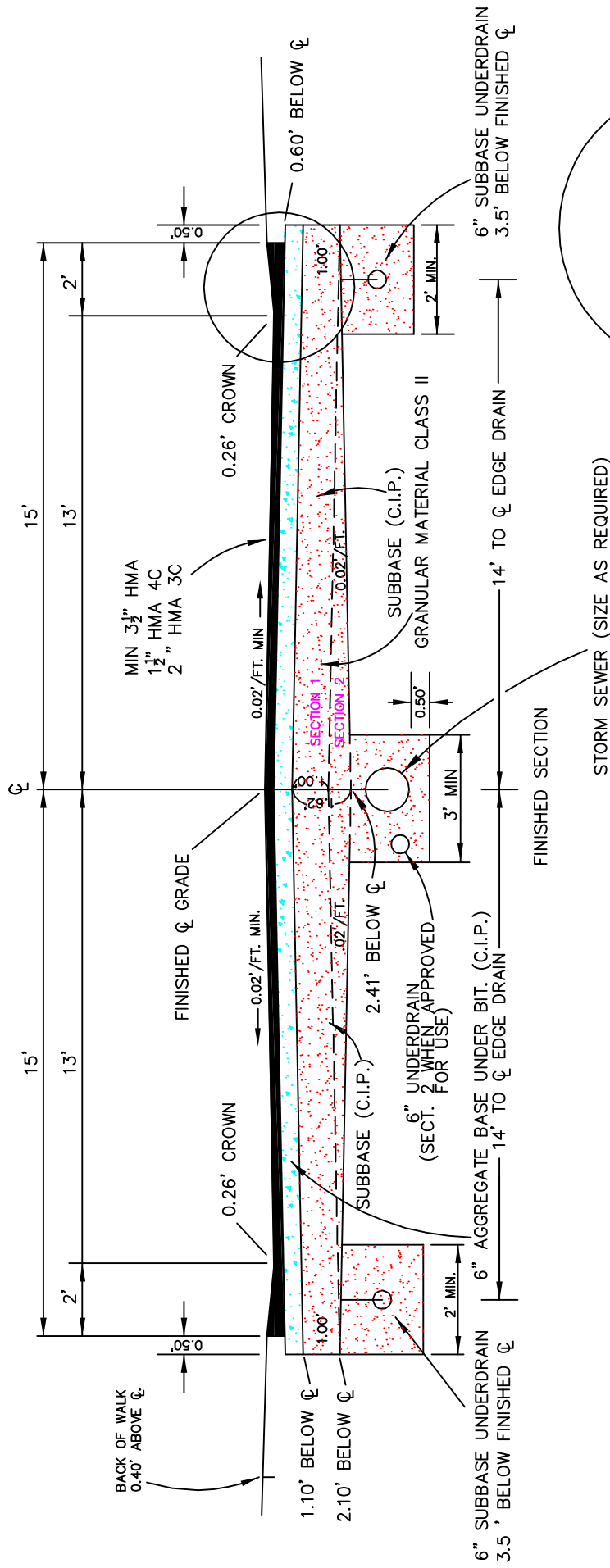
	<u>GRATES</u>	<u>EJIW</u>
36" Cul-de-sac Gutter	Type M-1	#5105
Valley Gutter on Grade	Type C4	#7065
Valley Gutter in a sag	Type BB-3	#7030
Curb and Gutter on Grade	Type K	#7045
Curb and Gutter in a Sag	Type BB	#7030
Intersection Curb Radii	Type B2	#7085

15. Curb returns at intersections shall be constructed with dub-downs for future sidewalk ramps per detail K-SD-1.
16. The consulting engineer shall maintain certification of all materials used on the project. Copies of the certifications shall be available upon request.
17. Bituminous paving shall consist of two courses. The leveling course shall be 2" of Bituminous Mix No.3C and the surfacing course shall be 1 1/2" Bituminous Mix No.4C. The Bituminous mixture type is subject to change based on MDOT recommended mixture design and application. Bituminous surface course will not be placed after November 1. Written approval from the Kent County Road Commission's Engineering Department will be required for placement of any bituminous course after November 1. Placement of bituminous material without written approval will be cause for non-acceptance or removal by the owner.
18. Bituminous paving will not be allowed prior to approval of the sanitary sewer, by the appropriate agency.
19. All structures adjusted for Bituminous will have the following cross-section; Concrete mix compacted to the flange and bituminous leveling compacted to within 1 1/2" of the top of the casting.
20. All 4", 6", & 8" Sewer Pipe Under drain will be N-12 (or equivalent HDPE) SLCCP, Smooth Lined Corrugated Plastic Pipe. Underdrain in a roll will not be allowed within the road influence area.
21. A written permit to place, signed by the Project Engineer and acknowledged by the contractor, will be required for each level of construction.

22. All Catch Basins, Storm Manholes and Storm Sewers are to be visually inspected and cleaned, as necessary, prior to final acceptance.
23. Density tests are required for all plats based on the following frequency:
 - a. 1 test per structure (Manholes, Catch Basins, or Culverts)
 - b. 1 test per pipe run
 - c. 1 test per 500 feet per lane (Subbase)
 - d. 1 test per 500 feet per lane (Agg Base)
 - e. 1 test per 500 feet/after a roller pattern is set (Bituminous Pavement)
24. There will be no Final Acceptance/Final Takeover of public streets or plats between the period of December 15 and March 15. Plats and streets will not be accepted for winter maintenance.
25. All storm catch basins shall have minimum 36-inch sump.
26. All storm sewers and culverts, including catch basin leads, shall be constructed with premium joints – flexible rubber compression gaskets per Sections 401, 402, and 909 of MDOT's 2003 Standard Specifications for Construction.

STANDARD SECTIONS
DETAILS & TABLES

KENT COUNTY ROAD COMMISSION
 STANDARD 30' BITUMINOUS VALLEY GUTTER SECTION
 FOR USE IN IMPERVIOUS SOILS



STORM SEWER PIPE & UNDERDRAIN
 FLOWLINE ELEVATION TO BE A MINIMUM OF
 4' BELOW FINISHED CENTERLINE GRADE.
 PLACE 6" SUBBASE UNDERDRAIN AS
 REQUIRED FOR SOIL CONDITIONS.

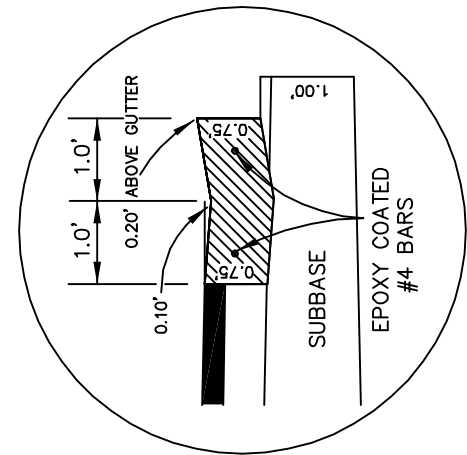
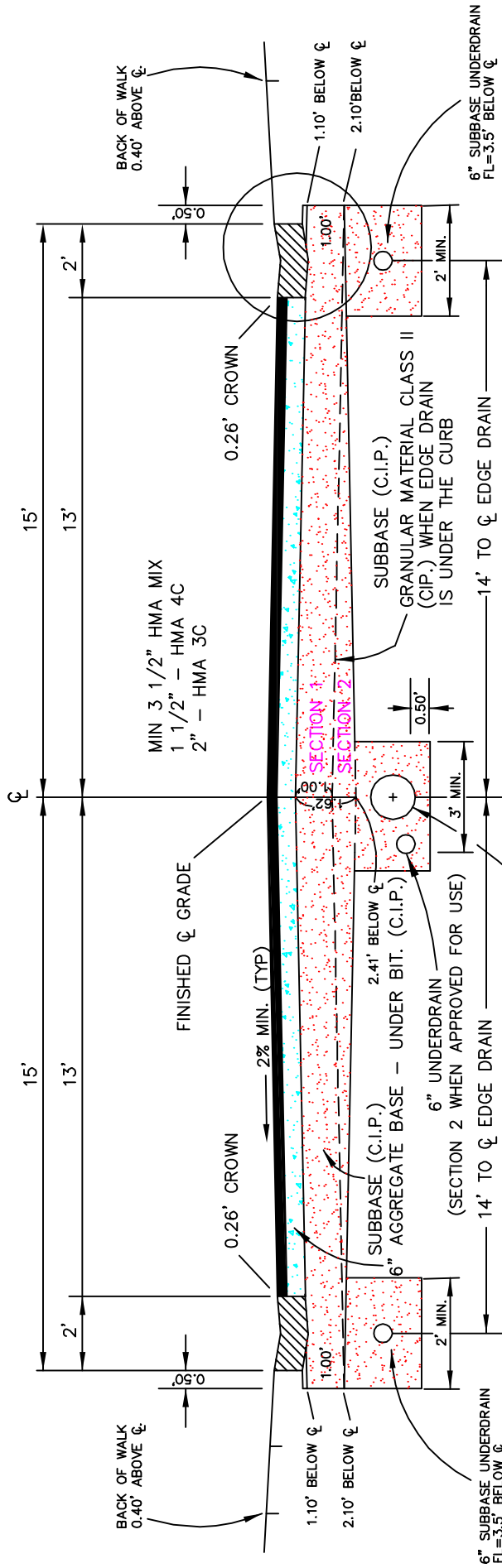
MATERIALS AND WORKMANSHIP SHALL COMPLY
 WITH CURRENT MICHIGAN DEPARTMENT OF
 TRANSPORTATION STANDARD SPECIFICATIONS.

ESTIMATED QUANTITIES

SUBBASE (C.I.P.)-	
SECTION 1 (NORMAL)	114.81 CYD. PER STA.
SECTION 2 (WHEN APPROVED FOR USE)	149.83 CYD. PER STA.
AGG. BASE CSE. (C.I.P.)	57.41 CYD. PER STA.
HMA MIX. 1 1/2" -4C	31.17 TON PER STA.
HMA MIX 2" -3C	36.67 TON PER STA.

ADD 20% FOR IRREGULARITIES

KENT COUNTY ROAD COMMISSION
 26' BITUMINOUS WITH 24" CONC. VALLEY GUTTER SECTION
 FOR USE IN IMPERVIOUS SOILS



STORM SEWER PIPE & UNDERDRAIN
 FLOWLINE ELEVATION TO BE A MINIMUM OF 4' BELOW
 FINISHED CENTERLINE GRADE.
 PLACE 6" SUBBASE UNDERDRAIN AS
 REQUIRED FOR SOIL CONDITION

ESTIMATED QUANTITIES

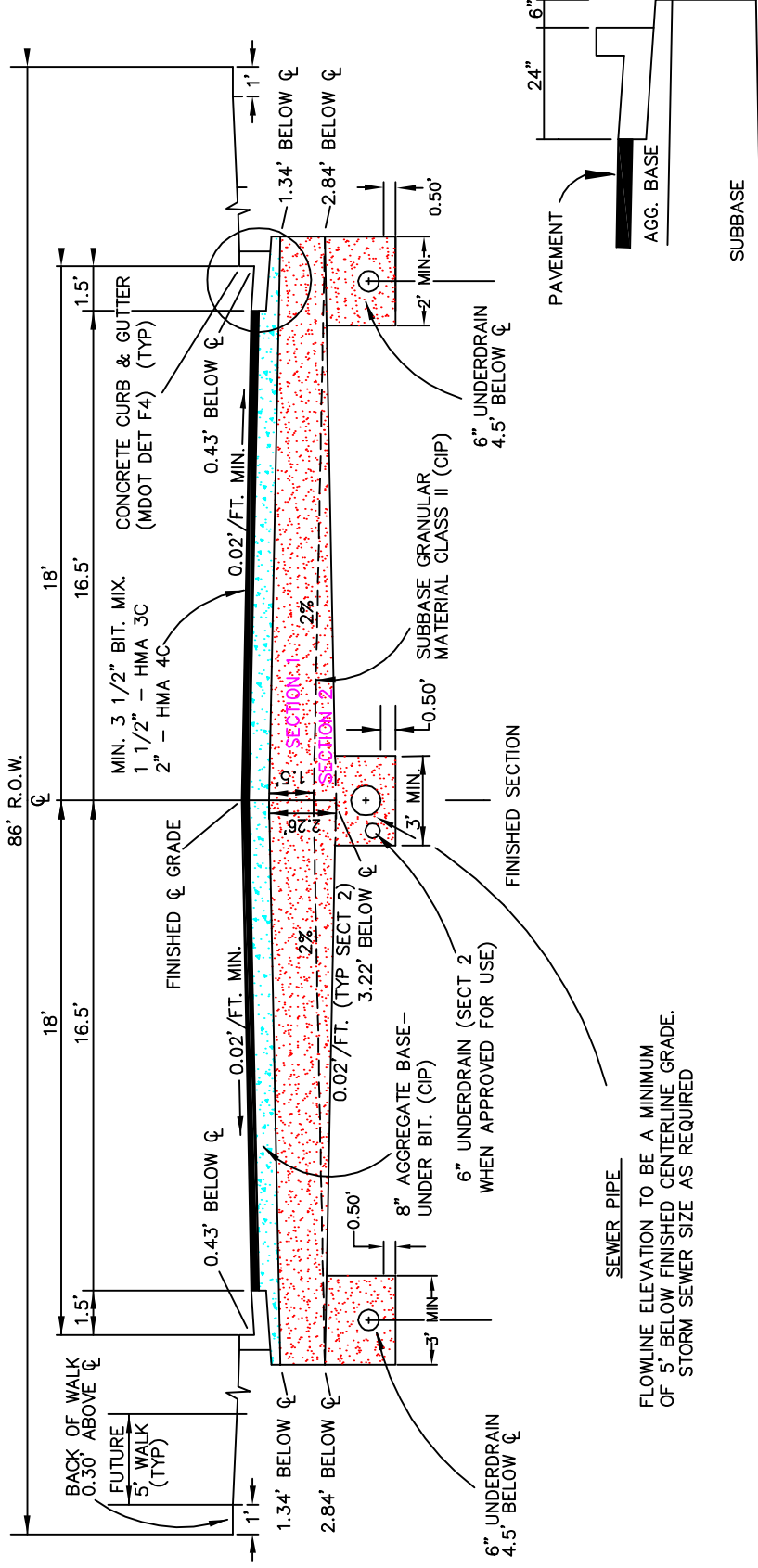
SUBBASE (C.I.P.)	114.24 CYD. PER STA.
SECTION 1 (NORMAL)	149.83 CYD. PER STA.
SECTION 2 (WHEN APPROVED FOR USE)	48.15 CYD. PER STA.
AGG. BASE CSE. (C.I.P.)	23.83 TON PER STA.
HMA MIX. 1 1/2"-4C	31.78 TON PER STA.
HMA MIX. 2"-3C	

MATERIALS AND WORKMANSHIP SHALL COMPLY
 WITH CURRENT MICHIGAN DEPARTMENT OF
 TRANSPORTATION STANDARD SPECIFICATIONS.

ADD 20% FOR IRREGULARITIES

KENT COUNTY ROAD COMMISSION STANDARD SECTION FOR INDUSTRIAL AND COMMERCIAL STREETS

FOR USE IN IMPERVIOUS SOILS



SEWER PIPE
FLOWLINE ELEVATION TO BE A MINIMUM OF 5' BELOW FINISHED CENTERLINE GRADE. STORM SEWER SIZE AS REQUIRED

USE EPOXY COATED REINFORCEMENT BARS IN CONCRETE CURB & GUTTER

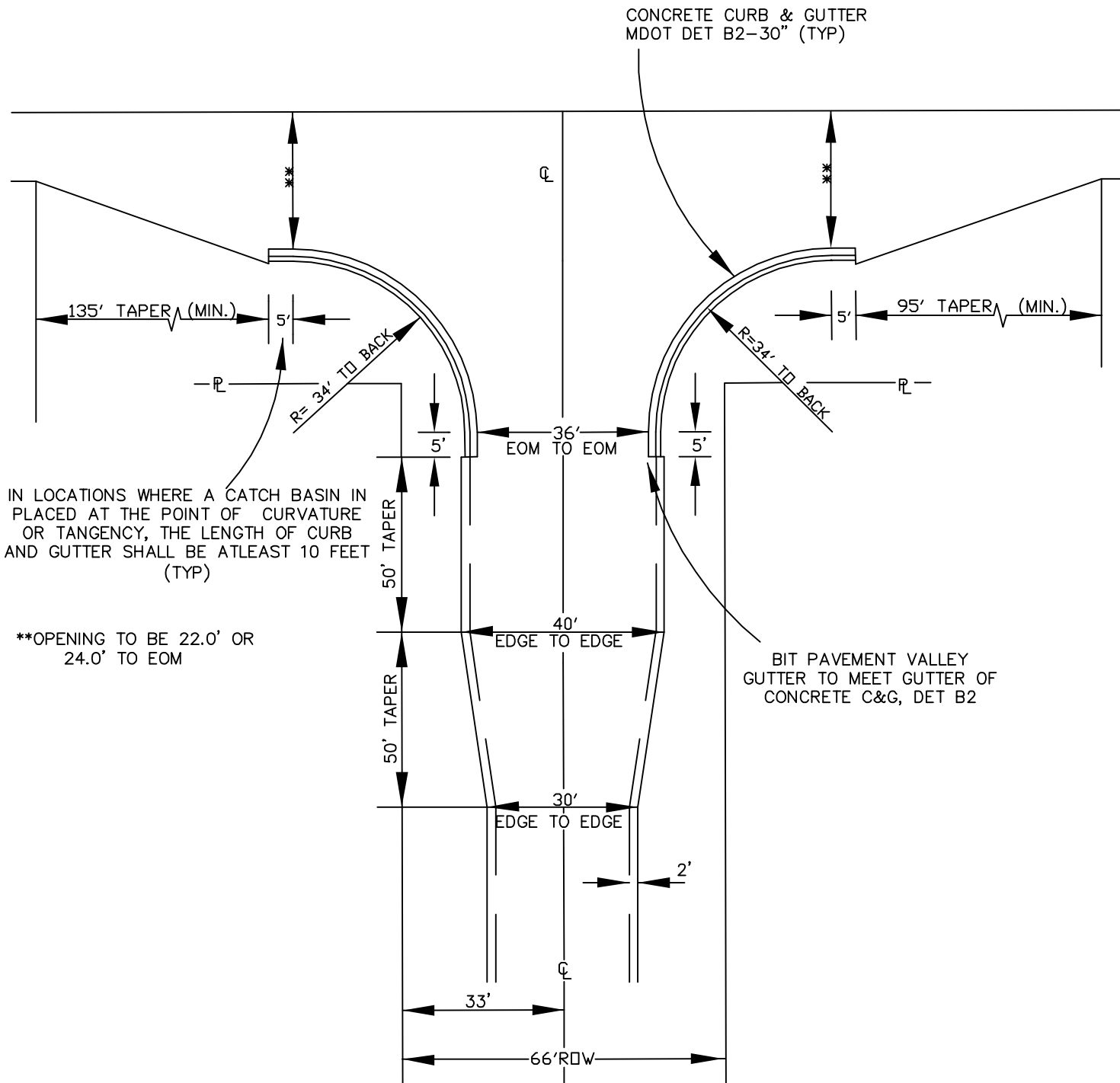
ESTIMATED QUANTITIES

SUBBASE (C.I.P.) SECTION 1 (NORMAL)	211.11 CYD. PER STA.
SECTION 2 (WHEN APPROVED FOR USE)	264.59 CYD. PER STA.
AGG. BASE CSE. (C.I.P.)	99.29 CYD. PER STA.
HMA MIX. 1 1/2"-4C	30.25 TON PER STA.
HMA MIX. 2"-3C	40.33 TON PER STA.

ADD 20% FOR IRREGULARITIES

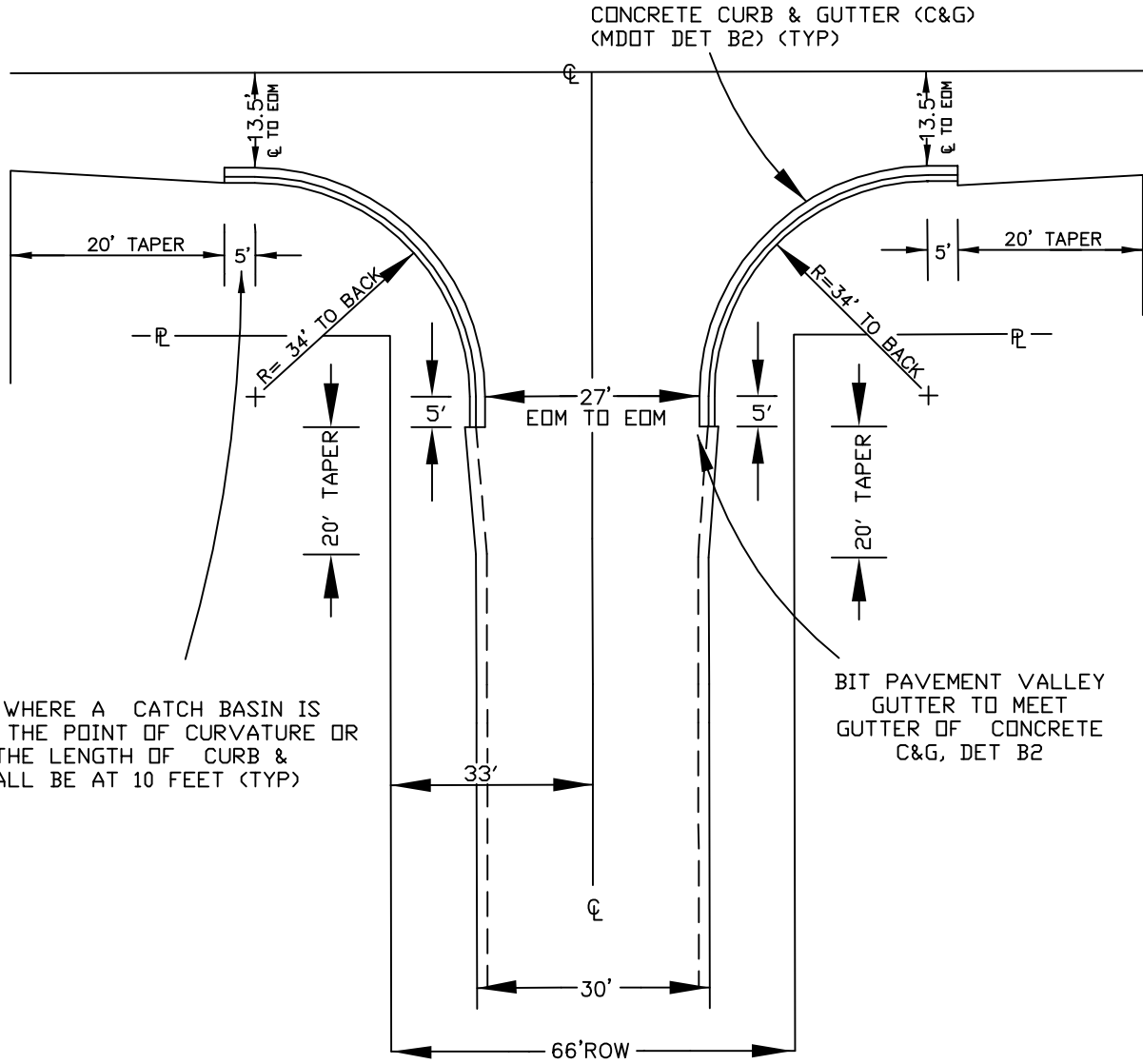
MATERIALS AND WORKMANSHIP SHALL COMPLY WITH CURRENT MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.

KENT COUNTY ROAD COMMISSION
 INTERSECTION DETAIL FOR RESIDENTIAL PUBLIC
 STREETS WITH EXISTING COUNTY PRIMARY OR LOCAL
 ROAD



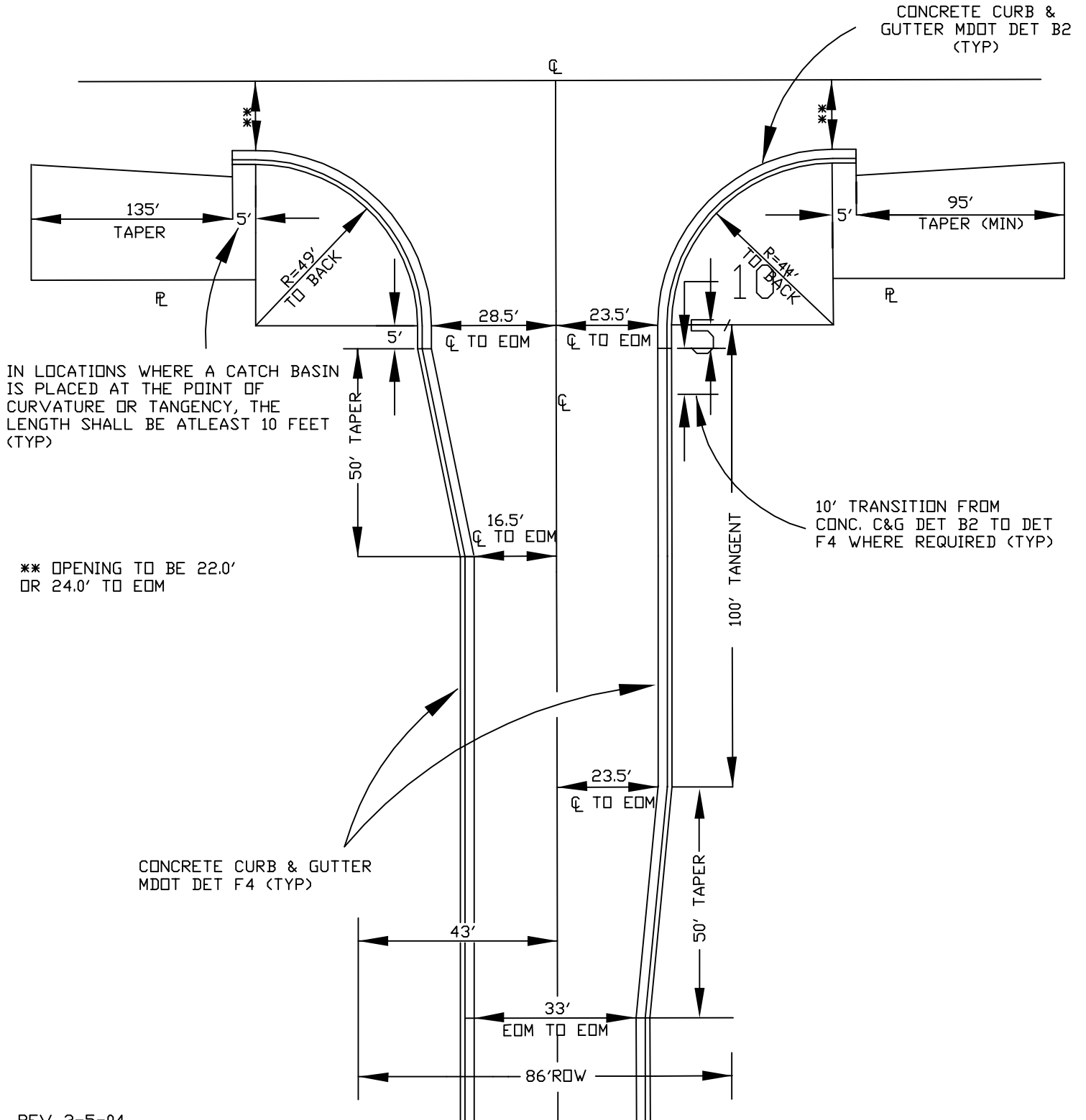
REV 3-5-04
 5-27-03
 RESIDENTIAL_INTER

KENT COUNTY ROAD COMMISSION
RESIDENTIAL INTERSECTION DETAIL
IN ALL PUBLIC STREETS
(RESIDENTIAL AREAS)



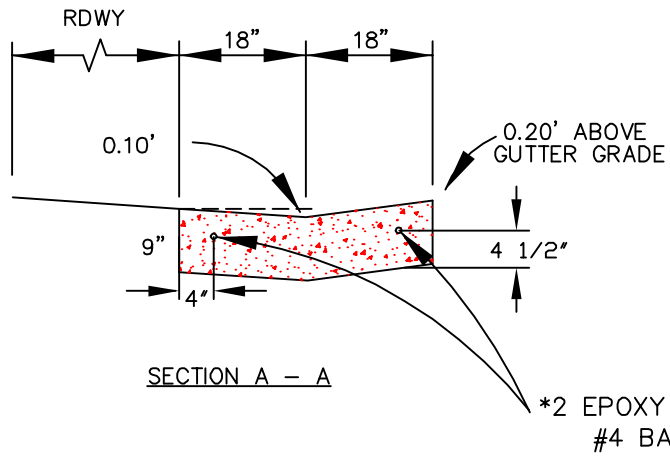
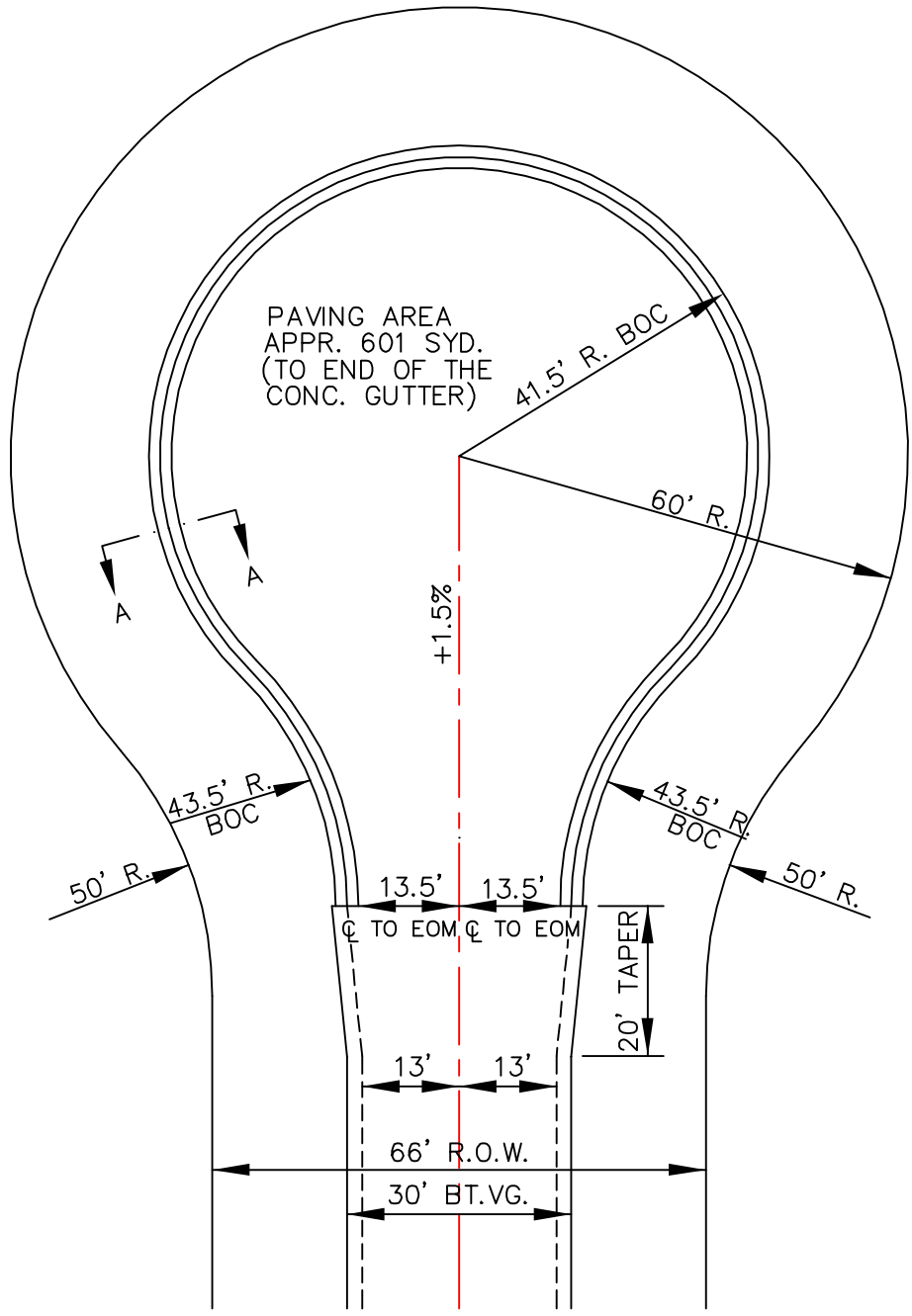
USE EPOXY COATED REINFORCEMENT BARS IN CONCRETE CURB & GUTTER

KENT COUNTY ROAD COMMISSION COMMERCIAL/INDUSTRIAL INTERSECTION DETAIL

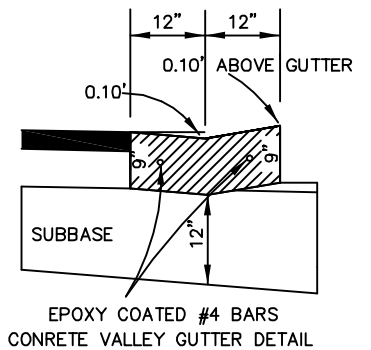
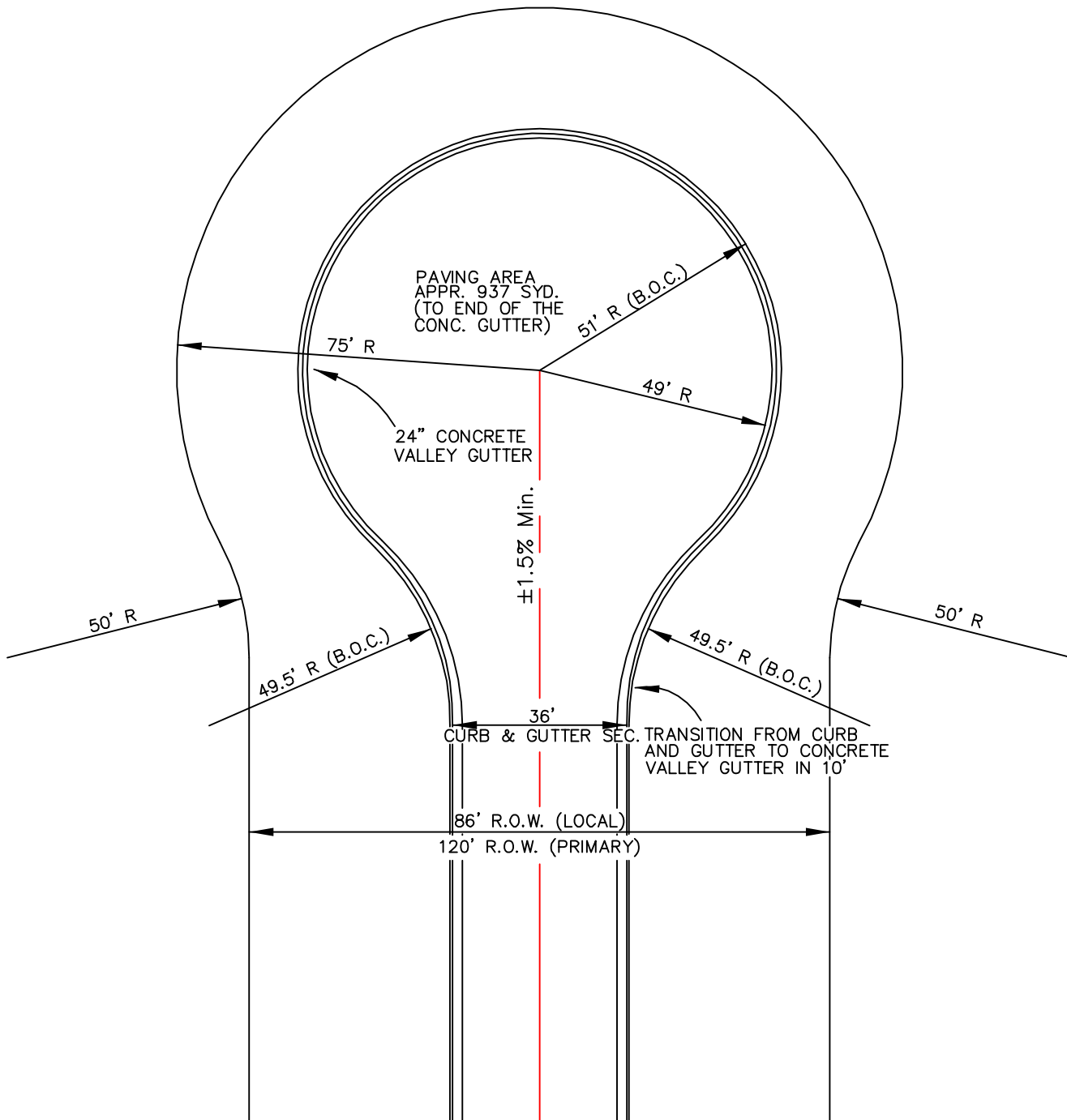


REV 3-5-04
ACAD-COM_INTER
5-27-03

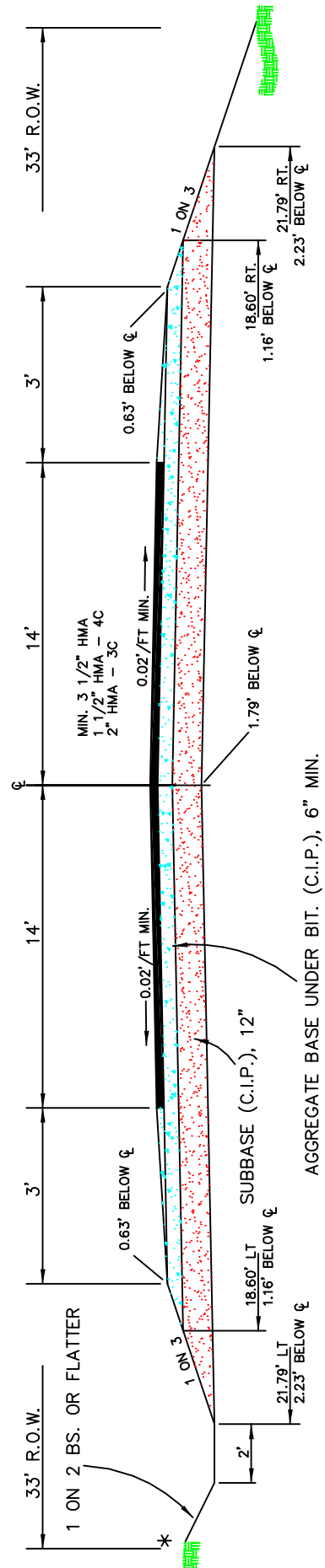
KENT COUNTY ROAD COMMISSION DETAIL OF RESIDENTIAL CUL-DE-SAC



KENT COUNTY ROAD COMMISSION
 DETAIL OF INDUSTRIAL AND COMMERCIAL CUL-DE-SACS



KENT COUNTY ROAD COMMISSION
 LOCAL ROAD TYPICAL SECTION #1



* DEVELOPER SHALL OBTAIN GRADING PERMITS AS REQUIRED BY KCRC.

FOR INDUSTRIAL OR COMMERCIAL PLATS, THE APPROPRIATE CURB AND GUTTER SECTION AS SHOWN OF SHEET #14 SHALL BE USED.

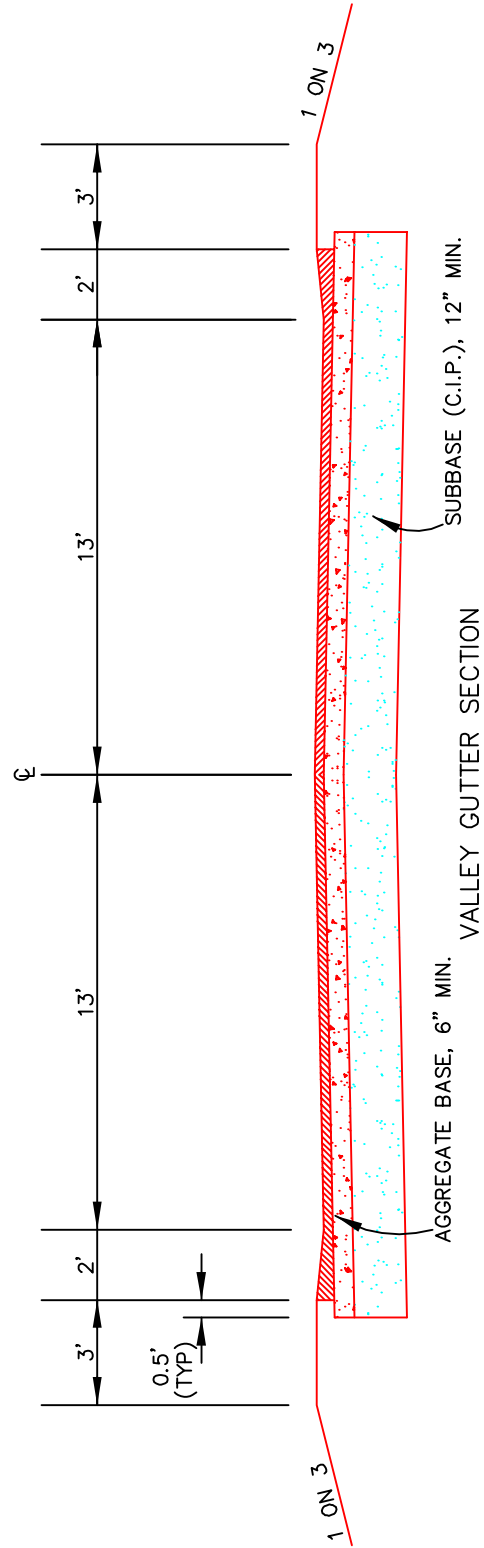
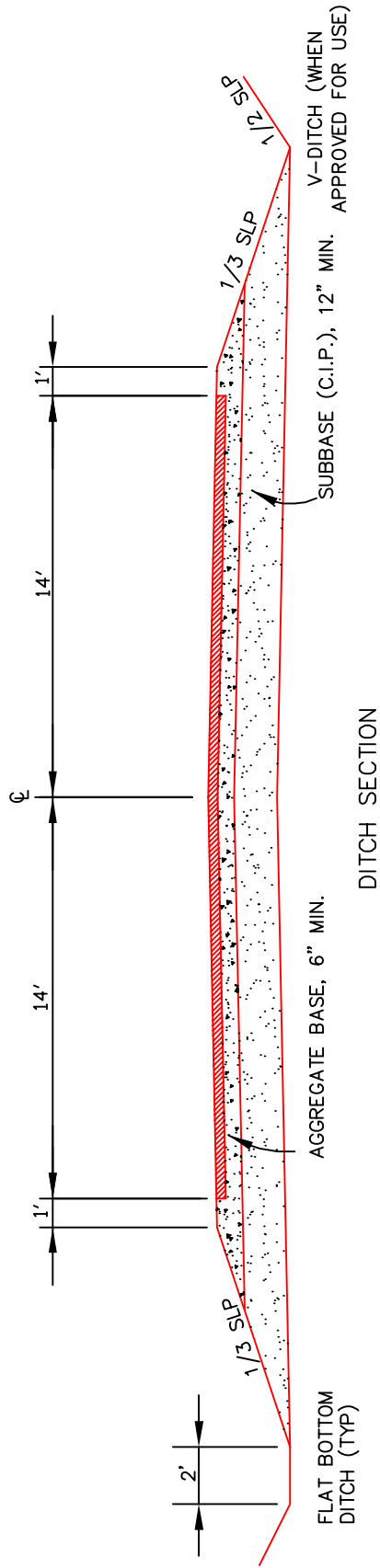
AGGREGATE BASE UNDER BIT. (C.I.P.), 6" MIN.

ESTIMATED QUANTITIES

SUBBASE (C.I.P.)	149.59 CYD. PER STA.
AGG. BASE CSE. (C.I.P.)	69.26 CYD. PER STA.
HMA MIX 1 1/2" 4C	25.67 TON PER STA.
HMA MIX. 2" 3C	34.22 TON PER STA.
ADD 20% FOR IRREGULARITIES	

NOTE: ALL SLOPES 1 ON 2 OR GREATER AND DITCHES WITH A 1% GRADE OR MORE SHALL BE STABILIZED WITH MULCH BLANKETS OR WITH SEED, FERTILIZER AND MULCH.

KENT COUNTY ROAD COMMISSION
 LOCAL ROAD TYPICAL SECTIONS #2 & #3



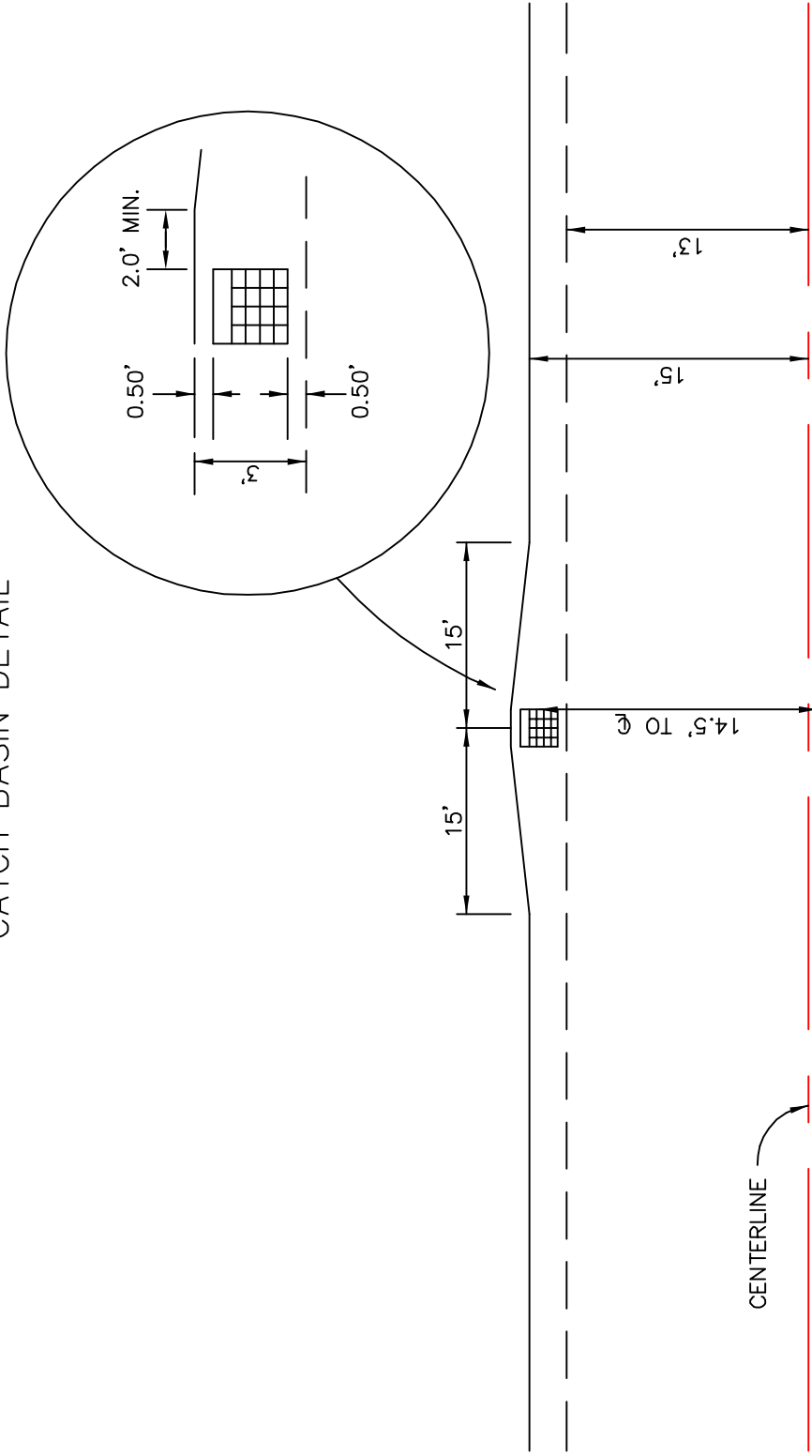
LEGEND

HMA SURFACE 3 1/2"	
GRAVEL (6")	
SSB (IF NECESSARY)	

BITUMINOUS SURFACING
 1 1/2" HMA 4C OVER
 2" HMA 3C

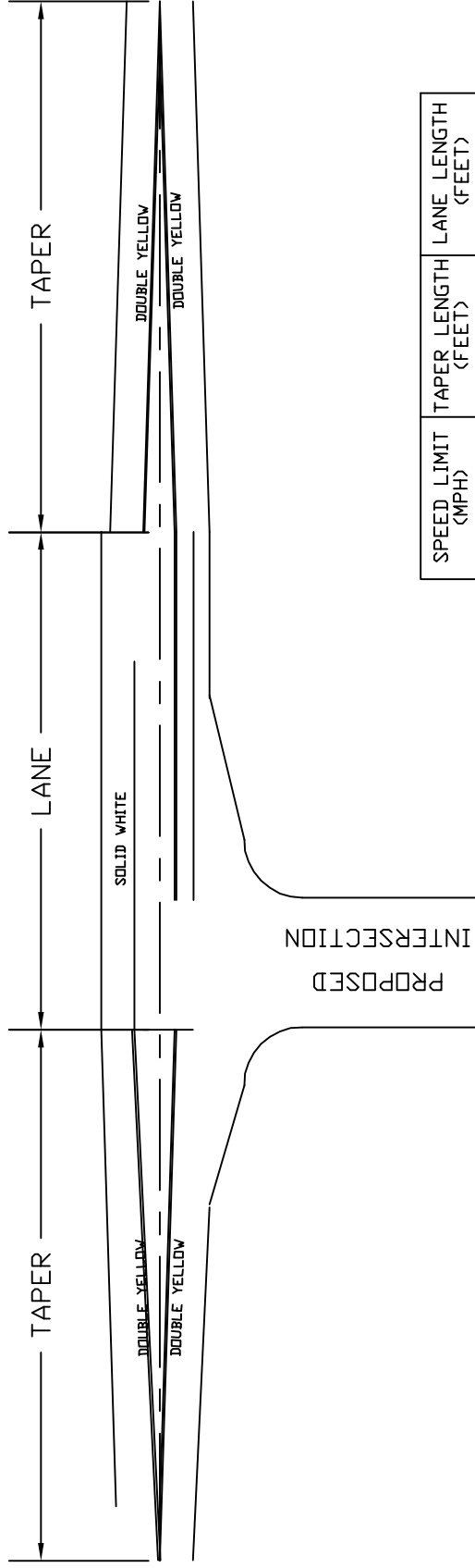
REV 3-5-04
 ACAD-LOC_TYP6
 5-27-03

BLACKTOP VALLEY GUTTER
CATCH BASIN DETAIL



SET CATCH BASINS IN VALLEY GUTTER SECTION 0.36' BELOW CENTERLINE GRADE.
GRATE TYPES ARE SHOWN ON THE ROAD PLANS. CENTERLINE OF CATCH BASIN
TO BE 14.5' LEFT OR RIGHT OF THE ROAD CENTERLINE.

LEFT TURN LANE DESIGN
FOR
(AN EXISTING PUBLIC STREET)



SPEED LIMIT (MPH)	TAPER LENGTH (FEET)	LANE LENGTH (FEET)
25	65	100
30	90	100
35	125	150
40	160	150
45	270	150
50	300	200
55	330	200

KENT COUNTY ROAD COMMISSION STREET NAMING GUIDELINES

1. East and West roads are called “Streets”, except for the mile roads North of Grand Rapids; they are called “Roads”. North and South roads are called “Avenues”.
2. Permanent cul-de-sacs will be called “Courts” and will maintain the same prefix as the street they connect to, i.e. Sam Street and Sam Court. All other names of courts in the same development must use a name for the court that is not used in the proposed development as a street name.
3. Other allowable suffixes are Drive and Boulevard. Boulevard can be used if there is a median separation of at least 102’ in length from the ROW line into the development.
4. Where a new street lines up with an existing public street, our policy is to use the existing street name at the intersection, and to use the public street name for the new private street name unless the private street intersects with a state highway, or county primary road. Under these circumstances, a different street name may be used.
5. Do not use names that are different in spelling but sound the same i.e. Gene-Jean, or Rayburn-Reyburn.
6. Do not use names already in use in Kent County or another municipality in Kent County. Do not change a name from a street to an Avenue or Drive. Example: If Oak Street is a recorded street name, Oak Drive will not be allowed.
7. Limit the names of streets to fifteen (15) letters. Stonebridge Point Drive has 21 letters/spaces and that is too many for the size of the street sign stock.
8. There will be a limit of six (6) times as to how many times a particular prefix can be used in a development in Kent County. Using the beginning prefix of such common names as Oak, Pine, and Maple, to name a few, will not be allowed.
9. Unusual suffixes, such as the following examples: Pass, Trail, or Circle will not be acceptable for usage. Double endings such as Pine Trail Drive or Division Avenue Blvd are not acceptable.
10. Street names should change at intersections or at 90-degree turns and not in the middle of curves.
11. Suffixes will not be included on the street name sign with the exception of “Ct.” as an abbreviation for “Court”.

**KENT COUNTY ROAD COMMISSION FOR
SEWER PIPE UNDERDRAIN UNDER
PAVEMENT AND SHOULDERS**

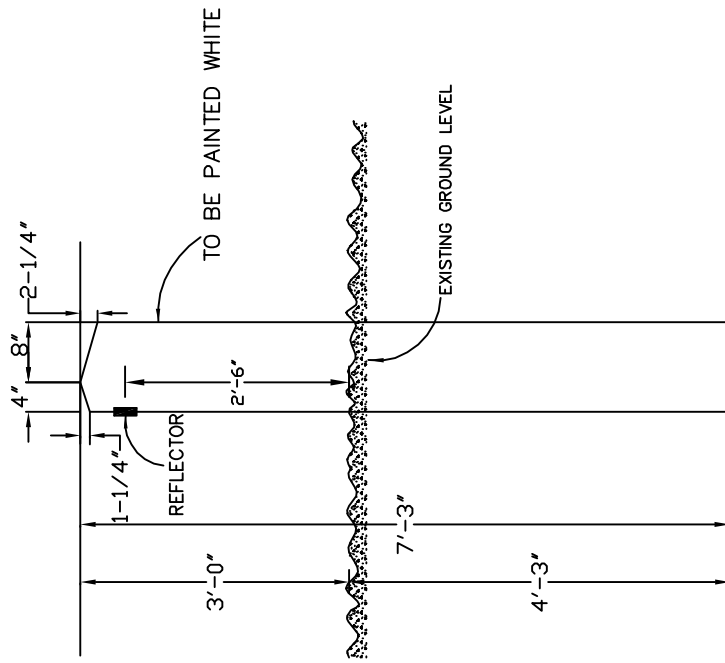
Pipe Dia.	0' to 2'	2.1' to 3'	3.1' to 8'	8.1' to 14'
6"	NO	*	*	*
8"	NO	*	*	*
12"	C-76-IV	C-76-III	C-76-III	C-14-III, C-76-IV
15"	C-76-IV	C-76-III	C-76-III	C-14-3, C-76-III
18"	C-76-IV	C-76-III	C-76-III	C-14-3, C-76-III
21"	C-76-IV	C-76-III	C-76-III	C-14-3, C-76-III
24"	C-76-IV	C-76-III	C-76-III	C-14-3, C-76-III
27"	C-76-IV	C-76-III	C-76-II	C-76-III
30"	C-76-IV	C-76-III	C-76-II	C-76-III
36"	C-76-IV	C-76-III	C-76-II	C-76-III
42"	C-76-IV	C-76-III	C-76-II	C-76-III
48"	C-76-IV	C-76-III	C-76-II	C-76-III
54"	C-76-IV	C-76-III	C-76-II	C-76-II
60"	C-76-IV	C-76-III	C-76-II	C-76-II

*** ALL 6" AND 8" UNDERDRAIN SHALL BE N-12 (OR EQUIVALENT HDPE) SLCCP CORREGATED PLASTIC PIPE WITH SOCK (ASSHTO M-252) WITH GEOTEXTILE REQUIREMENTS OF (ASHTO M-288)**

ALL CROSS PIPES AND LATERALS TO CATCH BASINS SHALL BE C-76-III

ALL STORM SEWERS, INCLUDING CULVERTS, CROSS PIPES AND LATERALS TO CATCH BASINS, SHALL BE CONDUCTED WITH PREMIUM JOINTS-FLEXIBLE RUBBER COMPRESSION GASKETS PER SECTIONS 402 AND 909, MDOT'S 2003 STANDARD SPECIFICATIONS FOR CONSTRUCTION.

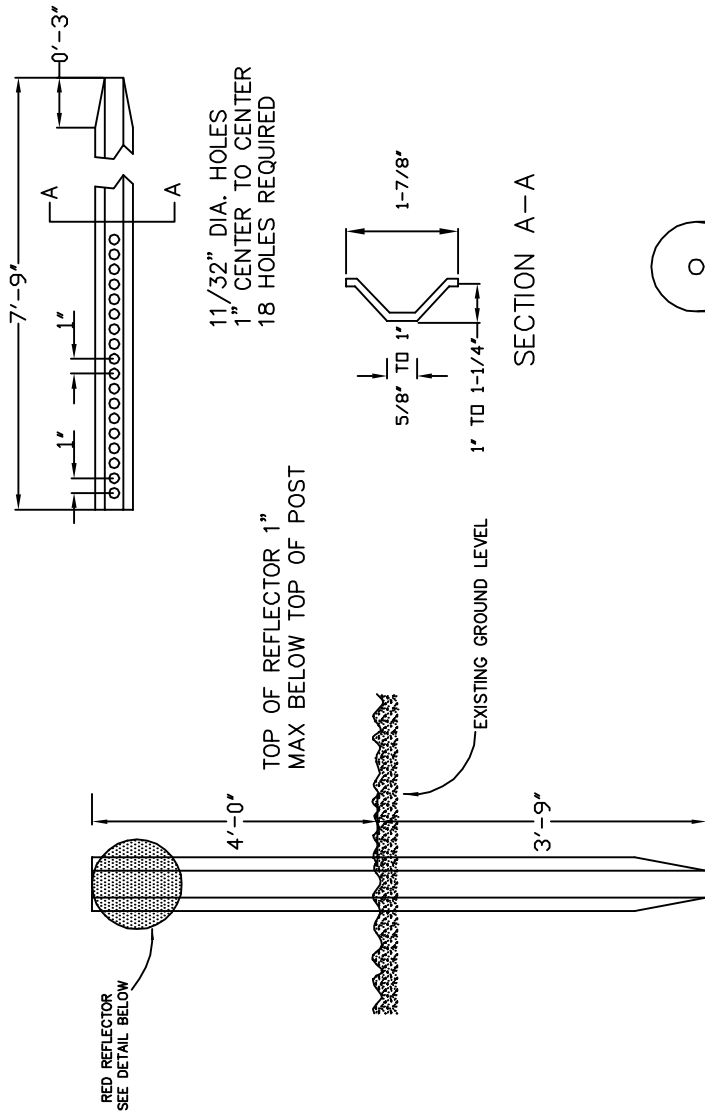
GUARD POST



ALL POSTS SHALL BE ROUND AND SHALL HAVE MINIMUM DIAMETERS OF 6 3/4" AT THE TOP AND 7 3/4" AT THE BOTTOM.

ALL POSTS SHALL BE TREATED IN ACCORDANCE WITH THE CURRENT M.D.O.T. STD. SPECIFICATIONS

DRAINAGE MARKER POST



DIMENSIONS SHOWN ARE MINIMUM AND MAXIMUM PERMISSIBLE
7'0" MIN. LENGTH, GALV. STEEL POST
MIN. NOMINAL WEIGHT-133LBS./FT.

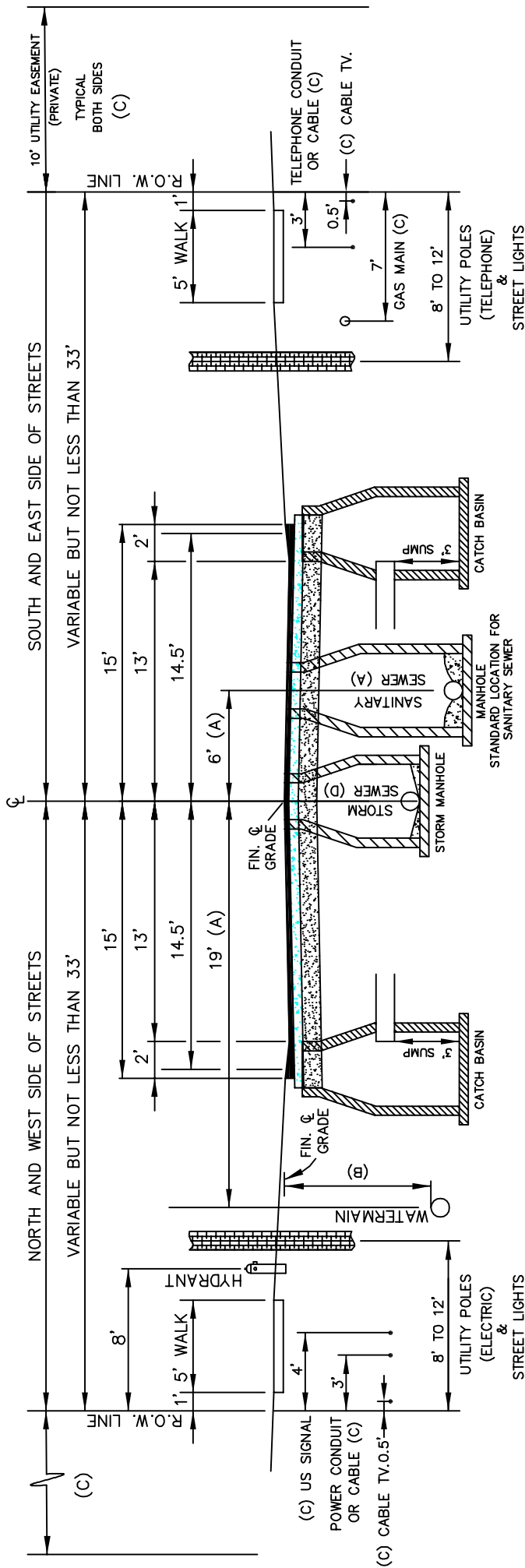
POST AND REFLECTOR UNIT SHALL CONFORM TO CURRENT M.D.O.T. STD. SPEC'S

KENT COUNTY ROAD COMMISSION
UTILITY LOCATIONS
Preferred and Alternate locations for
Utilities in Platted Streets and Roads
Revised January 1996

TYPE OF ROAD	PLAT - 66' ROW 30' STREET		66' ROW FUTURE 43' STREET		86' ROW FUTURE 51' STREET		100' ROW FUTURE 51' OR 63'	
	Preferred	Alternate	Preferred	Alternate	Preferred	Alternate	Preferred	Alternate
Sanitary Sewer	6' S/E	6' S/E	6' S/E	15' S/E	6' S/E	18' S/E	37' S/E	24' S/E
Storm Sewer	Centerline	CL-15' S/E	Centerline	CL-22'S/E	Centerline	CL-26' S/E	Centerline	6' N/W
Gas Main	26' S/E		26' S/E		36' S/E		43' S/E	
Watermain	19' N/W		27' N/W		30' N/W		37' N/W	
Power Poles			25' N/W		35' N/W		42' N/W	
Ameritech Poles			25' S/E		35' S/E		42' S/E	
C. P. Cable-Conduit	30' N/W	27'-30' N/W	30' N/W	27'-32' N/W	40' N/W	37'-42' N/W	47' N/W	44'-49' N/W
Ameritech Cable-Conduit	30' S/E	27'-32' S/E	30' S/E	27'-32' S/E	40' S/E	37'-42' S/E	47' S/E	44'-49' S/E
Cablevision	6" From PL	6" From PL	6" From PL	6" From PL	6" From PL	6" From PL	6" From PL	6" From PL
Sidewalk	5' Wide at 1' from ROW	5' Wide at 1' from ROW	5' Wide at 1' from ROW	5' Wide at 1' from ROW	5' Wide at 1' from ROW	5' Wide at 1' from ROW	5' Wide at 1' from ROW	5' Wide at 1' from ROW
Communication Cable	30' N/W	30' N/W	30' N/W	30' N/W	86' ROW 36' Street			
Street Light Poles	AT LEAST 21' N,S,E, & W						For Future Widening	
					San. Sewer	6' S/E		
					Gas	36' S/E		
					Watermain	30' N/W		

NOTE: All open cuts of Driveways
will be by permission of the
Property owners, not by KCRC.

LOCATION OF UTILITIES IN NEW PLATTED STREETS



NOTES:

All underground utility crossings of section line, section quarterline, and existing county primary and principle local roads shall be a minimum of 72" deep.

All buried cable road crossings will be a minimum of 48" deep under new platted and un-platted streets.

Boring pits to be 10' back of curbs or valley gutter, and 15' back of blacktop edge.

(A) KCRC may require sanitary sewer and/or watermain be placed outside the roadway area (to be determined on a case by case basis)

(B) Watermain shall be installed at least 5'-9" below Finish Centerline grade.

(C) Power, Telephone, Gas, Television, Electric, etcetera, conduits and/or cables will be located in a 10' Utility Easement adjacent to new platted or unplatted public streets. Utility locations within right of way as shown above generally applies to County primary roads and principle local roads Contact KCRC Engineering Dept. with request for location approval.

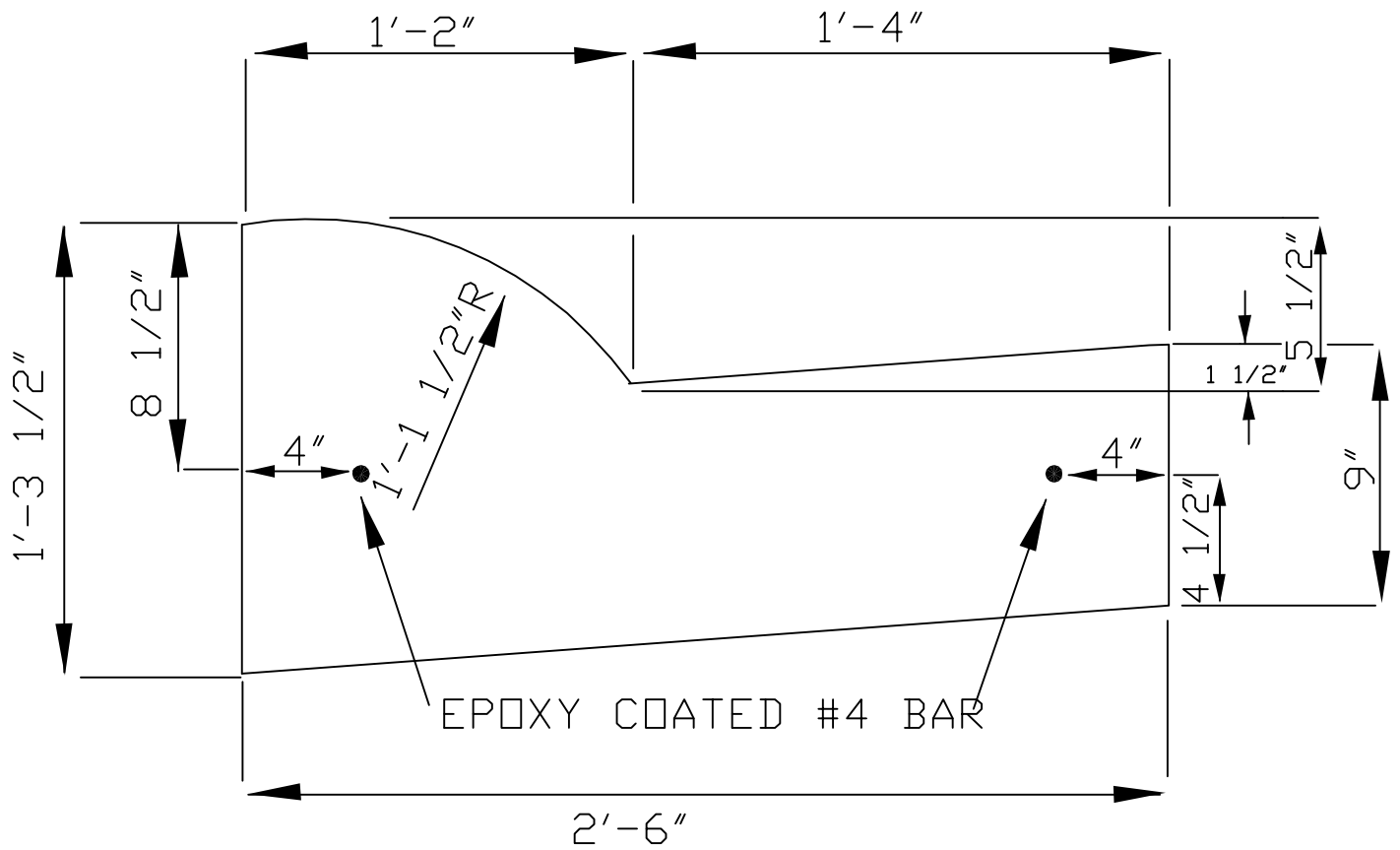
(D) Storm sewers under pavement, new platted and un-platted streets, shall be installed with a least 3' of cover.

All Utility Facilities located in the Highway Right-of-Way shall be an active participating member of the "Miss Dig" System.

All other utilities will be located a minimum of 3' below Finish Centerline grade.

ACAD-UTLL-LOC2
 5-27-03
 REV 5-11-05
 REV 26 APR 06 M.S.

KENT COUNTY ROAD COMMISSION
CONCRETE CURB & GUTTER DETAIL
MDOT DETAIL B2



REQUEST TO PLACE

PROJECT NAME: _____ DATE _____

ENGINEER: _____ CONTRACTOR REPRESENTATIVE: _____

CONTRACTOR: _____ PAVING CONTRACTOR _____

I have inspected the above project and find it to be constructed to reasonably close conformity with the plans and specifications of the KCRC.

The contractor assumes full responsibility for detail dimensions and elevations measured from lines, grades, and elevations established by the engineer. Subject to the above responsibility, permission is given to place:

___ Sand Subbase	_____	___ HMA 3C	_____	___ SFM	_____
	Date		Date		Date
___ Aggregate Base Course	_____	___ HMA 4C	_____		
	Date		Date		
___ Other (Specify) _____					_____
					Date

On the above project located at: _____

DISTRIBUTION

Original -Contractor
1st Copy --Consultant Representative
2nd Copy -- Project Engineer

Signature Title

REQUEST TO PLACE

PROJECT NAME: _____ DATE _____

ENGINEER: _____ CONTRACTOR REPRESENTATIVE: _____

CONTRACTOR: _____ PAVING CONTRACTOR _____

I have inspected the above project and find it to be constructed to reasonably close conformity with the plans and specifications of the KCRC.

The contractor assumes full responsibility for detail dimensions and elevations measured from lines, grades, and elevations established by the engineer. Subject to the above responsibility, permission is given to place:

___ Sand Subbase	_____	___ HMA 3C	_____	___ SFM	_____
	Date		Date		Date
___ Aggregate Base Course	_____	___ HMA 4C	_____		
	Date		Date		
___ Other (Specify) _____					_____
					Date

On the above project located at: _____

Signature Title

DISTRIBUTION

Original -Contractor
1st Copy --Consultant Representative
2nd Copy -- Project Engineer

APPENDIX A

CONSTRUCTION NOTICE (for Work within the Road Right of Way only)

We the undersigned, **NAME.....**, whose address is **ADDRESS.....**, being the owners of the premises hereinafter described, hereby acknowledged that we were notified by the developer of the pending road construction work on **PROJECT NAME and DESCRIPTION.....**

DEVELOPER'S NAME....., whose address is **ADDRESS.....**, being the owners of the above name project, are represented by **ENGINEER'S CONTACT NAME, FIRM NAME.....**, whose address is **ADDRESS.....**, and can be contacted with any questions at **TELEPHONE AND FAX NUMBERS.....**, during normal business hours.

The work will be completed in conformance with plans prepared for this project by the DEVELOPER'S ENGINEER and reviewed by the Kent County Road Commission. The work will progress under the supervision of the DEVELOPER'S ENGINEER and under the control of the DEVELOPER'S CONTRACT(s).

Work will be preformed in the road right of way for **ROAD NAME** without encroaching onto the adjoining parcel of land, described as follows:

The undersigned hereby covenant that they are the sole owners of the above described premises.

IN WITNESS WHEREOF, the undersigned have hereunto set their hands and seals this _____ day of _____, 2004.

NAME

NAME

Drafted By:

ConstructionNotice3/10/04

APPENDIX B

TEMPORARY CONSTRUCTION EASEMENT (Grading Permit)

We the undersigned, **NAME...** whose address is **ADDRESS...** being the owners of the premises hereinafter described, for and in consideration of **the sum of DOLLAR AMOUNT / or mutual benefit** and other good and valuable consideration to us in hand paid by the **DEVELOPER'S NAME...** receipt of which is hereby acknowledged, do hereby grant unto **DEVELOPER'S NAME... legal status...** of **BUSINESS ADDRESS...** the right to construct the following described improvements
....., on a parcel of land **DISTANCE** feet in width lying **DIRECTION** of and adjoining to the right of way of **STREET** which said **DISTANCE** foot parcel of land is described as follows:

DEVELOPER'S NAME... whose address is **ADDRESS...** being the owners of the above name project, are represented by **ENGINEER'S CONTACT NAME, FIRM NAME...** whose address is **ADDRESS...** and can be contacted with any questions at **TELEPHONE AND FAX NUMBERS...** during normal business hours.

The work will be completed in conformance with plans prepared for this project by the **DEVELOPER'S ENGINEER** and reviewed by the Kent County Road Commission. The work will progress under the supervision of the **DEVELOPER'S ENGINEER** and under the control of the **DEVELOPER'S CONTRACT(s)**.

The undersigned hereby covenant that they are the sole owners of the above described premises.

IN WITNESS WHEREOF, the undersigned have hereunto set their hands and seals this _____ day of _____, 2004.

NAME

NAME

Drafted By:

PlatTempConstEsmt3/10/04

APPENDIX C

All Deeds, Easements and property transfers to the Road Commission must contain the following statement:

“The Developer [or Seller or “party of the first part” or “grantor”] shall be responsible for all taxes and special assessments attributable to the transferred property, whether they become due and payable before the transfer of the property or after the transfer of the property for a period of two (2) years after final acceptance. Developer [or Seller or “party of the first part” or “grantor”] shall pay all such real estate taxes or special assessments on or before the respective due dates for each such tax or assessment”.

XIII**KENT COUNTY ROAD COMMISSION****PLAT CONSTRUCTION QUALITY CONTROL PROVISION**

The Kent County Road Commission (KCRC) has adopted a road design that will provide the County with years of maintenance-free service provided that materials and workmanship utilized by the contractor meet the minimum requirements. To insure that quality is built into the roads, the KCRC requires that one of the following construction quality control processes is adhered to by the contractor:

- Material and Workmanship Warranty
- Third Party Engineering Services for Testing Materials and Workmanship

After final plan approval and a minimum of two weeks prior to the pre-construction meeting, the developer/owner shall advise the KCRC which option they choose, and will then be required to meet the specifications as a condition of final acceptance of the platted street(s) by the KCRC.

KENT COUNTY ROAD COMMISSION

SPECIAL PROVISION
FOR
**MATERIALS & WORKMANSHIP WARRANTY
(NEW HOT MIX ASPHALT PUBLIC ROADS)**

1 of 5

a. Description. The materials and workmanship warranty shall consist of the warranty bond and the terms of this special provision, including the appendix. This special provision establishes the common terms and definitions applied to all new plat projects requiring a warranty (the warranted work). The appendix contains information unique to each pavement fix. The Materials & Workmanship Plat Warranty warrants the Kent County Road Commission (Commission) against defects in materials and workmanship.

b. Definitions.

1. **Materials & Workmanship Warranty - The Owner/General Contractor** (hereafter referred to as "Contractor") is responsible for correcting defects in the road structure caused by elements within the Contractor's control (i.e., the materials supplied and the workmanship), during the warranty period. Since the Commission is responsible for the road design, the Contractor assumes no responsibility for defects that are design related. If a defect is attributable to both, the materials and/or workmanship, and the design, responsibility for correcting the defect shall be shared by the Commission and the Contractor; the Contractor is responsible for the percentage of fault attributable to the workmanship and/or materials, and the Commission is responsible for the percentage of fault attributable to the design.
2. **Acceptance Date of Construction** - The date when the warranted work is complete and confirmed in writing on the initial acceptance document, by the Commission, to be in compliance with the specifications and is open to traffic. This is the date of initial acceptance and constitutes the start date for the warranty period.
3. **Warranty Bond** - A bond issued by a surety, which guarantees that the warranty requirements will be met.
4. **Conflict Resolution Team (CRT)** - The five-person team responsible for resolving disputes between the Commission and the Contractor regarding any claim of non-compliance with the warranty requirements.
5. **Driving Lane(s)** - The delineated pavement surface used by traffic and the portion of the pavement considered warranted work. Each of the following is considered a separate driving lane.

- Each individual mainline lane.
- The sum of all acceleration/deceleration lanes.
- Auxiliary lanes, such as passing lanes and turn lanes, are considered a separate driving lane.

Approaches, driveways, shoulders and adjoining transition tapers between various types of pavement are not considered driving lanes for the purpose of this provision.

6. Warranty Work - Corrective action taken to bring the warranted work into contract compliance.

c. Initial Acceptance. The Commission and the Contractor shall jointly review all completed warranted work, or a portion thereof, as determined by the Commission. If the work does not meet KCRC Plat requirements, the Contractor shall make all necessary corrections, at their expense, prior to initial acceptance. Initial acceptance will occur as soon as the Commission confirms in writing, on the initial acceptance form, that KCRC Plat requirements have been met for the warranted work. The date on which initial acceptance occurs is termed the Acceptance Date of Construction.

Initial acceptance will be documented and executed jointly by the Commission and the Contractor on a form furnished by the Commission. A copy of the form will be sent to the Contractor's warranty bond surety agent by the Commission. Neither the initial acceptance nor any prior inspection, acceptance or approval by the Commission diminishes the Contractor's responsibility under this warranty.

d. Warranty Bond. The Contractor shall furnish a single term warranty bond, in an amount stipulated in the appendix, prior to initial street acceptance. The effective starting date of the warranty bond shall be the Acceptance Date of Construction. The warranty bond will be released at the end of the warranty period or after all warranty work has been satisfactorily completed, whichever is latest.

e. Rights and Responsibilities of the Commission. The Commission:

1. Reserves the right to approve the schedule proposed by the Contractor to perform warranty work.
2. Reserves the right to approve all materials and specifications used in warranty work.
3. Reserves the right to determine if warranty work performed by the Contractor meets the KCRC Plat specifications.
4. Reserves the right to perform, or have performed, routine maintenance during the warranty period, which routine maintenance will not diminish the Contractor's responsibility under the warranty.

5. Reserves the right, if the Contractor is unable, to make immediate emergency repairs to the pavement to prevent an unsafe road condition as determined by the Commission. The Commission will attempt to notify the Contractor that action is required to address an unsafe condition. However, should the contractor be unable to comply with this requirement, to the Commission's satisfaction and within the time frame required by the Commission, the Commission will perform, or have performed any emergency repairs deemed necessary. Any such emergency repairs undertaken will not relieve the Contractor from meeting the warranty requirements of this Special Provision. Any costs associated with the emergency repairs will be paid by the Contractor if it is determined the cause was from defective materials and/or workmanship.
6. Is responsible for monitoring the road structure throughout the warranty period and will provide the Contractor all written reports of the surface treatment's condition related to the warranty requirements. The Contractor shall not be relieved of any responsibility based upon a claim that the Commission failed to adequately monitor the road structure or to report its findings to the Contractor.
7. Is responsible for notifying the Contractor, in writing, of any corrective action required to meet the warranty requirements.

f. Rights and Responsibilities of the Contractor. The Contractor:

1. Shall warrant to the Commission that the warranted work will be free of defects in materials and workmanship. The warranty bond shall be described on a form furnished by the Commission. The completed form shall be submitted to the Commission as a condition of the acceptance date of construction.
2. Is responsible for performing all warranty work including, but not limited to, maintaining traffic and restoring all associated pavement features, at the Contractor's expense.
3. Is responsible for performing all temporary or emergency repairs, resulting from being in non-compliance with the warranty requirements, using Commission approved materials and methods.
4. Shall notify the Commission and submit a written course of action for performing the needed warranty work a minimum of ten calendar days prior to commencement of warranty work, except in the case of emergency repairs as detailed in this special provision. The submittal must propose a schedule for performing the warranty work and the materials and methods to be used.

5. Shall follow a Commission approved maintaining traffic plan when performing warranty work. All warranty work shall be performed under permit issued by the Kent County Road Commission Engineering Department.
6. Is required to supply to the Commission documentation that all insurance required by the KCRC Plat is in effect during the period(s) that warranty work is being performed.
7. Shall complete all warranty work prior to conclusion of the warranty period, or as otherwise agreed to by the Commission.
8. Shall be liable during the warranty period in the same manner as Contractors currently are liable for their construction related activities with the Commission pursuant to the Michigan Department of Transportation standard specifications, including, but not limited to subsections 103.06, 107.10 and 107.11. This liability shall arise and continue only during the period when the Contractor is performing warranty work. This liability is in addition to the Contractor performing and/or paying for any required warranty work, and shall include liability for injuries and/or damages and any expenses resulting there from which are not attributable to normal wear and tear of traffic and weather, but are due to non-compliant materials, faulty workmanship, and to the operations of the Contractor.

g. Evaluation Method. The Commission will conduct pavement evaluations by dividing the project into segments. Each individual driving lane will be divided into segments of 528 feet (1/10 mile) in length for measuring and quantifying the condition parameters. For cul-de-sacs and road segments less than one-tenth of a mile in length, each driving lane shall be one segment. Evaluation will include use of both the Commission's Pavement Management System and/or field pavement condition reviews. This evaluation may be waived in emergency situations.

The beginning point for laying out segments will be the Point of Beginning (POB) of the project. Segments will be laid out consecutively to the Point of Ending (POE) of the project. The original segmentation of the project will be used for all successive reviews throughout the warranty period.

h. Warranty Requirements. Warranty work will be required when the threshold limit for a condition parameter is exceeded, and specific threshold limits and corrective actions covered in the appendix as a result of a defect in materials and/or workmanship.

To determine whether the failure to meet the warranty criteria is a result of defects in materials and/or workmanship, a joint field investigation by the Commission and the Contractor will be conducted. The Commission and Contractor may elect to have a forensic investigation conducted. The decision to undertake a forensic investigation, the scope of it, and the selection of the party to conduct it will be agreed to by the Commission and the Contractor. The forensic investigation will be conducted following the "Material and Workmanship Forensic Investigation Procedure". If agreement cannot be reached a Conflict Resolution Team (CRT) may be convened in accordance with this special provision. The CRT will then decide the need for a forensic investigation, its scope and the party to conduct the investigation. All costs related to the forensic investigation will be shared proportionately between the Contractor and the Commission based on the determined cause of the condition.

During the warranty period, the Contractor will not be held responsible for road structure distresses that are caused by factors unrelated to materials and workmanship. These include, but are not limited to: chemical and fuel spills, vehicle fires, snow plowing, and quality assurance testing such as coring. Other factors considered to be beyond the control of the Contractor, which may contribute to pavement distress, will be considered by the Engineer on a case-by-case basis upon receipt of a written request from the Contractor.

i. Conflict Resolution Team. The sole responsibility of the Conflict Resolution Team (CRT) is to provide a decision on disputes between the Commission and the Contractor regarding application or fulfillment of the warranty requirements. The CRT will consist of five members:

- Two members selected, and compensated by the Commission.
- Two members selected and compensated by the Contractor.
- One member mutually selected by the Commission and the Contractor. Compensation for the third party member will be equally shared by the Commission and the Contractor.

If a dispute arises on the application or fulfillment of the terms of this warranty, either party may serve written notice that appointment of a CRT is required.

At least three members of the CRT must vote in favor of a motion to make a decision. The CRT may decide to conduct a forensic investigation, will determine the scope of work and select the party to conduct the investigation. All costs related to the forensic investigation will be shared proportionately between the Contractor and the Commission based on the determined cause of the condition.

j. Emergency Repairs. If the Commission determines that emergency repairs are necessary for public safety, the Commission or its agent may take repair action. Emergency repairs must be authorized by the Commission.

Prior to emergency repairs, the Commission will document the basis for the emergency action. In addition, the Commission will preserve evidence of the defective condition.

Appendix A (W)

A-1 (W)

12-09-03

MATERIALS & WORKMANSHIP WARRANTY APPENDIX FOR NEW/RECONSTRUCTED PLAT STREETS

- A1. Application.** This appendix applies to pavement warranties on new and reconstructed Hot Mix Asphalt (HMA) roads built with an unbound or stabilized aggregate base.
- A2. Limits of Warranted Work.** The warranted work includes the road structure within the project limits unless otherwise indicated on the plans.
- A3. Warranty Term.** The warranty term will be **four** years from the date of Initial Acceptance otherwise termed the Acceptance Date of Construction.
- A4. Warranty Bond.** The Owner or General Contractor will supply a warranty bond equal to \$35,000.00 or ten percent of the total contract amount whichever is less. For purposes of bond amount determination, the cost of \$350,000.00/mile will be used. Bond amount shall be rounded up to the next whole \$1,000.00 limit.
- A5. Condition Parameters.** Condition parameters are used to measure the performance of the HMA pavement during the warranty term. Each condition parameter has a threshold level applied to each segment and a maximum number of defective segments allowed before corrective action (warranty work) is required.

Definitions

Transverse Crack - A crack, at least five feet in length that is oriented primarily in the transverse direction versus the longitudinal direction. That is, the angle between the overall crack line and the transverse line is less than 45 degrees. It can be either straight or irregular in direction.

Longitudinal Crack/Open Joint - A crack or open joint, at least five feet in length, that is oriented primarily in the longitudinal direction versus the transverse direction. That is, the angle between the overall crack line and the centerline is less than 45 degrees. It can exist anywhere in the driving lane; i.e., at the pavement centerline joint, wheel path, center of lane, or lane/shoulder joint.

De-bonding - A physical separation of two HMA layers. De-bonding will be visually identified as shoving, or the loss of the new surface course. Surface potholes, regardless of depth, will be classified as de-bonding.

Raveling - Surface disintegration, due to the loss of coarse or fine aggregate material, that occurs over an area or in a continuous longitudinal strip.

Flushing - The accumulation of excess asphalt binder on the pavement surface that creates a shiny, reflective condition and becomes tacky to the touch at high temperatures.

Rutting - A longitudinal surface depression in the wheel path. It may have associated transverse displacement or humping.

Alligator Cracking - Parallel longitudinal cracks with transverse tears between them exhibiting a pattern similar to an alligator hide. An Alligator Crack typically starts in a wheel path and may extend to other lane locations.

Block Cracking - Transverse and longitudinal cracking that has progressed to a pattern that the pavement is broken into blocks of size less than 12' by 12'. The shape of each block may be irregular.

Pavement Surface Differential Settlement – Either longitudinal or transverse distortion or settlement of the pavement surface creating a depression or heave of the subgrade, aggregate base, utility trench, or drainage system.

Drainage System Failure – Defect of any component of the drainage system that impedes or alters the flow, collection, or distribution of storm water from the road structure.

- A6. Warranty Requirements.** The table lists the allowable threshold limit for each condition parameter within each segment and the maximum number of allowable segments within a driving lane for each condition parameter. If any of the warranty requirements are not met, as a result of a defect in materials and/or workmanship, corrective action (warranty work) is required.

The defective segments for surface distress may or may not be contiguous to necessitate corrective action. The maximum allowable number of defective segments for each condition parameter applies to each driving lane in each travel direction. Each driving lane shall be evaluated independent of adjacent driving lanes. Any pavement surface requiring removal/replacement to correct deficiencies, for any condition parameter, shall be replaced full-width across the driving lane.

WARRANTY REQUIREMENTS		
CONDITION PARAMETER ⁽⁴⁾	THRESHOLD LIMITS PER SEGMENT (Length = 528 feet)	MAX. DEFECTIVE SEGMENTS PER DRIVING LANE-MILE ⁽¹⁾
Transverse Cracking	3	1
Longitudinal Cracking/ Open Joint	10% of segment length	1
De-bonding	5% of segment length	1
Raveling	8% of segment length	1
Flushing	4% of segment length	1
Rutting ⁽³⁾	ave. rut depth = 3/8 inch (2)	1
Drainage System Failure	Not allowed	1
Pavement Surface Differential settlement	½" in 25 feet	1

(1) The maximum allowable number of defective segments per driving lane is determined by multiplying by the length of the specific driving lane in miles.

(2) The rut depth threshold applies to each wheel path independently.

(3) The pavement surface will be evaluated for the presence of rutting on each driving lane throughout the warranty period. The pavement surface will be measured beginning at the POB and every 132 feet thereafter to determine average rut depth to quantify rutting for a particular segment.

Rut measurements will be done using a straight rigid device that is a minimum of 7 feet long and of sufficient stiffness that it will not deflect from its own weight, or a wire under sufficient tension to prevent sag when extended 7 feet. Measurements will be taken by placing this "straightedge" across the pavement surface perpendicular to the direction of travel. The straightedge shall contact the surface on at least two bearing points with one located on either side of the rut. The straightedge is properly located when sliding the straightedge along its axis does not change the location of the contact points. Rut depth is then measured at the point of greatest perpendicular distance from the bottom of the straightedge to the pavement surface.

(4) Any amount of alligator and/or block cracking, pothole, or reflective cracking is an unacceptable condition, and will be removed and replaced as approved by the Engineer (minimum of 150 percent of affected area).

A7. Corrective Actions.- The following corrective actions are recommended to outline typical acceptable treatments for the various condition parameters. The Commission will accept the listed corrective action if the action addresses the cause of the condition parameter. The Contractor may use an alternative action subject to Commission approval.

CONDITION PARAMETER ⁽²⁾	RECOMMENDED ACTION
Transverse Cracking	Cut and Seal
Longitudinal Cracking	Cut and Seal
De-bonding	Mill and Resurface affected courses
Raveling	Mill and Resurface affected courses
Flushing	Mill and Resurface top course
Rutting	Microsurface or Mill and Resurface ⁽¹⁾
Drainage System Failure	Repair or Replace as directed by KCRC Engineer
Pavement Surface Differential Settlement	Remove and Replace pavement lane width x 150% of settlement length

(1) Recommended action is dependent on the depth of the rut susceptible material.

(2) Any areas exhibiting Alligator or Block Cracking shall be removed and replaced as directed by the Engineer.

Appendix B (W)

12-09-03

KENT COUNTY ROAD COMMISSION

**INITIAL ACCEPTANCE
FOR
ROAD STRUCTURE WARRANTY**

PLAT:	_____
TOWNSHIP:	_____
SURETY NAME:	_____
SURETY ADDRESS:	_____
CONTRACTOR/DEVELOPER:	_____
CONTRACTOR CONTACT PERSON:	_____

INITIAL ACCEPTANCE OF WARRANTY WORK APPROVAL	
CONTRACTOR'S SIGNATURE:	_____
ENGINEER'S SIGNATURE:	_____
ACCEPTANCE DATE:	_____



[12-09-03]

KENT COUNTY ROAD COMMISSION WARRANTY BOND

{ _____ street name _____, _____ street name _____, & _____ street name _____ }
{ _____ Project or Plat Name _____, Section _____, _____ Township _____ }

{Page 1 of 2}

Bond Number _____

KNOWN ALL MEN BY THESE PRESENTS:

That we, _____, (hereinafter called the "Principal"), and _____ a corporation duly organized under the laws of the State of _____ and duly licensed to transact business in the State of Michigan (hereinafter called "Surety"), are held and firmly bound unto the Kent County Road Commission (hereinafter called the "Obligee"), in the sum of _____ **Dollars (\$xx,000.00)**, for the payment of which sum well and truly to be made, we, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has requested that the Kent County Road Commission accept and take-over _____ Drive, _____ Drive, and _____ Drive in the Plat of _____ *(project or plat name)*, Section _____, _____ Township, as public highways, and;

WHEREAS, the said Principal is required to guarantee the installed improvements in _____ Drive, _____ Drive, and _____ Drive in the Plat of _____ *(project or plat name)*, Section _____, _____ Township, against defects in materials or workmanship which may develop during the period beginning on the _____ day of _____, 20XX, the date(s) the Acceptance Date of Construction by the Obligee in accordance with the Kent County Road Commission's Special Provision for Materials and Workmanship Warranty (adopted 12-9-03), and expiring on the _____ day of _____, 20XX.

In no event shall losses paid under this bond aggregate more than the amount of the bond.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if said Principal shall faithfully carry out and perform the said guarantee, and shall, on due notice, repair and make good at its own expense any and all defects in materials or workmanship in the said work which may develop during the period specified above or shall pay over, make good and reimburse to the said Obligee all loss and damage which said Obligee may sustain by reason of failure or default of said Principal so to do, then this obligation shall be null and void; otherwise shall remain in full force and effect.

**KENT COUNTY ROAD COMMISSION
WARRANTY BOND**

{ street name, street name, & street name }
{ Project or Plat Name, Section , Township }

{Page 2 of 2}

PROVIDED HOWEVER, that in the event of any default on the part of said Principal, a written statement of the particular facts showing such default and the date thereof shall be delivered to the Surety by registered mail, promptly in any event within ten (10) days after the Obligee or his representative shall learn of such default and that no claim, suit or action by reason of any default of the Principal shall be brought hereunder after the expiration of thirty (30) days from the end of the warranty period as herein set forth.

Signed this _____ day of _____, _____.

Contractor _____

By _____

Surety _____

By _____

Attorney-In-Fact
Surety Company, Financial Services – Payments

KENT COUNTY ROAD COMMISSION
SPECIAL PROVISION
FOR
**THIRD PARTY ENGINEER SERVICES FOR
TESTING MATERIALS AND WORKMANSHIP
(NEW HOT MIX ASPHALT PUBLIC ROADS)**

1 of 2

a. Description: The provision requires the owner/developer (Contractor) to provide funding for engineer services to perform material and workmanship testing and inspection. The engineer services will be performed on behalf of the KCRC by a qualified engineering firm under contract with and as directed by the KCRC. The type and minimum frequency of testing and inspection is specified below, and will be paid for by the Contractor:

b. Payment for Third Party Engineer Services:

1. The Contractor shall provide KCRC with a minimum cash deposit in the amount of \$5,000.00 or greater as determined necessary for testing and inspection fees. For cash deposits greater than \$5,000.00, KCRC will provide the Contractor with a cost estimate of proposed fees necessary to insure the quality of materials and workmanship during construction. Any unused portion of the deposit will be returned following final acceptance of the road(s).
2. KCRC will select the engineering firm from a list of pre-qualified firms. The engineering firm cannot be associated with or involved in the Contractor's plat engineering design or layout.
3. The third party engineering services will be performed under the direction of the KCRC, and payment for these services will be made by KCRC on behalf of the Contractor. Periodic payment will be deducted from the Contractor's cash deposit with any remaining balance returned to the Contractor upon completion of testing and inspection services, and after final acceptance of the platted street(s) by KCRC. If additional funds are required to perform all needed and necessary third party engineering services, the Contractor will be notified and required to provide an additional cash deposit to KCRC.

c. Third Party Engineering Services Material Acceptance And Testing Requirements: Kent County Road Commission material acceptance and minimum testing requirements for Plat Construction shall be in accordance with the current MDOT Standard Specifications for Construction with the following modifications:

1. Material Sampling Frequency:

Material	Sampling Frequency
Subbase (Class II)	One sieve analysis test per 1000 Cubic Yards
Aggregate Base	One sieve analysis test per 1000 tons
HMA Pavement	One extraction/gradation test per 1000 tons or a minimum of 2 tests per day
Concrete	Minimum of two test cylinders for 28-day compressive strength per pour

2. Minimum Density Testing Frequency:

Material	Testing Frequency
Drainage Structures	One test per Manhole, Catch Basin, or Culvert
Storm Sewer	One test per storm sewer run
Subbase	One test per 500 lane feet
Aggregate Base	One test per 500 lane feet
HMA Pavement	One test per 500 lane feet (after roller pattern is established)

3. Material Certification Requirements:

(the following list is a minimum, and additional certifications may be necessary)

- Reinforced concrete pipe and manholes
- Manhole and catch basin castings
- Polyethelene underdrain
- Geotextile fabric
- HMA asphalt binder
- Steel Beam Guardrail and posts
- Reinforcing Steel

d. Final Acceptance of Platted Roads:

1. Final acceptance will not be granted until outstanding third party testing and inspection fees have been paid.
2. Upon receipt of final acceptance, the Contractor will be responsible for materials and workmanship for a period of one year from date of acceptance.

Date: _____

To: Kent County Road Commission

Subject: **Plat and Street Warranty or Testing Selection**
(In conformance with KCRC's "Plat Construction Quality Control Provision")

Development Name: _____

Plat Street Construction

Public Street Construction

Street Names and Limits:

a) _____

b) _____

c) _____

d) _____

Construction Quality Control Process Selection:

Material and Workmanship Warranty

Third Party Engineering Services for Testing Materials and Workmanship

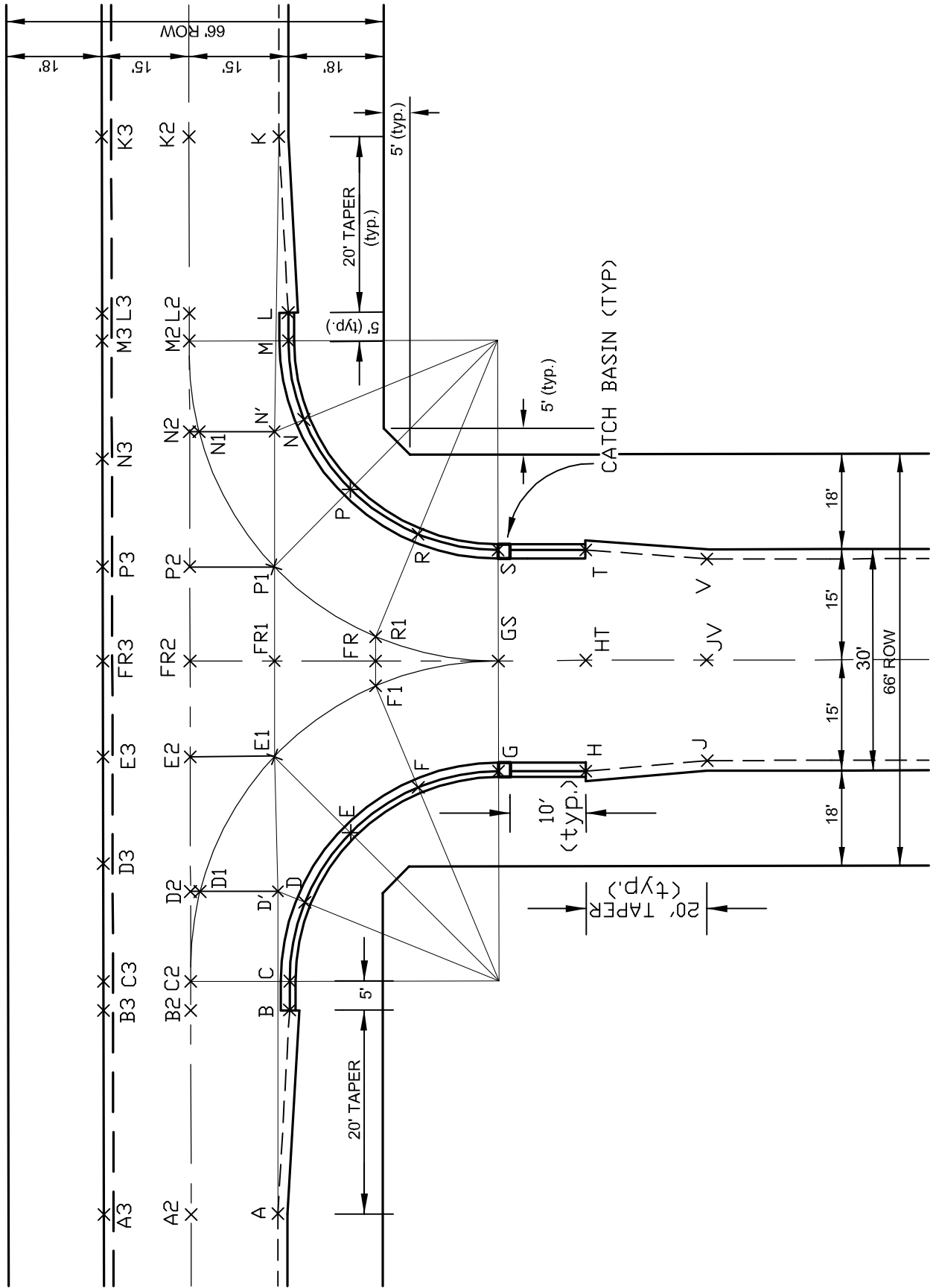
(Note: Check selection and cross-out process not selected)

Developer's Representative: _____ (Signature)
_____ (Printed name)
_____ (Company name)
_____ (Address)

_____ (Telephone number)
_____ (Fax number)
_____ (email)

KENT COUNTY ROAD COMMISSION
 RESIDENTIAL 3-WAY (TEE) INTERSECTION DETAILING
 PUBLIC STREETS IN RESIDENTIAL AREAS

1 OF 2



Kent County Road Commission
Residential 3-Way (Tee) Intersection Detailing
Public Streets in Residential Areas
2 of 2

Centerline of Thru roadway with corresponding ride line(s):

Profile: A2, B2, C2, D2, E2, FR2, P2, N2, M2, L2, K2.
A , B ' , C ' , D ' , E1, FR1, P1, N ' , M ' , L ' , K .

Profile: A2, B2, C2, D2, E2, FR2, P2, N2, M2, L2, K2.
A3, B3, C3, D3, E3, FR3, P3, N3, M3, L3, K3.

Gutterline with corresponding concentric arc (typically 15-ft from gutterline connecting the centerlines):

Profile: A2, B2, C2, D1, E1, F1, GS, HT, JV. (Note 1)
A , B , C , D , E , F , G , H , J . (Gutterline)

Profile: K2, L2, M2, N1, P1, R1, GS, HT, JV. (Note 1)
K , L , M , N , P , R , S , T , V . (Gutterline)

Centerline of the intersecting street:

Profile: JV, HT, GS, FR, FR1, FR2, FR3.

Miscellaneous roadway and gutter relationships:

Profile: E, E1, FR1, P1, P.

Profile: F, F1, FR , R1, R.

Profile: D, D' , D1, D2, D3.

Profile: N, N' , N1, N2, N3.

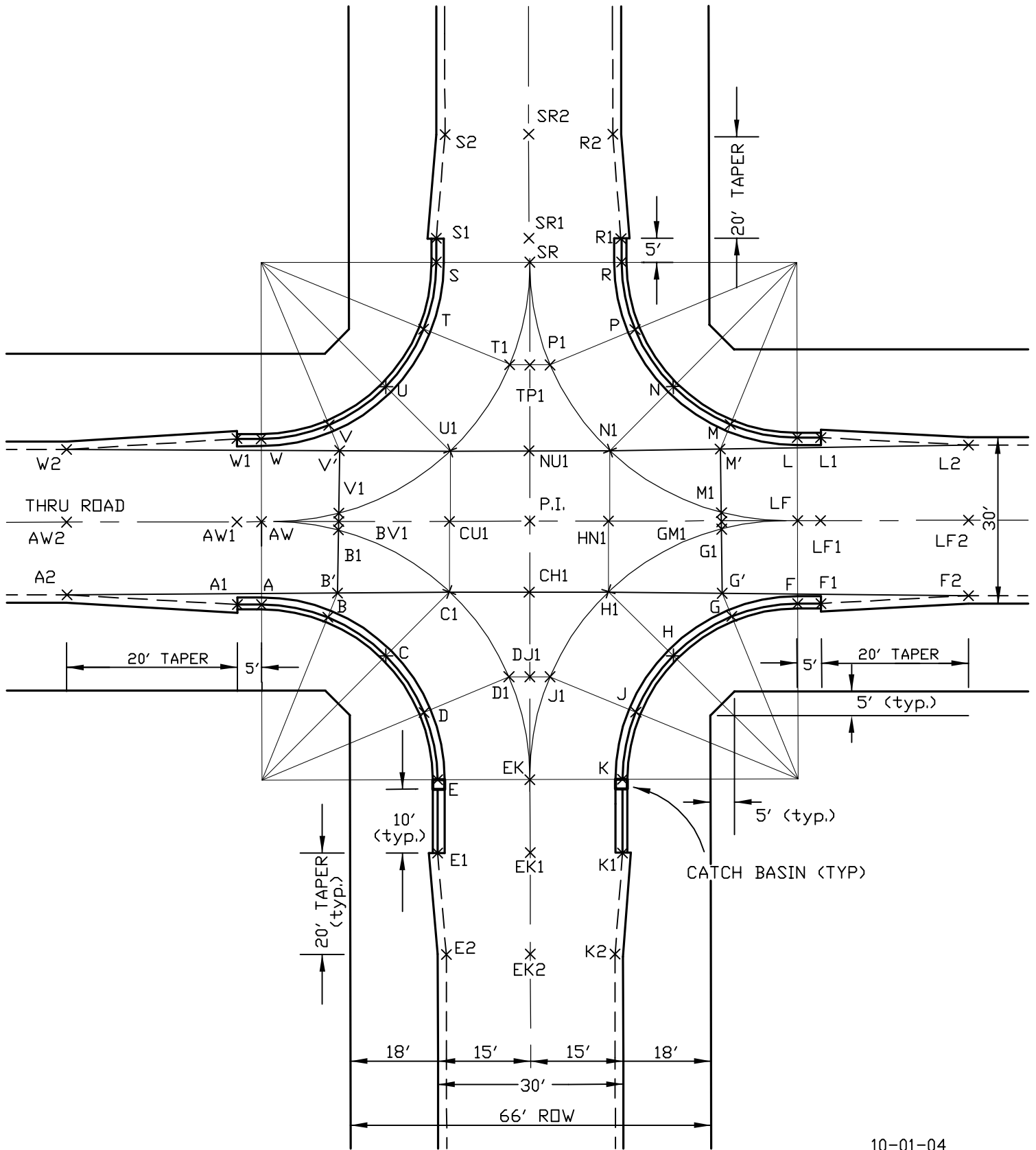
Note 1: Show points without connecting lines because arc length is greater along this line than in the gutterline.

Note 2: (') Symbolizes a rideline point adjacent to a gutter point. (13 ft. from centerline)

Where applicable, the elevations at the whole and half stations along with pertinent vertical curve point elevations should also be shown, if for no other reason than as a check for elevations and slopes that do not fit (smoothly).

Additional profile maybe required.

KENT COUNTY ROAD COMMISSION
 RESIDENTIAL 4-WAY INTERSECTION DETAILING
 PUBLIC STREETS IN RESIDENTIAL AREAS
 1 OF 2



Kent County Road Commission
Residential 4-Way Intersection Detailing
Public Streets in Residential Areas
2 of 2

Centerline of the thru roadway with corresponding rideline(s):

Profile: AW2, AW1, AW, BV1, CU1, P.I., HN1, GM1, LF, LF1, LF2.
 A2 , A1 , A' , B' , C1 ,CH1, H1 , G' , F' , F1 , F2.

Profile: AW2, AW1, AW, BV1, CU1, P.I., HN1, GM1, LF, LF1, LF2.
 W2 , W1 , W' , V' , U1 ,NU1, N1 , M' , L' , L1 , L2 .

Gutterline with corresponding concentric arc (typically 15-ft from gutterline connecting the centerlines):

Profile: AW2, AW1, AW, B1, C1, D1, EK, EK1, EK2. (Note 1)
 A2 , A1 , A , B , C , D , E , E1 , E2. (Gutterline)

Typical all corners.

Centerline of the intersecting (minor) street:

Profile: EK2, EK1, EK, DJ1, CH1, P.I., NU1, TP1, SR, SR1, SR2.

Miscellaneous roadway and gutter relationships:

Profile: D, D1, DJ1, J1, J.
Profile: C, C1, CH1, H1, H.
Profile: B, B', B1, BV1, V1, V', V.
Profile: G, G', G1, GM1, M1, M', M.
Profile: T, T1, TP1, P1, P.
Profile: U, U1, NU1, N1, N.

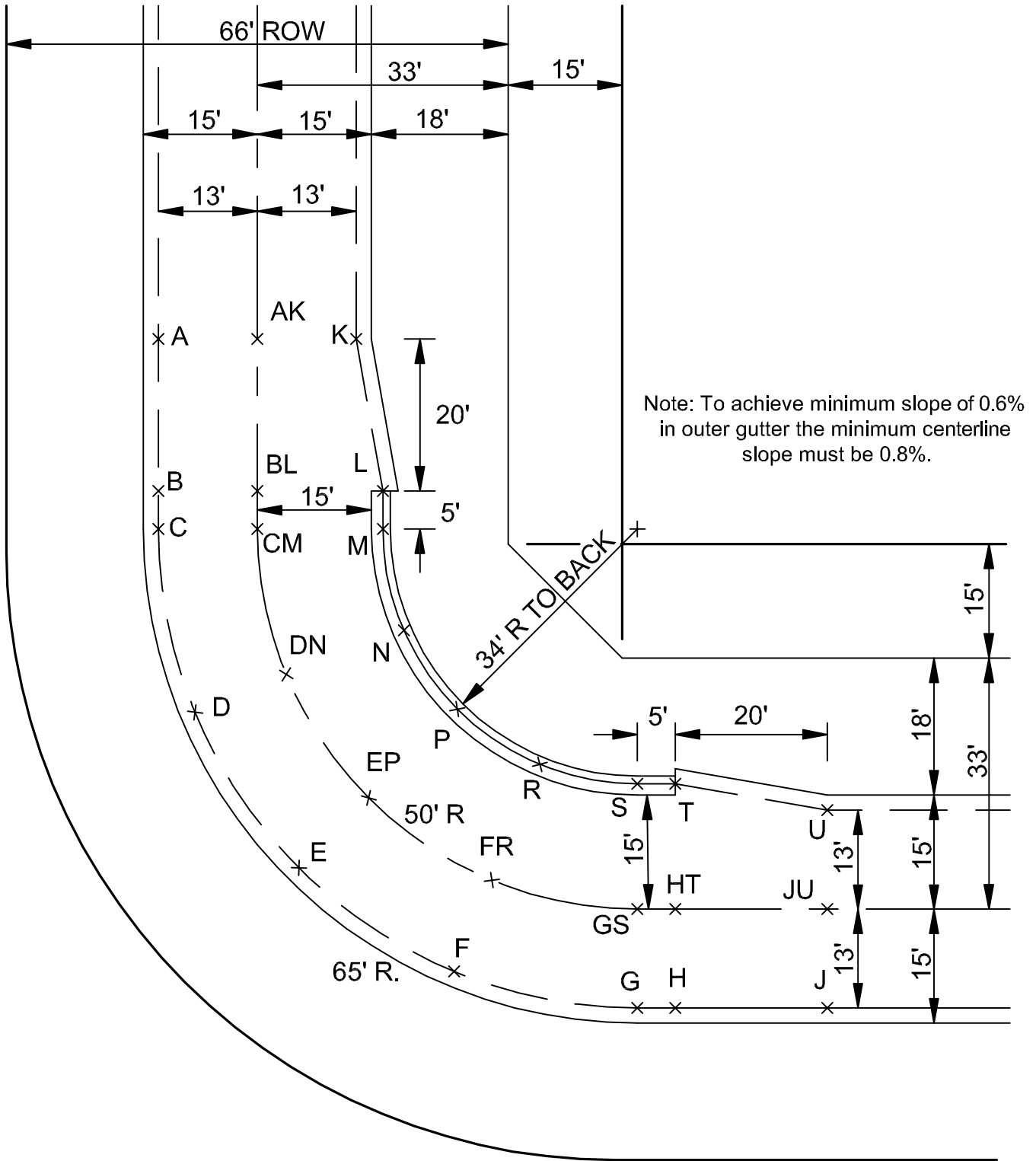
Note 1: Show points without connecting lines because arc length is greater along this line than in the gutterline.

Note 2: (') Symbolizes a rideline point adjacent to a gutter point. (13 ft from the centerline)

Where applicable, the elevations at the whole and half stations along with pertinent vertical curve point elevations should also be shown, if for no other reason than as a check for elevations and slopes that do not fit (smoothly).

Additional profile maybe required.

KENT COUNTY ROAD COMMISSION
 RESIDENTIAL ELBOW INTERSECTION DETAILING
 (+/-90°) PUBLIC STREETS IN RESIDENTIAL AREAS
 1 OF 2



Kent County Road Commission
Residential Elbow Intersection Detailing
Public Streets in Residential Areas
2 of 2

Centerline of the thru roadway:

Profile: AK, BL, CM, DN, EP, FR, GS, HT, JU.

Gutterline:

Profile: K, L, N, P, R, S, T, U. (Gutterline)

Profile: A, B, C, D, E, F, G, H. (Gutterline)

Miscellaneous roadway and gutter relationships:

Profile: C, CM, M.

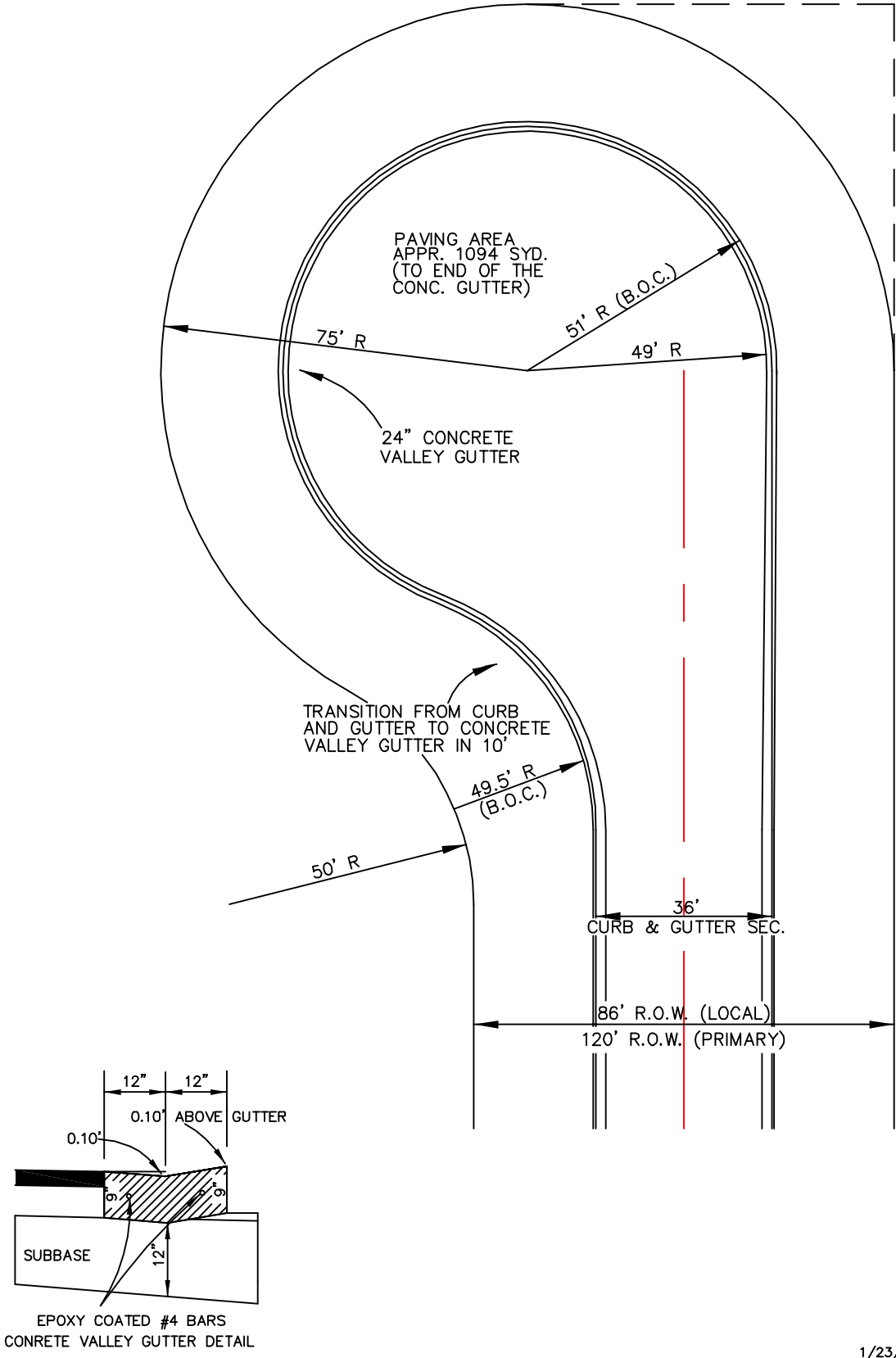
Profile: E, EP, N.

Profile: G, GS, S.

Where applicable, the elevations at the whole and half stations along with pertinent vertical curve point elevations should also be shown, if for no other reason than as a check for elevations and slopes that do not fit (smoothly).

Additional profile maybe required.

KENT COUNTY ROAD COMMISSION
 DETAIL OF INDUSTRIAL AND COMMERCIAL CUL-DE-SACS (OFFSET)



KENT COUNTY ROAD COMMISSION DETAIL OF RESIDENTIAL CUL-DE-SAC (OFFSET)

