Zack Stewart
Northern District Commissioner

ne O. Burkes
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Ronnie Shows
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September 4, 1996

NEW DESIGN CRITERIA FOR THE 1987 4-LANE HIGHWAY PROGRAM

NEW CONSTRUCTION (RELOCATION)--

- NEW 4-LANES--

  → Design Speed ---------- 70 MPH (112.7 km/h)
  → Criteria to Use ---------- New Construction Criteria Tables
  → Access Control ---------- 2-B (Partial Control)

PARALLEL [TO EXISTING] SECTIONS--

- NEW 2-LANES--
  → Design Speed ---------- 65 MPH (104.6 km/h)
  → Criteria to Use ---------- New Construction Criteria Tables
  → Access Control ---------- Type 3 (by Permit)

- EXISTING 2-LANES--

  → Design Speed -----
  Any section that can not meet 3-R stopping sight distance criteria (vertical profile) using the posted speed (normally 65 MPH (104.6 km/h)) as the design speed, shall be regraded to the posted speed K-values using 3-R criteria (see attached Table). The Commission Order dated April, 1996, may be used for the posted speed.

  → Slopes -----
  Existing lanes shall be upgraded to 3R criteria (see attached Typical Section No. 1); however, any regraded section shall conform to the following policy:
  ♦ Active Projects Not Printed For Right of Way ---
  ★ The typical section of the regraded section(s) will have safety slopes, the same as new construction (see attached Typical Section No. 2).

- Projects Printed For Right of Way, And Still In The Pre-Construction Phase --
  - ★ Use 3R criteria as shown on attached Typical Section No. 1. If necessary, backslopes may be modified up to 2:1 maximum to stay within the proposed right of way. If a backslope greater than 3:1 is required and the vertical distance from the bottom of the ditch to the top of the backslope is greater than 20 feet (6.1 m), title, plan-profile and cross-section sheets shall be furnished to the Geotechnical Branch for their approval and/or recommendation.

Note: When modifying slopes, a Design Exception will **not** be required since slopes are not a part of the 13 Controlling Design Criteria.

→ Profile Grade Difference -----

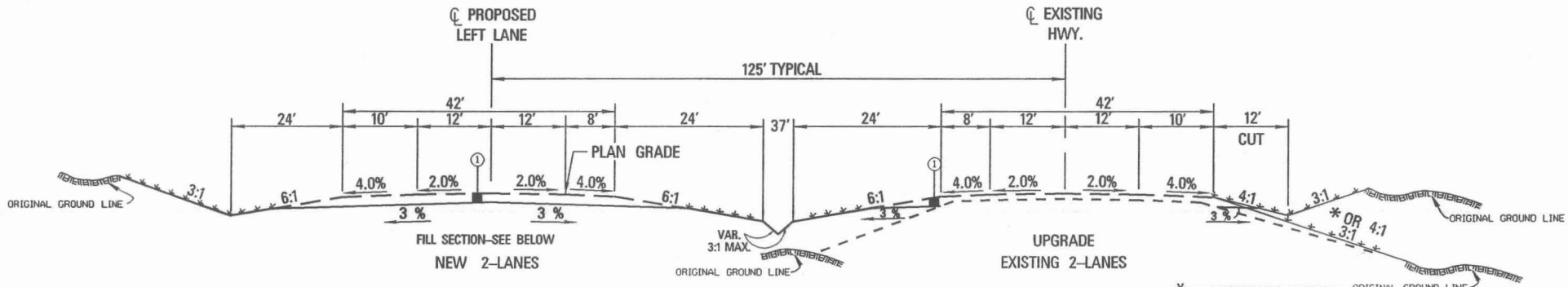
When the maximum profile grade differential between the new 2-lanes and the existing 2-lanes exceeds the established values as shown in the MDOT's *Design Manual,* the existing 2-lanes shall be regraded to the posted speed (normally 65 MPH (104.6 km/h)) K-values using 3-R criteria (see attached Table).

→ Crossover Sight Distance -----

When a crossover is established using an existing county road as a control point, the stopping sight distance at the crossover must meet the posted speed (design speed) K-values using 3R criteria on the existing lanes. If the stopping sight distance does not meet the required design speed, the county road must be relocated (and is usually difficult to do), or the existing lanes regraded. Intermediate crossovers must meet the required stopping sight distance or be eliminated; however, it may be shifted but can <u>not</u> be any closer to another crossover than the minimum distance of 880 feet (268.2 meters) or 1760 feet (536.4 meters) for an English project. Crossover spacings for metric projects are 250 meters (820.2 feet) and 500 meters (1,640.4 meters).

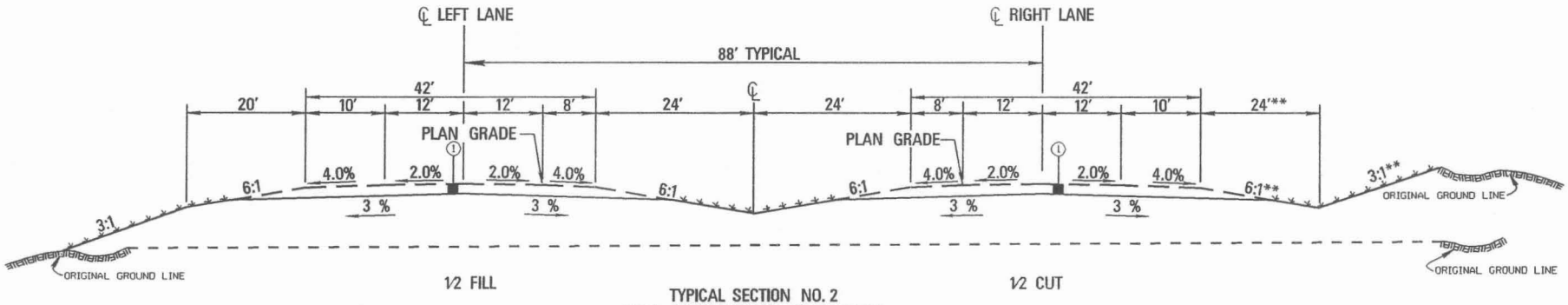
→ Access Control ---------- Type 3 (by Permit)

Attachments



TYPICAL SECTION NO. 1
PARALLEL
UPGRADE EXISTING 2–LANES

*4:1 DESIRABLE WITHIN
EXISTING R.O.W.
3:1 MAXIMUM



1/2 FILL

1/2 CUT

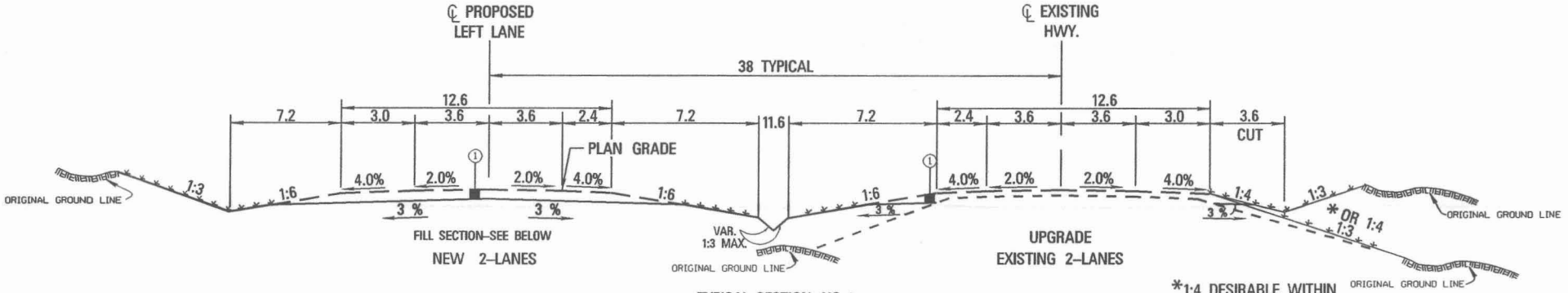
TYPICAL SECTION NO. 2
NEW CONSTRUCTION (RELOCATION)
AND / OR
PARALLEL SECTION WITH EXISTING
2–LANES REGRADED**

① FUTURE STRUCTURE THICKNESS

** FOR EXCEPTION TO EXISTING LANES,
SEE "SLOPES" IN MEMO DATED
SEPTEMBER 4, 1996, TITLED, "NEW
DESIGN CRITERIA FOR THE 1987
4–LANE HIGHWAY PROGRAM".

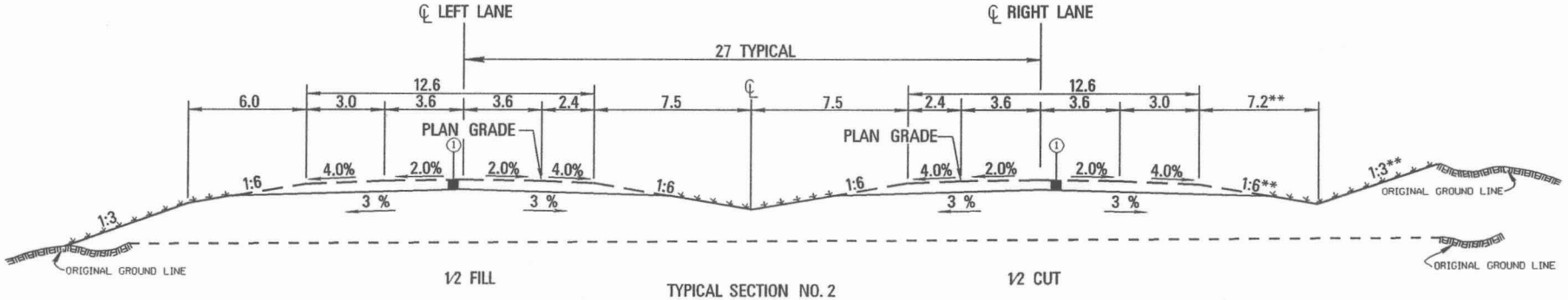
TYPICAL SECTION
1987 4–LANE
HIGHWAY PROGRAM

RWD7: /USR/MARK/PICK/WRK/TYPP.DGN
PICK'S PC: C:/PICK/TYPP.DGN (REVISED)
9-4-96



TYPICAL SECTION NO. 1
PARALLEL
UPGRADE EXISTING 2–LANES

*1:4 DESIRABLE WITHIN EXISTING R.O.W.
1:3 MAXIMUM



1/2 FILL

1/2 CUT

TYPICAL SECTION NO. 2
NEW CONSTRUCTION (RELOCATION)
AND / OR
PARALLEL SECTION WITH EXISTING
2–LANES REGRADED**

** FOR EXCEPTION TO EXISTING LANES, SEE "SLOPES" IN MEMO DATED SEPTEMBER 4, 1996, TITLED, "NEW DESIGN CRITERIA FOR THE 1987 4–LANE HIGHWAY PROGRAM".

① FUTURE STRUCTURE THICKNESS

NOTE : ALL DIMENSIONS ARE IN METERS.

METRIC TYPICAL SECTION 1987 4–LANE HIGHWAY PROGRAM

RWD7: /USR/MARK/PICK/WRK/TYPP.DGN
PICK'S PC: C:/PICK/TYPP.DGN (REVISED)
9-4-96

August 15, 1995

EQUIVALENT DESIGN SPEEDS FOR ENGLISH AND METRIC												
English	MPH	70	65	60	55	50	45	40	35	30	25	20
Metric	km/h	110	100	100	90	80	70	60	60	50	40	30

STOPPING SIGHT DISTANCE AND MINIMUM K-VALUES FOR ENGLISH AND METRIC DESIGN

ENGLISH

Design Speed		Stopping Sight Distance		Minimum K-Values			
				New Construction		3-R	
MPH	km/h	Feet	Meters	Crest	Sag	Crest	Sag
70	112.7	625	190.5	290	150	205	105
65	104.6	550	167.6	230	130	160	90
60	96.6	525	160.0	190	120	145	80
55	88.5	450	137.2	150	100	110	70
50	80.5	400	121.9	110	90	85	55
45	72.4	325	99.1	80	70	60	45
40	64.4	275	83.8	60	60	40	35
35	56.3	225	68.6	40	50	30	30
30	48.3	200	61.0	30	40	25	20
25	40.2	150	45.7	20	30	N/A	N/A
20	32.2	125	38.1	10	20	N/A	N/A

METRIC

Design Speed		Stopping Sight Distance		Minimum K-Values			
				New Construction		3-R	
km/h	MPH	Meters	Feet	Crest	Sag	Crest	Sag
110	68.4	180	591	80	43	56	31
100	62.1	160	525	62	37	44	26
90	55.9	140	459	43	30	34	21
80	49.7	120	394	32	25	25	17
70	43.5	100	328	22	20	18	13
60	37.3	80	262	14	15	11	10
50	31.1	60	197	9	11	7	7
40	24.9	50	164	5	8	5	5
30	18.6	30	98	3	4	2	3