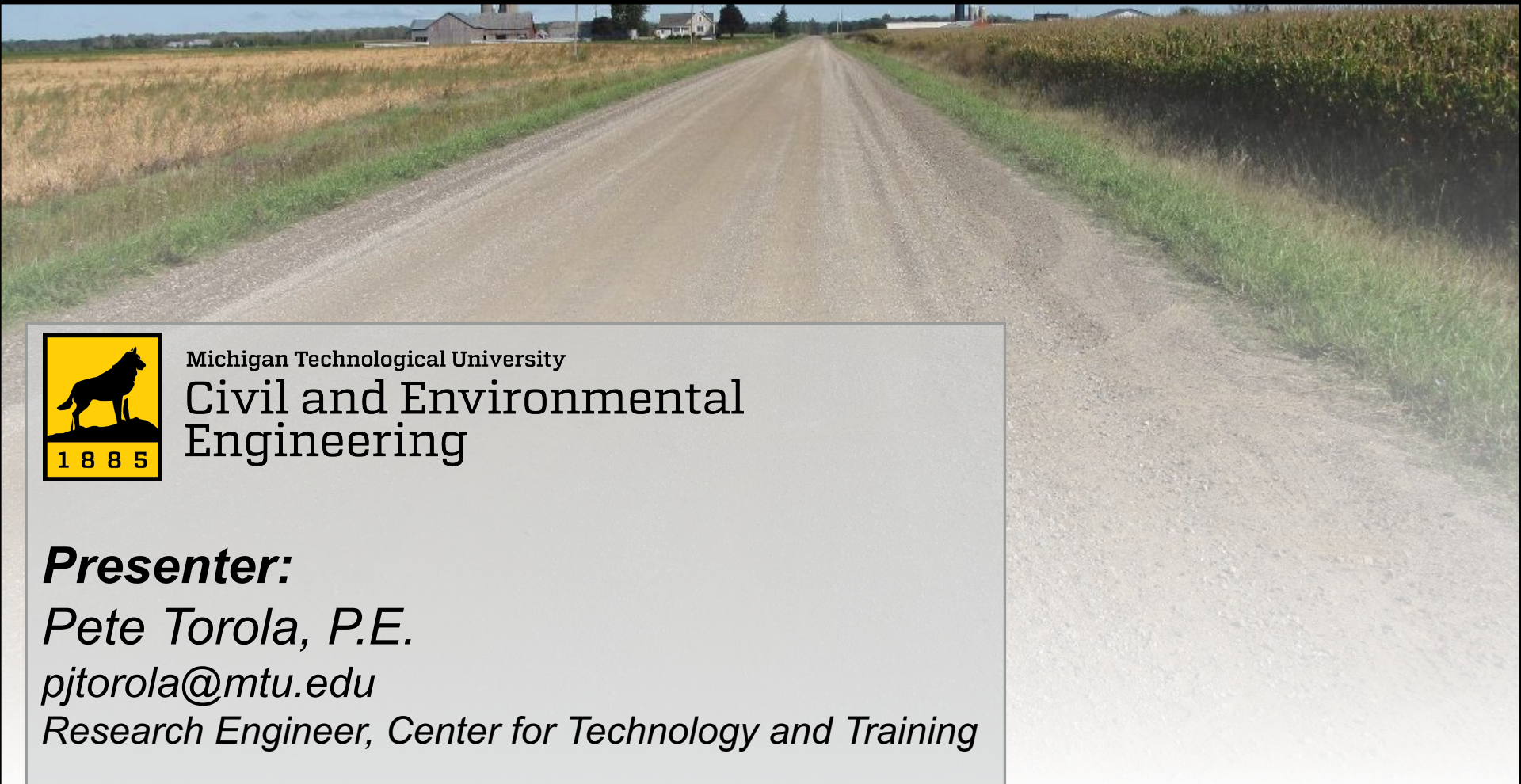


Michigan's Inventory-Based Rating System for Unpaved Roads



Michigan Technological University
**Civil and Environmental
Engineering**

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Research Engineer, Center for Technology and Training

Agenda

Why rate roads?

Other systems

IBR System

IBR measured elements



Why Rate Roads?

Why Rate Roads? (2)



To see how road condition is changing

Why Rate Roads? (3)

Roadsoft: v2017.5 : Van Buren (County)

File TAMC Asset Management Safety Analysis Reporting LDC Tools Settings Help

Map

Road Segment

Zoom Options

Filter

View Module

Extended Service Life Calculation

Options

Data points before treatment (minimum): 1

Data points after treatment (minimum): 2

Network (Optional): Road Ratings 2014

ESL Calculation method: Additional Years until CDP reached Years until Rating repeats

Manage Analyses (Optional)

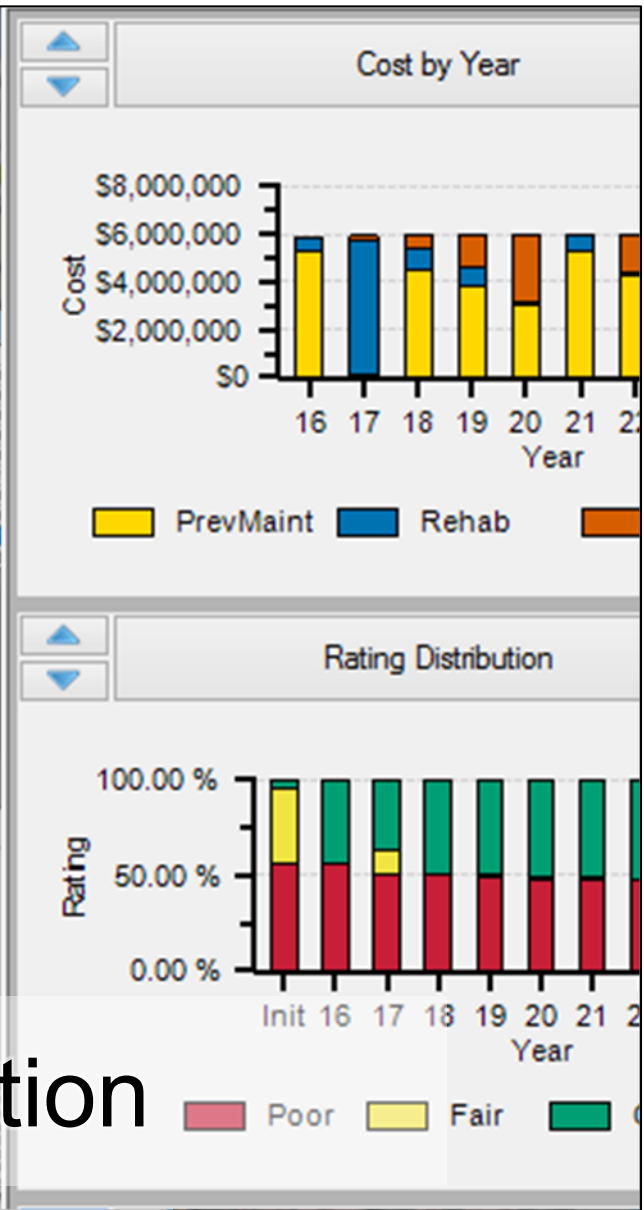
Use	TreatDate	FullName	Brp
<input checked="" type="checkbox"/>	8/31/2014	Lake Shore ...	0.000
<input checked="" type="checkbox"/>	8/31/2014	Lake Shore ...	0.042
<input checked="" type="checkbox"/>	8/31/2014	Lake Shore ...	0.067
<input checked="" type="checkbox"/>	8/31/2014	J St	0.000
<input checked="" type="checkbox"/>	8/31/2014	J St	0.064
<input checked="" type="checkbox"/>	8/30/2014	19th Ave	1.452
<input checked="" type="checkbox"/>	8/30/2014	49th St	0.000
<input checked="" type="checkbox"/>	8/30/2014	18th Ave	0.433
<input checked="" type="checkbox"/>	8/30/2014	49th St	0.143
<input checked="" type="checkbox"/>	8/30/2014	20th Ave	6.210

Surface Type	Surface Sub-Type	Treatment
Asphalt	Asphalt Blue Star	
Asphalt	Asphalt Rural	
Asphalt	Asphalt Rural 2	
Asphalt	Asphalt Standard	Seal Coat W/Fog Seal (per mile)
Asphalt	Asphalt Urban	
Asphalt	Composite	
Asphalt	VBORC Asphalt C	
Asphalt	VBORC FED AID	
Brick	Brick	
Concrete	Concrete Standard	
Earth	Graded Earth	

Date	Treatment	Rating	Use	Rating
6/4/2015		8	<input checked="" type="checkbox"/>	
8/31/20...	Seal Coat W/F...	8	<input checked="" type="checkbox"/>	
8/28/20...		7	<input checked="" type="checkbox"/>	
9/12/20...		7	<input checked="" type="checkbox"/>	
5/24/20...		7	<input checked="" type="checkbox"/>	
8/4/2011		6	<input checked="" type="checkbox"/>	
9/30/20...	Seal Coat W/F...	8	<input checked="" type="checkbox"/>	
10/3/20...		3	<input checked="" type="checkbox"/>	
11/11/2...		6	<input checked="" type="checkbox"/>	
7/1/2004	Sealcoat - 07	8	<input checked="" type="checkbox"/>	

Detail Report Summary Report Print Chart Average ESL

Deterioration Curve for 45th St Segment 0.749-1.764
 Surface Subtype: Asphalt-Standard Treatment: Seal Coat W/Fog Seal (per mile)
 ESL Method: Additional Years until CDP reached



To estimate future road condition

Why Rate Roads? (4)



To measure effectiveness of past improvements

Why Rate Roads? (5)



To determine what/where/when improvements are needed

Why Rate *Unpaved* Roads?

Why Rate *Unpaved* Roads?



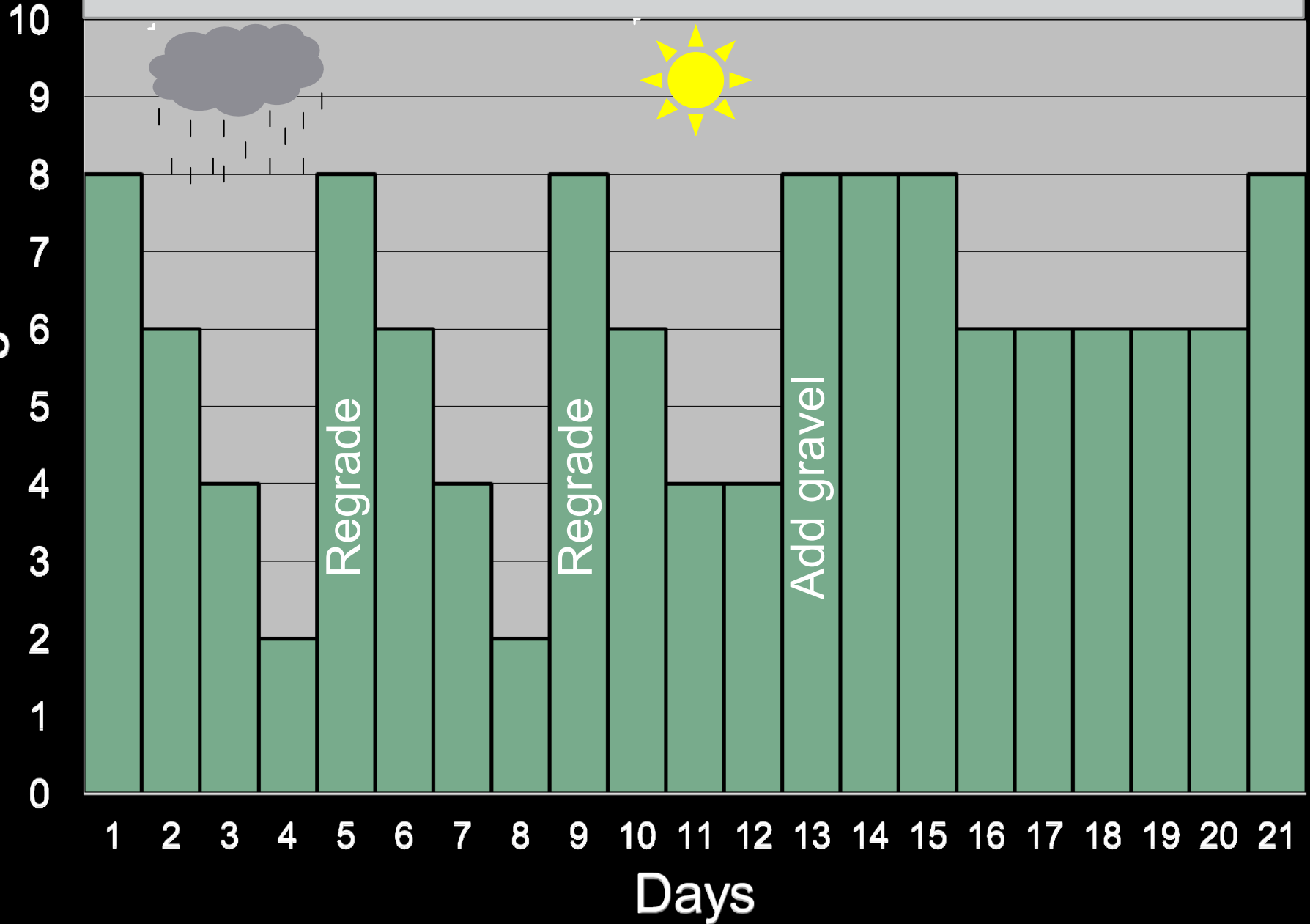
- Prioritize work
- Show response to investments (network metric)
- Communicate with the public

Surface Condition Rating System Correlate to:

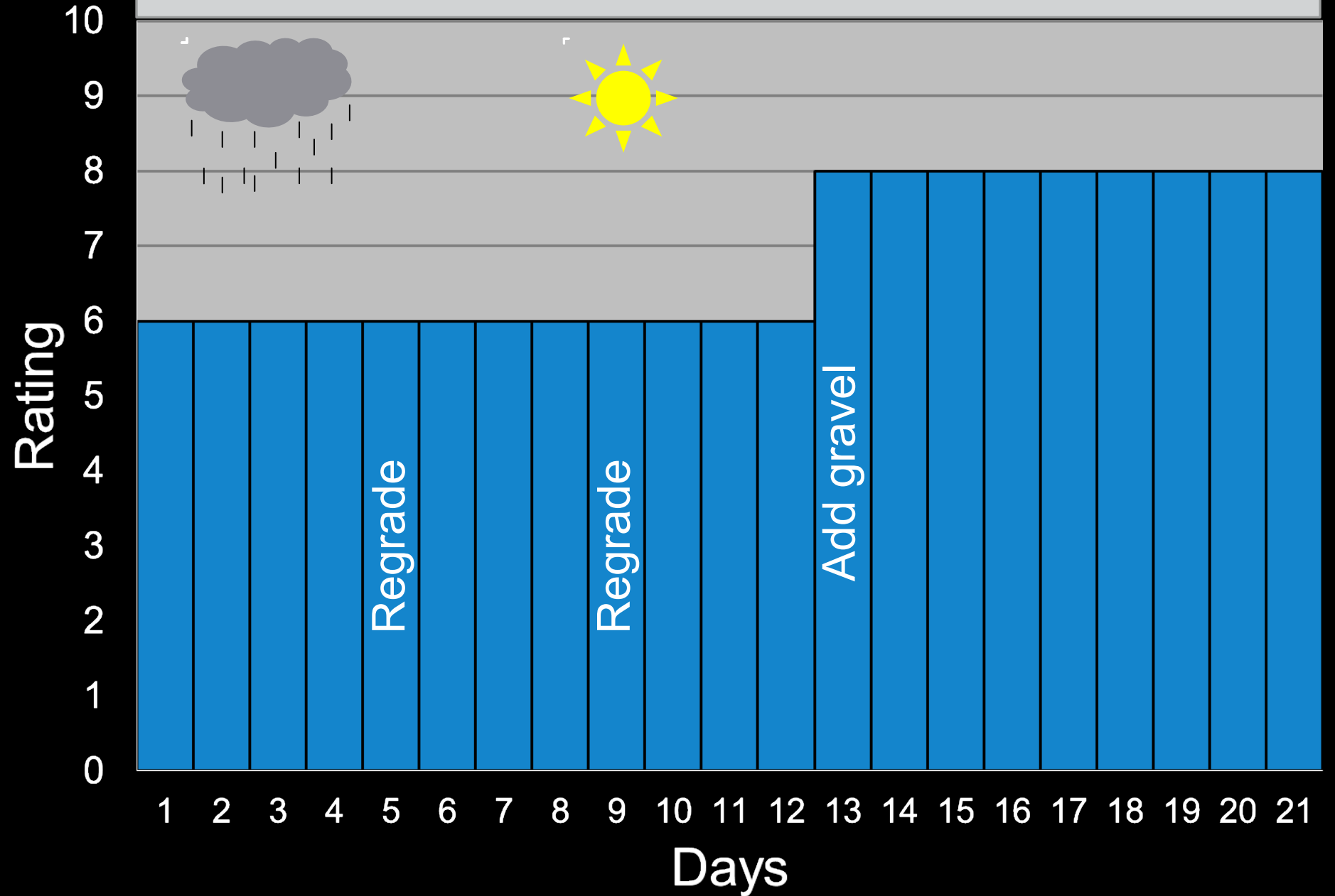
- Cost to repair surface defects
- Structure of the pavement
- Asset value
- User experience or usability



Unpaved Surface Condition vs Time



Ideal Unpaved Road Rating System



Michigan Fall Example



Michigan Spring Example



Saturated Soils During Spring Thaw




Other Factors In Unpaved Roads

Is surface condition important in this situation?

...but inadequate width!



Great surface condition...

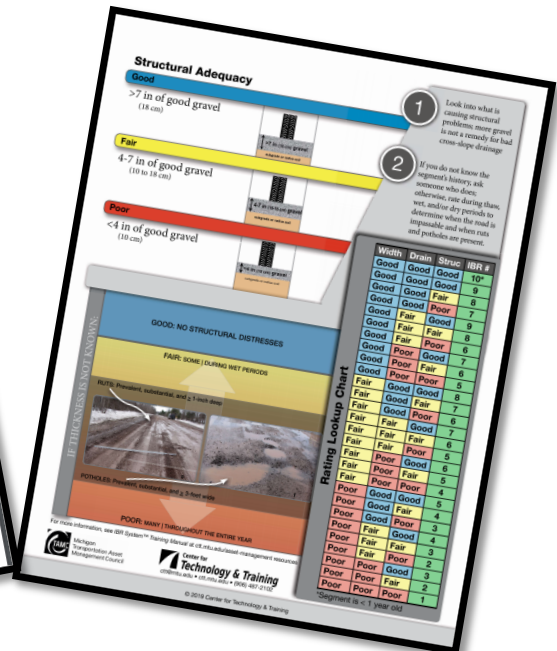
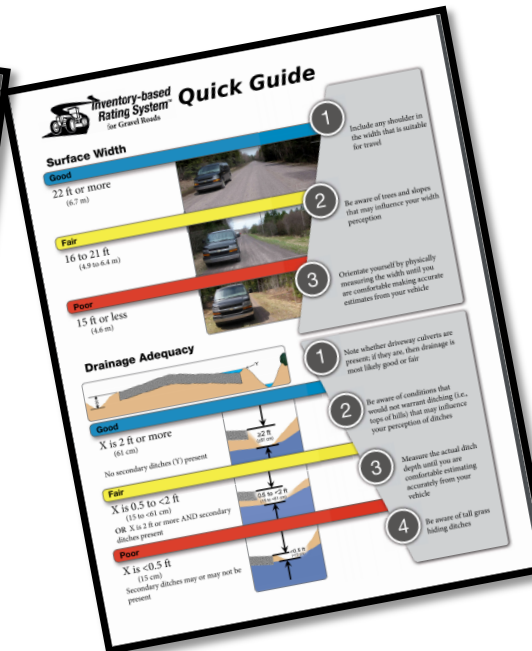


Are These The Same “Condition”?



Inventory-Based Rating System

- Cost effective to collect
- Accessible to local agencies
- Stable measure
- Responsive to major work



IBR Measured Elements

Surface Width

Drainage Adequacy

Structural Adequacy



Measured Elements Receive an Assessment...

Surface Width

Drainage Adequacy

Structural Adequacy

Good

Fair

Poor

✓ *“good” drainage adequacy*

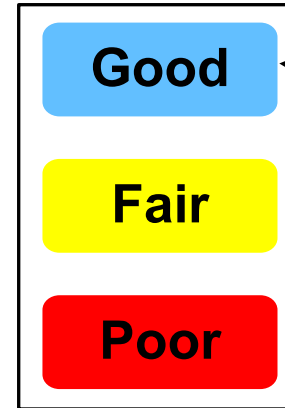
✓ *“good” structural adequacy*

✓ *“good” surface width*

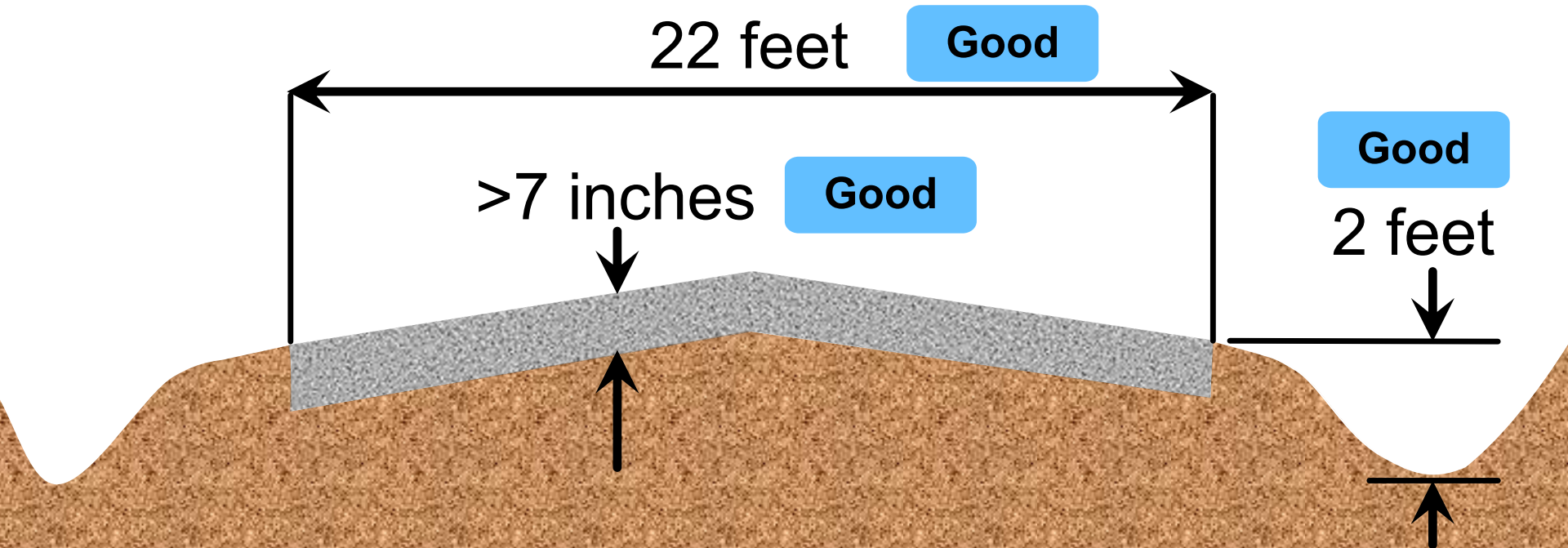


...based on a baseline Condition...

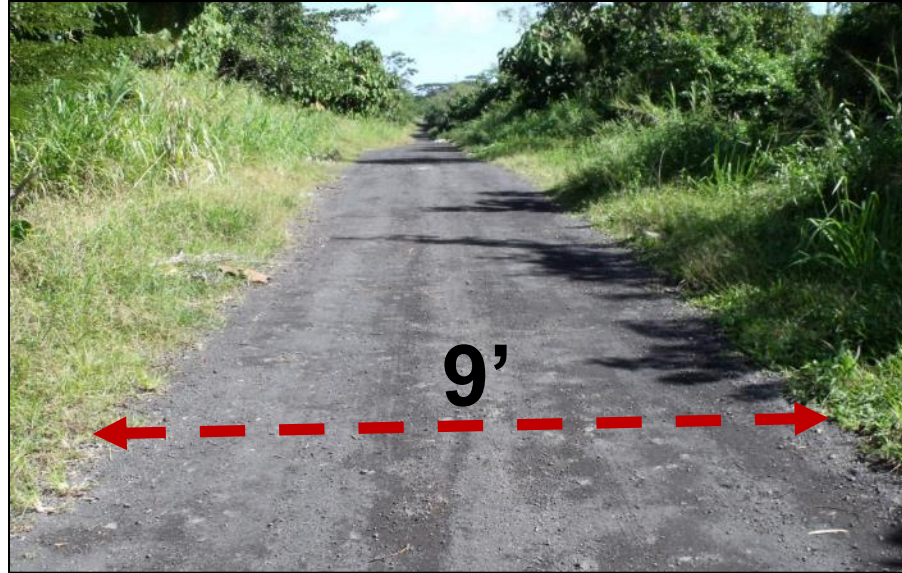
Baseline—or “good”—condition determined by characteristics considered acceptable by most road users



The baseline—or “good”—condition



Surface Width Assessment



Good

22 feet

Fair

16 to 21 feet

Poor

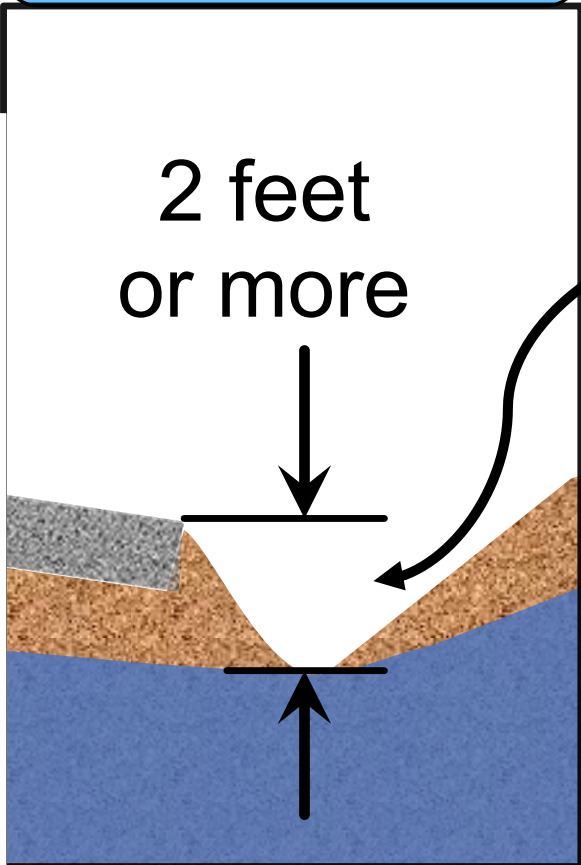
15 feet or less



Drainage Adequacy Assessment

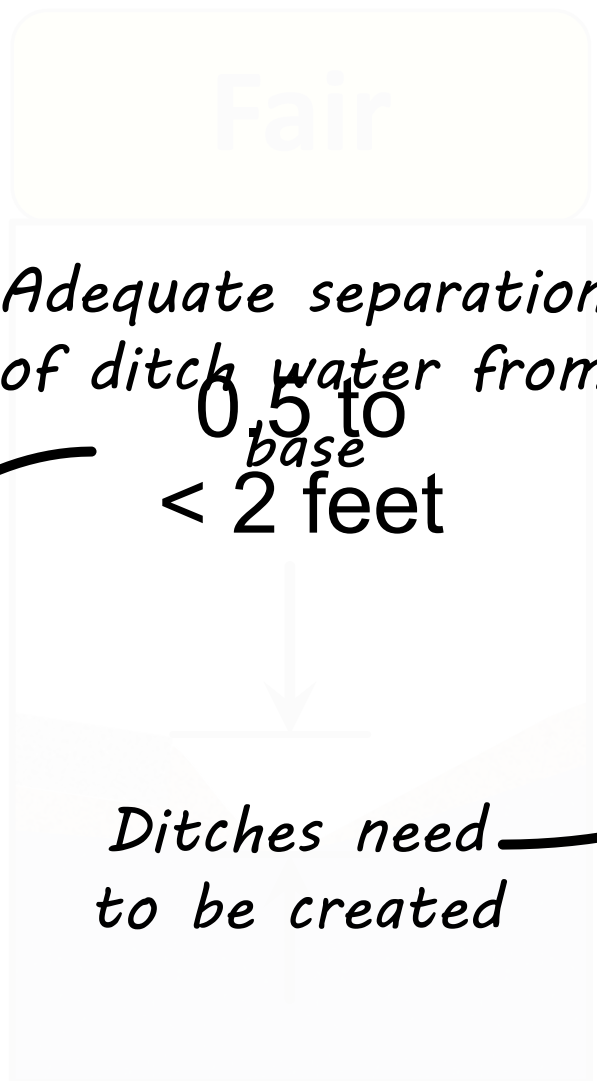
Good

2 feet
or more



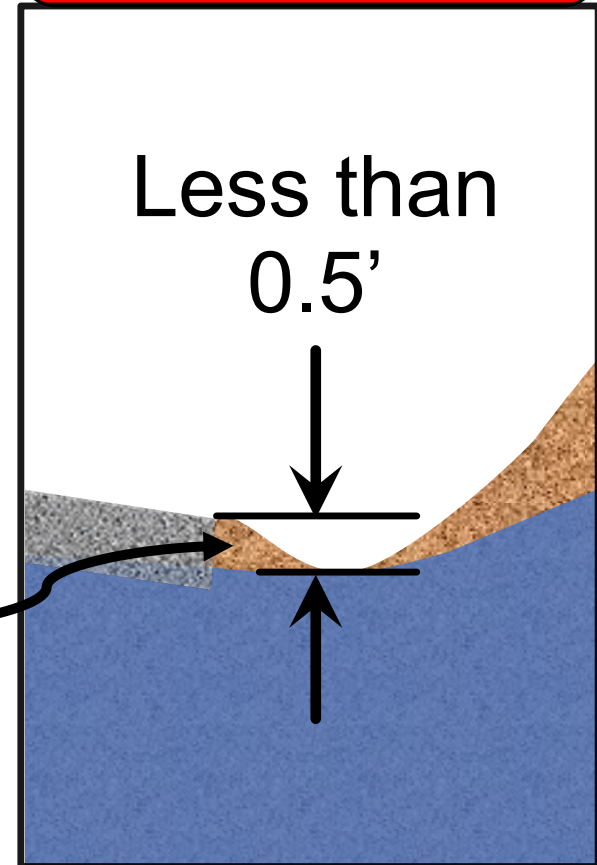
Fair

Adequate separation
of ditch water from
base
0.5 to
< 2 feet



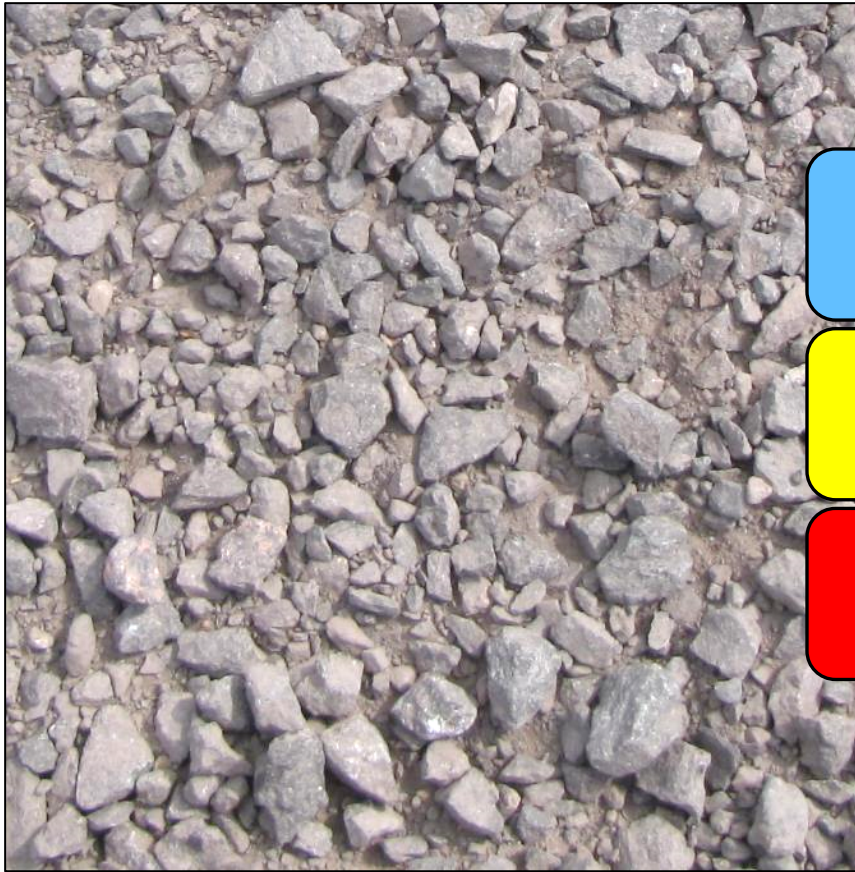
Poor

Less than
0.5'



*Ditches need
to be created*

Structural Adequacy Assessment



Gravel Thickness

Good

>7 inches

4 to 7 inches

< 4 inches

...to Generate an IBR Number

- ✓ "good" surface width
- ✓ "good" drainage adequacy
- ✓ "good" structural adequacy

IBR # = 9

Rating Lookup Chart

Width	Drain	Struc	IBR #
Good	Good	Good	10*
Good	Good	Good	9
Good	Good	Fair	8
Good	Good	Poor	7
Good	Fair	Good	9
Good	Fair	Fair	8
Good	Fair	Poor	6
Good	Poor	Good	7
Good	Poor	Fair	6
Good	Poor	Poor	5
Fair	Good	Good	8
Fair	Good	Fair	7
Fair	Good	Poor	6
Fair	Fair	Good	7
Fair	Fair	Fair	6
Fair	Fair	Poor	5
Fair	Poor	Good	6
Fair	Poor	Fair	5
Fair	Poor	Poor	4
Poor	Good	Good	5
Poor	Good	Fair	4
Poor	Good	Poor	3
Poor	Fair	Good	4
Poor	Fair	Fair	3
Poor	Fair	Poor	2
Poor	Poor	Good	3
Poor	Poor	Fair	2
Poor	Poor	Poor	1

*Segment is < 1 year old

