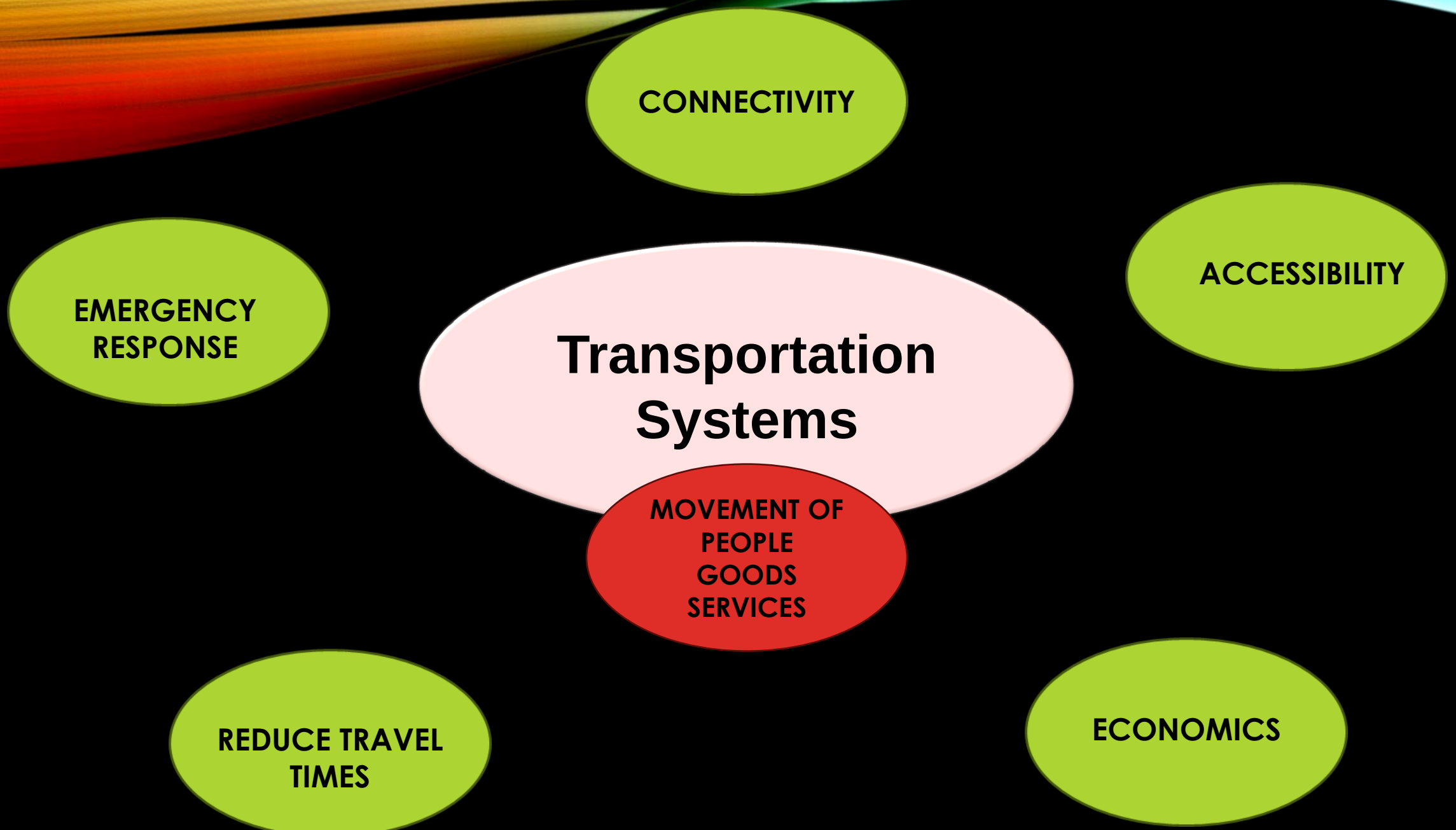
TOWN ROAD BUILDING BASICS

Tim Barbeau, P.E., P.L.S.
raSmith


Tonka


Tonka
952


Tonka
105
Tonka


CONNECTIVITY
EMERGENCY RESPONSE
ACCESSIBILITY
Transportation Systems
MOVEMENT OF PEOPLE GOODS SERVICES
REDUCE TRAVEL TIMES
ECONOMICS

PLANNING

DESIGN

CONSTRUCTION

PLANNING

TWO ELEMENTS OF PLANNING

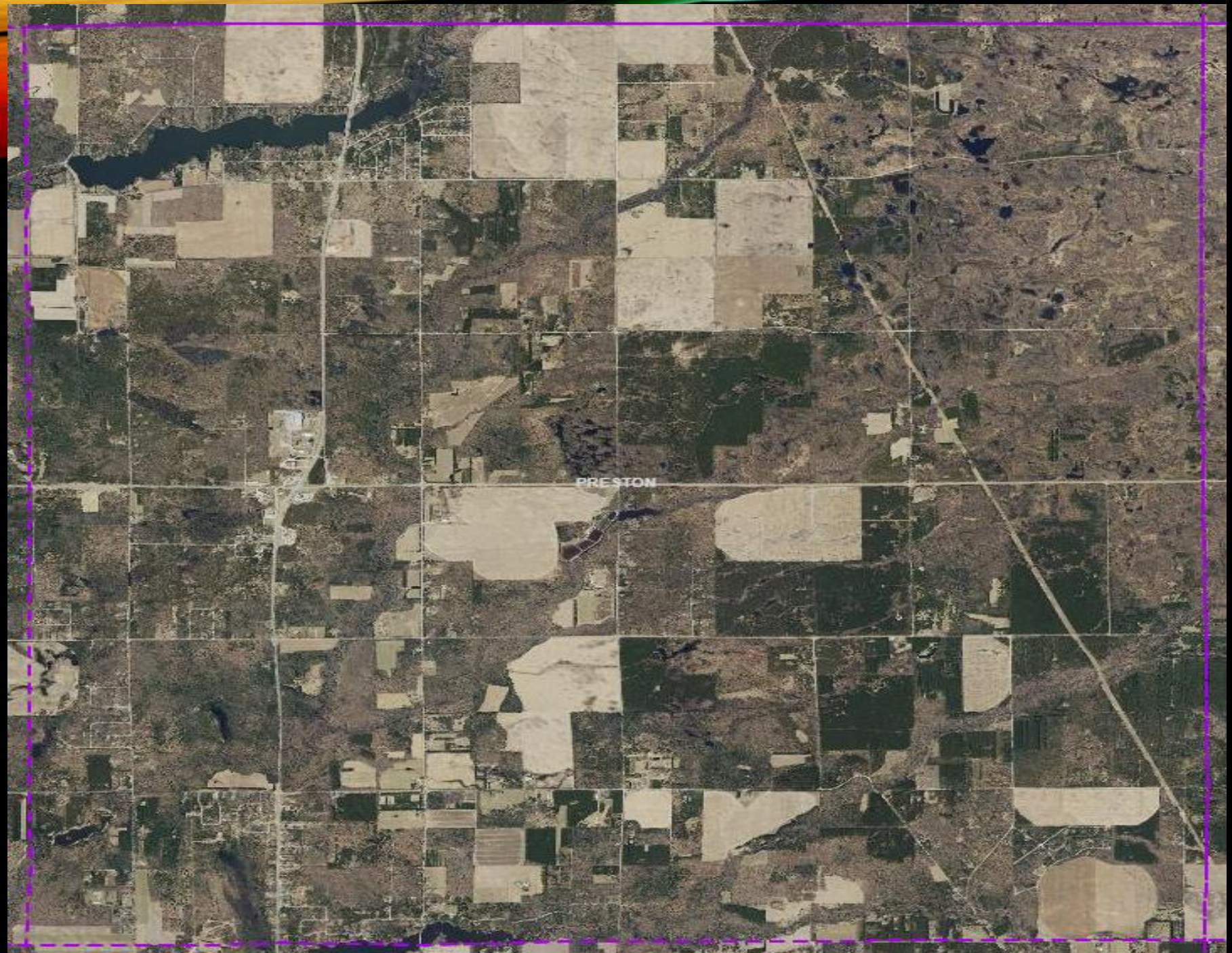
ELEMENT 1

Determine purpose of the road

ELEMENT 2

Determine location and layout

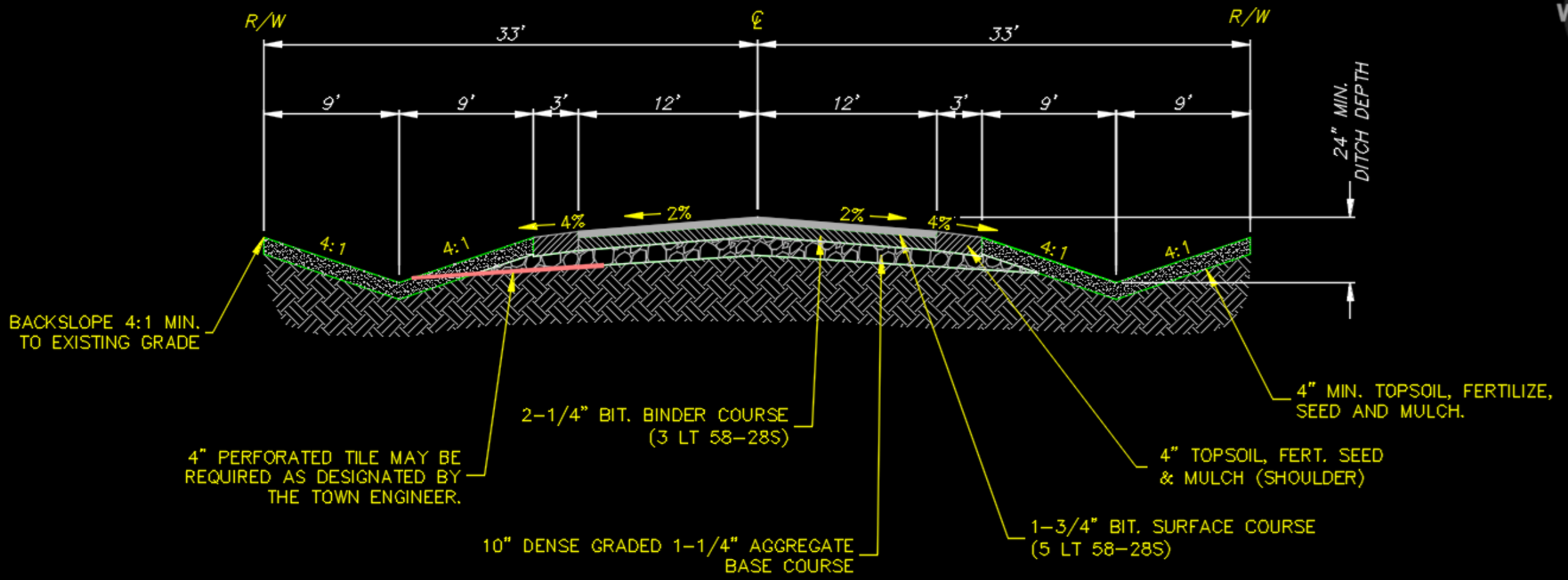
Topography, physical barriers, environmental barriers, soils, drainage patterns, future road plans

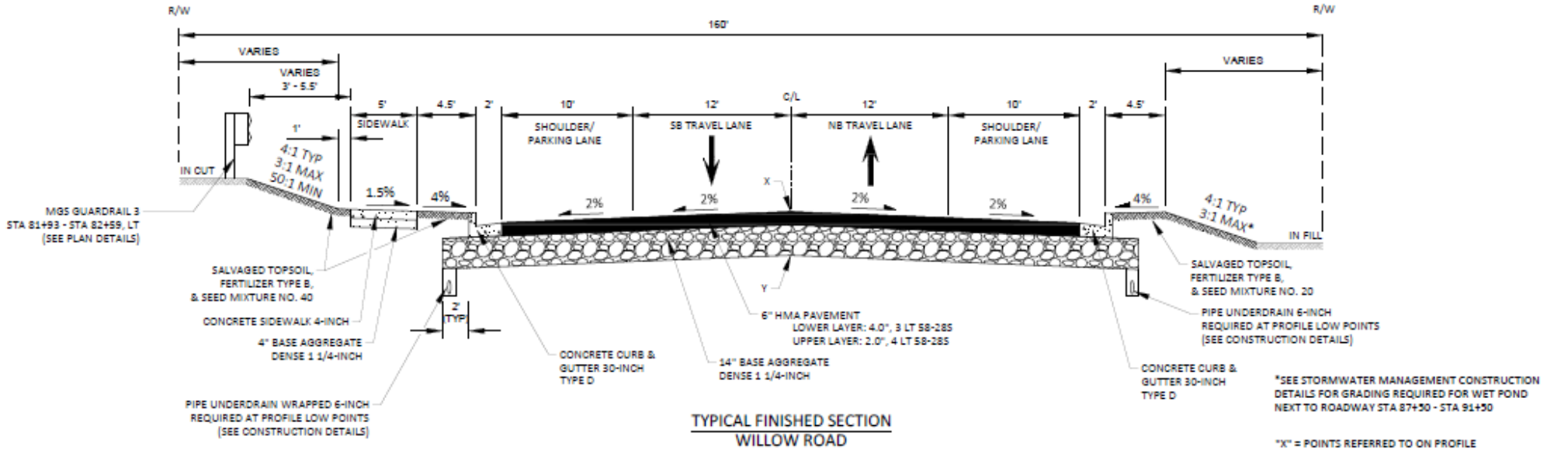

PRESTON

DESIGN

DESIGN

- 1. **Typical section for the road.**


R/W
33'
℄
33'
R/W
9'
9'
3'
12'
12'
3'
9'
9'
24" MIN.
DITCH DEPTH
4%
2%
2%
4%
4:1
4:1
4:1
4:1
BACKSLOPE 4:1 MIN.
TO EXISTING GRADE
4" PERFORATED TILE MAY BE
REQUIRED AS DESIGNATED BY
THE TOWN ENGINEER.
2-1/4" BIT. BINDER COURSE
(3 LT 58-28S)
10" DENSE GRADED 1-1/4" AGGREGATE
BASE COURSE
1-3/4" BIT. SURFACE COURSE
(5 LT 58-28S)
4" TOPSOIL, FERT. SEED
& MULCH (SHOULDER)
4" MIN. TOPSOIL, FERTILIZE,
SEED AND MULCH.

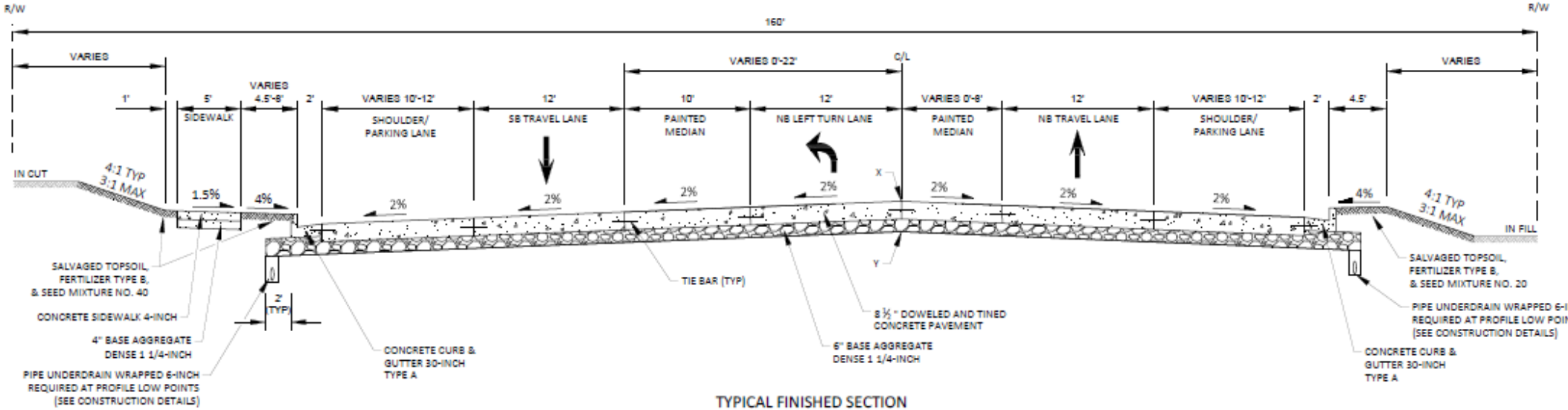


*SEE STORMWATER MANAGEMENT CONSTRUCTION DETAILS FOR GRADING REQUIRED FOR WET POND NEXT TO ROADWAY STA 87+50 - STA 91+50

"X" = POINTS REFERRED TO ON PROFILE
"Y" = POINTS REFERRED TO ON CROSS SECTIONS

TYPICAL FINISHED SECTION
WILLOW ROAD
STA 73+18 - STA 93+50

DESIGN SPEED 40 MPH



TYPICAL FINISHED SECTION
WILLOW ROAD
STA 93+50 - STA 97+00

DESIGN SPEED 40 MPH

"X" = POINTS REFERRED TO ON PROFILE
"Y" = POINTS REFERRED TO ON CROSS SECTIONS

DESIGN

1. Typical section for the road.
2. **Minimum widths of right-of-way, road pavement, shoulders.**

82.50 Town road standards. (1) The following minimum geometric design standards are established for improvements on town roads:

Annual Average 24–hour Traffic (ADT)	Minimum Design Standards
(a) Local service, intermittent traffic	
1. Right–of–way	3 rods
2. Roadway width	20 feet
3. Surface width	16 feet
(b) Under 100 ADT	
1. Right–of–way	3 rods
2. Roadway width	24 feet
3. Surface width	18 feet
4. Maximum grades	9 percent–11 percent
(c) 100 to 250 ADT	
1. Right–of–way	4 rods
2. Roadway width	26 feet
3. Surface width	20 feet
4. Maximum grades	8 percent–11 percent
(d) 251 to 400 ADT	
1. Right–of–way	4 rods
2. Roadway width	32 feet
3. Surface width	22 feet
4. Maximum grades	6 percent–8 percent
5. Curvature	6°–12.5°
(e) 401 to 1,000 ADT	
1. Right–of–way	4 rods
2. Roadway width	34 feet
3. Surface width	22 feet
4. Maximum grades	5 percent–8 percent
5. Curvature	5°–12.5°
(f) 1,001 to 2,400 ADT	
1. Right–of–way	4 rods
2. Roadway width	44 feet
3. Surface width	24 feet
4. Maximum grades	5 percent–7 percent
5. Curvature	4.5°–7.5°
(g) Over 2,400	State trunk standards

Design Criteria for Town Roads

(New Construction Only)

Design Class	Traffic Volume	Roadway							Structure	
	AADT Current	Roadway Width (feet)	Surfacing Width (feet)	Minimum Shoulder Width (feet)	Horizontal Curve (Degrees/Radius)		% Grade		Highway Load	Clear Roadway Width for Structures (feet)**
					Upper Min (°/ft)	Min (°/ft)	Des. Max	Max		
T1	Local Service Intermittent Traffic	20, 22*	16, 18*	2					*	24
T2	Under 100	24	18	3			9	11	*	24
T3	100 - 250	26	20	3			8	11	*	24
T4	251 - 400	32	22	5	6°/960'	12.25°/485'	6	8	*	26
T5	401 - 1000	34	22	6	5°/1190'	12.25°/485'	5	8	*	28
T6	1001-2400	44	24	10	4.5°/1330'	7.5°/758'	5	7	*	30
T7	Over 2400	USE STATE TRUNK DESIGN CRITERIA								

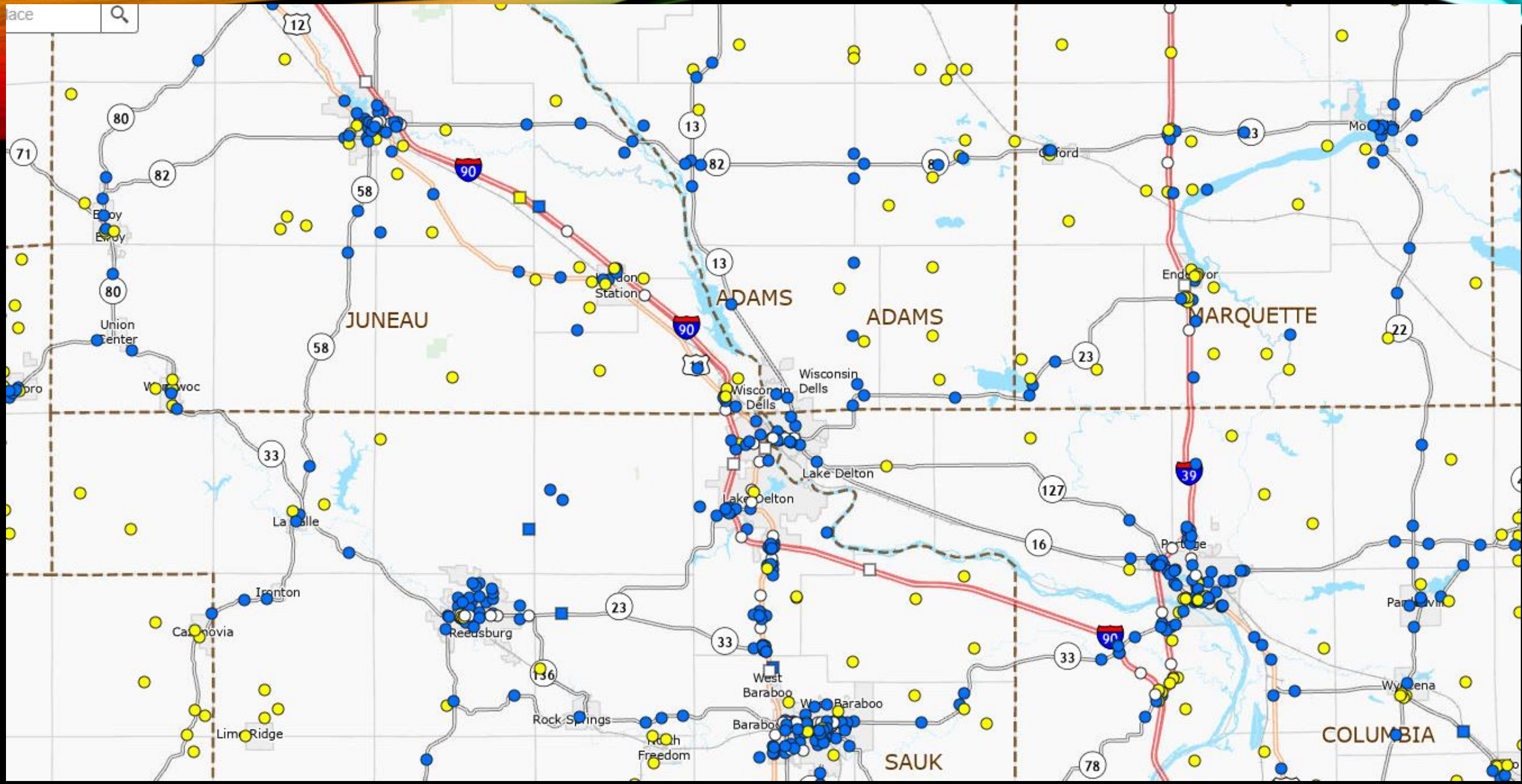
TABLE A—RECONSTRUCTION

TRAFFIC VOLUME			ROADWAY WIDTH DIMENSIONS IN FEET		
Design Class	Current ADT	Design Speed MPH	Traveled Way	Shoul-der	Road-way
T1	Under 250	40	20	3	26
T2	250–750	50	22	4	30
T3	Over 750	55	24	6	36

TABLE B—RESURFACING AND RECONDITIONING

TRAFFIC VOLUME			ROADWAY WIDTH DIMENSIONS IN FEET		
Design Class	Current ADT	Design Speed MPH	Traveled Way	Shoul-der	Road-way
TR1	Under 250	—	18	2	22
TR2	250 – 400	40	20	2	24
TR3	401 – 750	50	22	2	26
TR4	Over 750	55	22	4	30

Note: Examples of resurfacing and reconditioning improvements which may be appropriate for existing town roads include, but are not limited to, pavement rehabilitation; widening lanes and shoulders; replacing bridge elements to correct structural deficiencies; bridge deck overlays; bridge and culvert replacement; and other related improvements such as minor grading, subgrade work and correction of drainage problems.

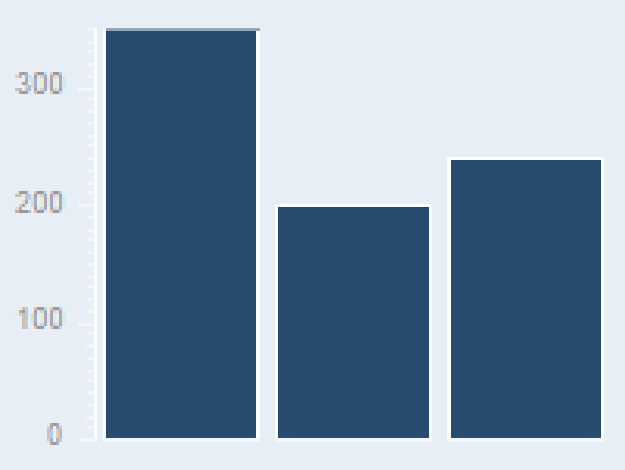

12
80
71
82
58
90
13
82
Oxford
Mo
Elroy
Elroy
80
Union
Center
Station
ADAMS
ADAMS
JUNEAU
MARQUETTE
58
90
23
22
Wisconsin
Dells
Wisconsin
Dells
33
Lake Delton
Lake Delton
39
127
La Crosse
16
Portage
Ironton
Reedsburg
23
33
33
90
136
West
Baraboo
Baraboo
Rock Springs
Lime Ridge
North
Freedom
SAUK
COLUMBIA
78

Site:010285

Site Type: Short Duration
AADT: 350 (Final)
AADT Date: 6/14/2021
County: Adams
Location: CTH K WEST OF CTH B DELL PRAIRIE TNSHP
Street View Lat,Long: 43.71,-89.73

AADT History

Most recent on left. Hover over bar to show date and AADT.



Related tables:

AADT

Design Criteria for Rural State Trunk Highways Functionally Classified as Local Roads (Level Terrain)

Traffic Volume			Roadway width Dimensions [1]								Bridges [1,3,4]		
				Traveled Way Width Based on Design Speed (feet)				Roadway Width [3], Based on Design Speed (feet)				Clear Roadway Width of Bridges Based on Design Speed (feet)	
Design Class	Current ADT	Design ADT	Design Speed (mph) [2]	40 mph or less	45-50 mph	55 mph or more	Shoulder Width (feet)	40 mph or less	45-50 mph	55 mph or more	Design Load	50 mph or less	55 mph or more
L1	0-250		30-60	18-22	20-22	22	2-4	22-26	24-26	26	[5]	24-28	26-28
L2	250-400		40-60	18-22	20-22	22	2-4	22-30	24-30	26-30	[5]	26-30	26-30
L3	400-750	Under 1500	50-60		22-24	22-24	5-6		32-36	32-36	[5]	28-30	28-30
L4		1500-2000	50-60		22-24	24	6		34-36	36	[5]	30-34	30-34
		2000-3500			24	24	6		36	36	[5]	36	36
L5		Over 3500	50-60		24	24	8			40	[5]	40	40

[1] Where ranges of widths are shown, the lower numbers are the lower range of widths and the larger are the upper range of widths eligible for federal or state project participation.

[2] Design Speeds should typically be 5 mph greater than the posted speeds.

[3] Bridges in Design Classes L4 and L5 with total lengths over 100 feet may be designed with clear roadway widths of 30 feet. See FDM 11-26-30.5.13.3 for Roadway Widths, Clear Roadway Widths of Bridges, and Underpasses between Closely Spaced Roundabouts.

[4] Lateral clearance design criteria for underpass bridges are included in FDM 11-35-1.

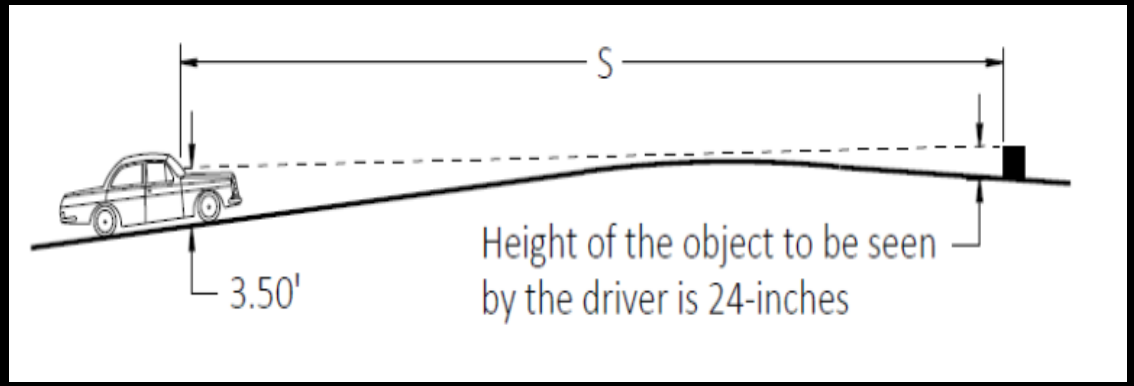
[5] See WisDOT Bridge Manual and consult with Bureau of Structures for appropriate Bridge Design Loadings.

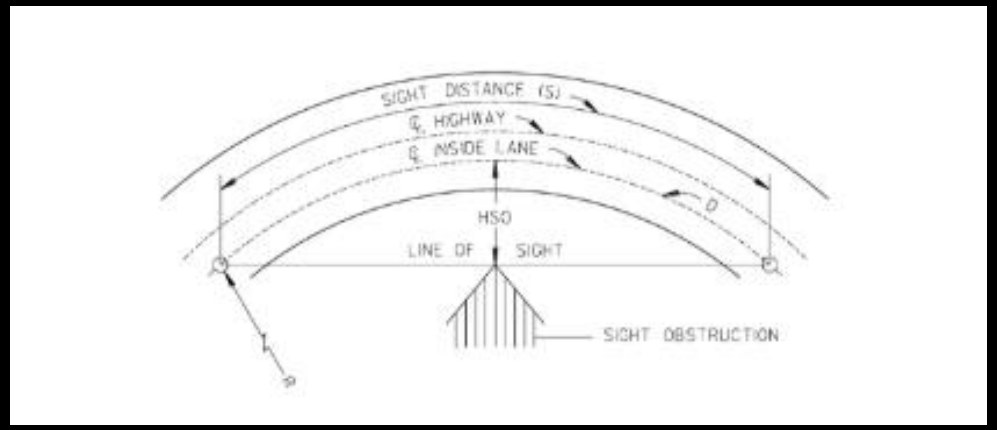
DESIGN

1. Typical section for the road.
2. Minimum widths of right-of-way, road pavement, shoulders.
3. **Sight Distance –Horizontal and Vertical curves**
4. Design criteria from municipal codes.

SIGHT DISTANCE

- Stopping sight distance must be considered for vertical curves, horizontal curves and at intersections.



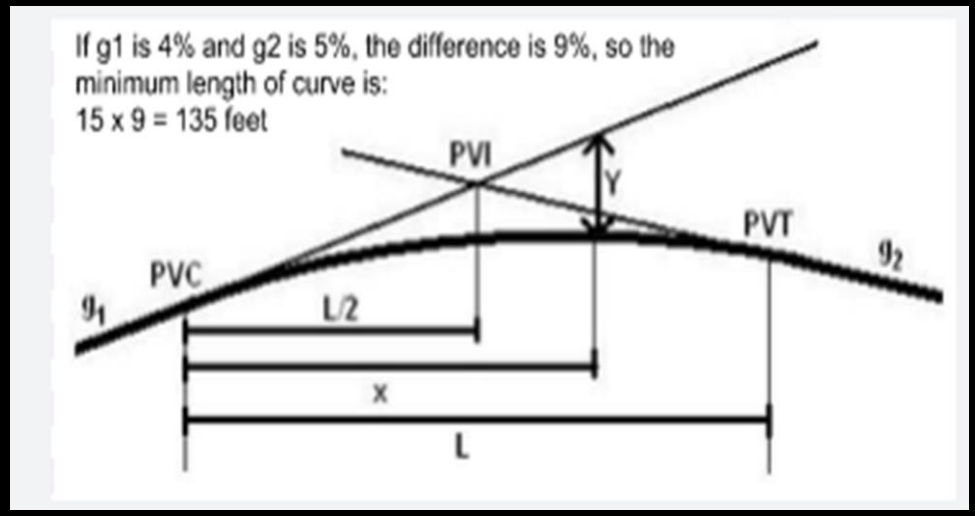


DESIGN

1. Typical section for the road.
2. Minimum widths of right-of-way, road pavement, shoulders.
3. Sight Distance –Horizontal and Vertical curves
4. **Design criteria from municipal codes.**

MUNICIPAL CRITERIA - EXAMPLE

- Horizontal curves: designed such that the minimum sight distance with clear visibility is provided: for major roads, 300 feet, for collector roads, 250 feet and for local roads 100 feet.
- Vertical curves: 15 x the algebraic difference between the rates of grade.



MUNICIPAL CRITERIA - EXAMPLE

- Horizontal curves: designed such that the minimum sight distance with clear visibility is provided: for major roads, 300 feet, for collector roads, 250 feet and for local roads 100 feet.
- Vertical curves: 15 x the algebraic difference between the rates of grade.
- **Maximum grade for major and collector streets : 6%, for minor roads, 10%**
- **Intersections must be at right angles**
- **No more than 2 streets to each intersection**
- **Intersection spacing (jogs) must be greater than 125 feet apart**
- **Vision corner restrictions required on all corners.**

DESIGN

1. Typical section for the road.
2. Minimum widths of right-of-way, road pavement, shoulders.
3. Design criteria from municipal codes.
4. **Design Speed**

SPEED

- Speeds are set by Chapter 346.57(4) of the State Statutes.
- For town roads, in the absence of other fixed limits (school zones, safety zones) or the posting of limits as required by law, 55 mph
- 35 mph on any town road where on either side of the highway, within any 1000 feet along such highway, the buildings in use for business, industrial or residential purposes fronting thereon average less than 150 feet apart, provided the Town has adopted an ordinance determining such speed limit and has posted signs to give adequate warning to users of the town road.

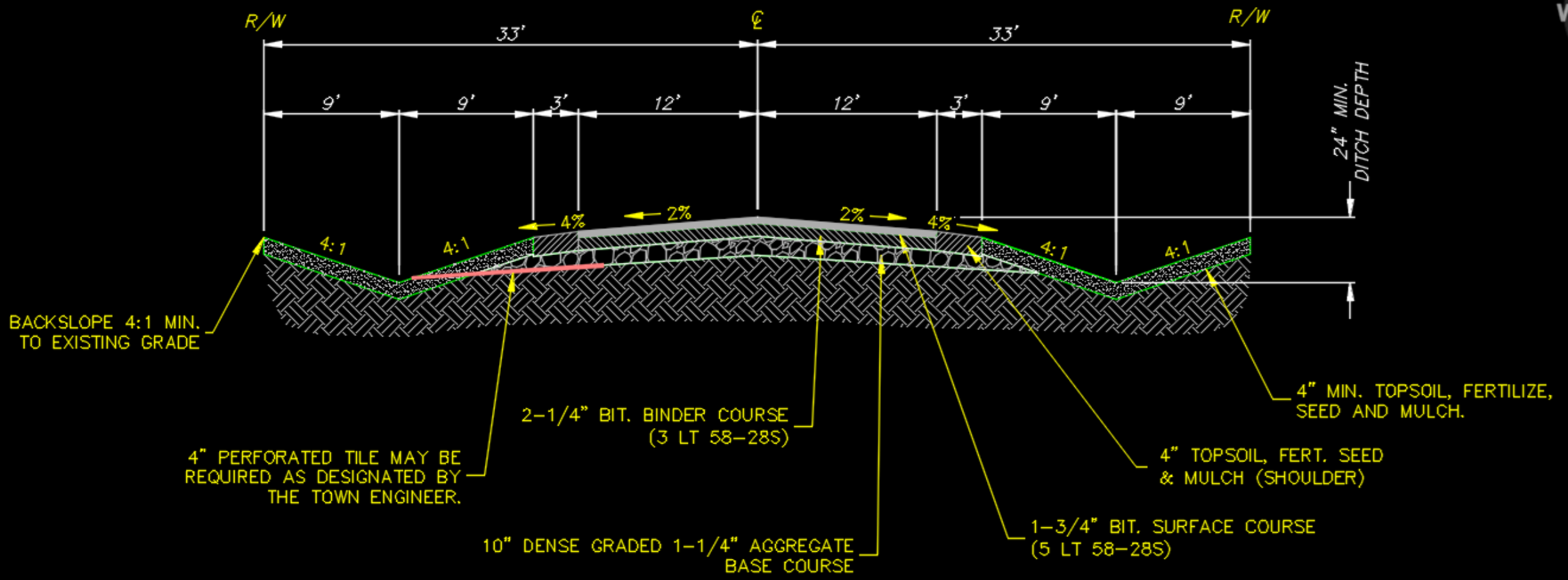
CONSTRUCTION

CONSTRUCTION

1. **Drainage.**

CONSTRUCTION

1. Drainage.
2. **Typical cross section**


R/W
33'
℄
33'
R/W
9'
9'
3'
12'
12'
3'
9'
9'
24" MIN.
DITCH DEPTH
4%
2%
2%
4%
4:1
4:1
4:1
4:1
BACKSLOPE 4:1 MIN.
TO EXISTING GRADE
4" PERFORATED TILE MAY BE
REQUIRED AS DESIGNATED BY
THE TOWN ENGINEER.
2-1/4" BIT. BINDER COURSE
(3 LT 58-28S)
10" DENSE GRADED 1-1/4" AGGREGATE
BASE COURSE
1-3/4" BIT. SURFACE COURSE
(5 LT 58-28S)
4" TOPSOIL, FERT. SEED
& MULCH (SHOULDER)
4" MIN. TOPSOIL, FERTILIZE,
SEED AND MULCH.

CONSTRUCTION

1. Drainage.
2. Typical cross section
3. **Elements of a road section**
   - Subgrade
   - Base course
   - Pavement
   - Shoulders
   - Drainage


KOBELCO

TO BE USED FOR PROJECTS: SOUTHERN ASPHALT ZONE

Classification	Applications	Upper Layer Binder Designation	Asphalt Mixes

LT <2 Million ESALs	• **Residential driveways**
	• **Parking lots**
	• **Schools & recreational areas**
	  • Playgrounds/tracks
	  • Bike paths
	  • Sidewalks
	• **Low volume roadways**
	  • Subdivision streets
	  • Collector streets
	  • Town roads
	  • County roads
		Standard (S)
		No modification for normal traffic situations
			LT 58-28 S

MT 2-8 Million ESALs	• **Industrial parking lots**
	  • Loading docks
	  • Bus stops
	• **Medium volume roadways**
	  • Arterial streets
	  • Roundabouts
	  • Slow moving traffic
	  • Town roads
	  • County roads
		Standard (S)
		No modification for normal traffic situations
		
		Heavy (H)
		To accommodate slow moving traffic situations
			MT 58-28 S
			
			MT 58-28 H

HT	• **Truck terminals**	**Heavy (H)** To accommodate	**HT 58-28 H**

TO BE USED FOR PROJECTS: NORTHERN ASPHALT ZONE

Classification	Applications	Upper Layer Binder Designation	Asphalt Mixes

LT <2 Million ESALs	• **Residential driveways**
	• **Parking lots**
	• **Schools & recreational areas**
	  • Playgrounds/tracks
	  • Bike paths
	  • Sidewalks
	• **Low volume roadways**
	  • Subdivision streets
	  • Collector streets
	  • Town roads
	  • County roads
		Standard (S)
		No modification for normal traffic situations
			LT 58-28 S
			
			LT 58-34 S

MT 2-8 Million ESALs	• **Industrial parking lots**
	  • Loading docks
	  • Bus stops
	• **Medium volume roadways**
	  • Arterial streets
	  • Roundabouts
	  • Slow moving traffic
	  • Town roads
	  • County roads
		Standard (S)
		No modification for normal traffic situations
		
		Heavy (H)
		To accommodate slow moving traffic situations
			MT 58-28 S
			
			MT 58-34 S
			
			MT 58-28 H
			
			MT 58-34 H

HT	• **Truck terminals**	**Heavy (H)** To accommodate	**HT 58-28 H**

QUICK REFERENCE GUIDE

ASPHALT BID/MIX SPECIFICATIONS

STEP 1 Asphalt Mix Gradation (Nmas)

1	37.5 mm	**4**	12.5 mm
2	25.0 mm	**5**	9.5 mm
3	19.0 mm	**6**	4.75 mm

STEP 2 Traffic Level Classification

LT	Low Volume (<2 Million ESALs)
MT	Medium Volume (2-8 Million ESALs)
HT	High Volume (>8 Million ESALs)

STEP 3 Asphaltic Binder Grades

58-28
58-34*

STEP 4 Binder Designation

S	Standard
H	Heavy
V**	Very Heavy
E***	Extremely Heavy


P&H
P&H
4100A
P&H
KOMATSU
830E
ATG-9009

QUESTIONS?

Tim Barbeau
raSmith
Tim.Barbeau@rasmith.com

Thank You