



Right Repair, Right Time, Right Cost at the Right Place

Fredericton Lean and Asset Management Conference

April, 2016

GNB Assets

- Highways and Structures
- Buildings
- Other

Asset Management

- Concepts
- Data and Modeling
- Deployment

Continuous Improvements

- Reducing errors and Improving Efficiencies
- Connected and standardized systems
- Cross Asset Optimization and Scheduling

Brief overview of

GNB ASSETS

2011-12

Pollett River Bridge (1893)



Pollett River Bridge (Continued)



© 2014

The Department of Transportation and Infrastructure

- **Mission:**

- Contribute to NB's Economy and Quality of life
- Provide and support sustainable infrastructure
- Provide safe and efficient movement of people and goods

- **Key Objectives:**

- Invest in infrastructural Renewal
- Enhance Strategic Partnerships
- Plan, Build, Maintain, Divest
- Competence, Impartiality, Integrity, Respect, Service

Infrastructure Snapshot

- Highways: 22,633 km
- Bridges and Large Culverts: 5,296
- Small Culverts: $\geq 235,000$
- Signs: $\geq 77,000$
- Buildings:

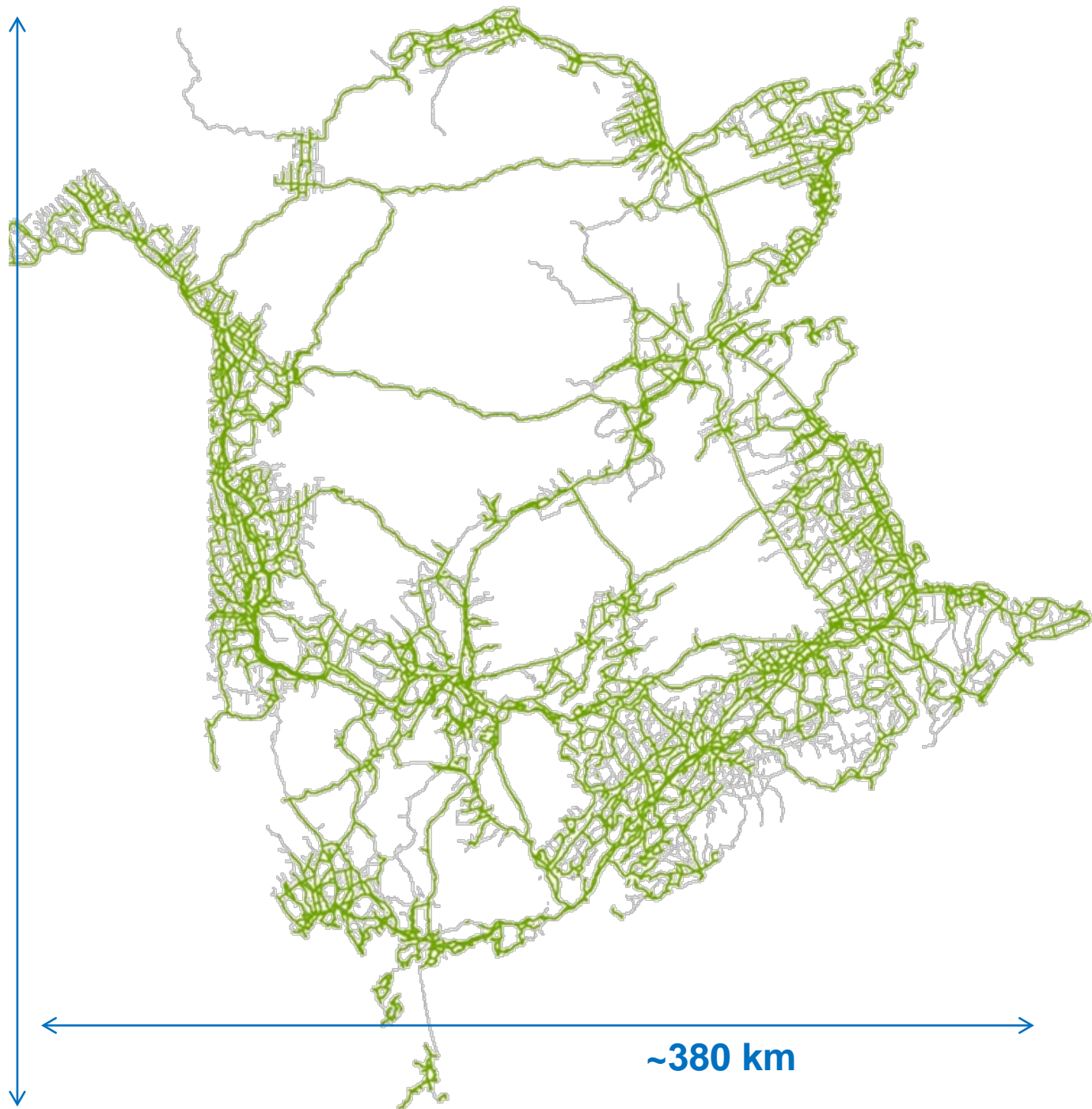
\$5B



Highways

~390 km

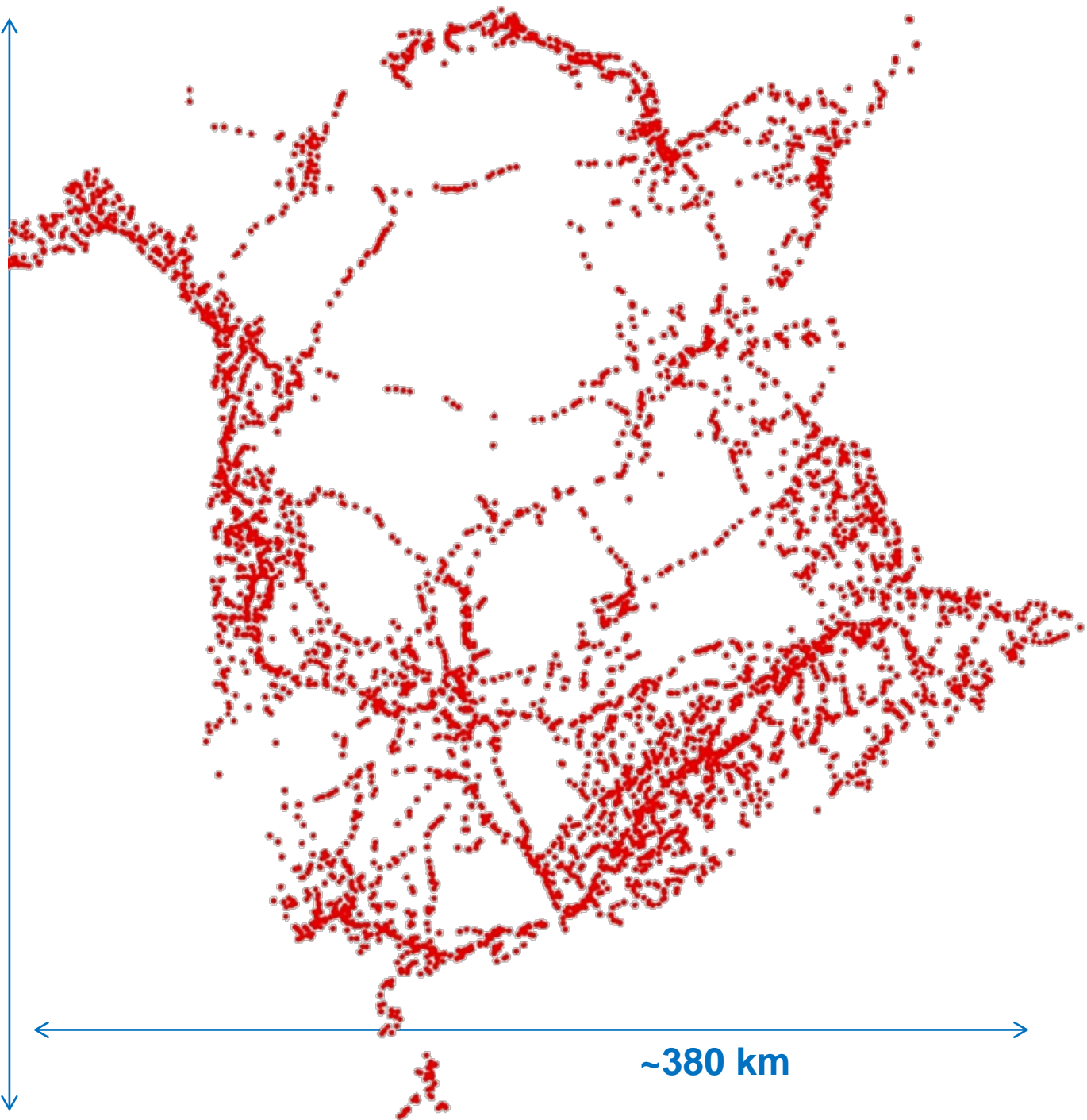
~380 km



Structures

~390 km

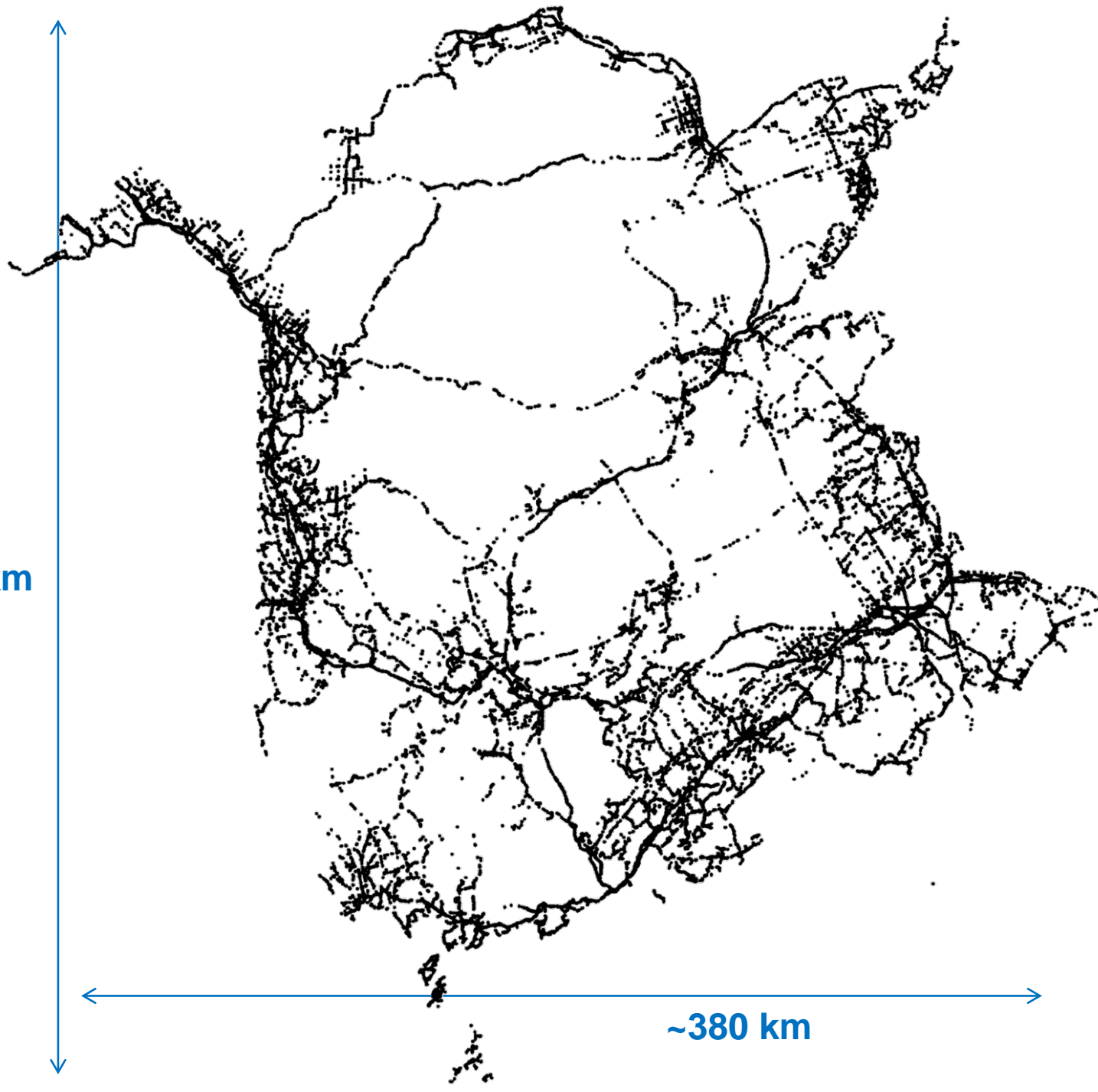
~380 km



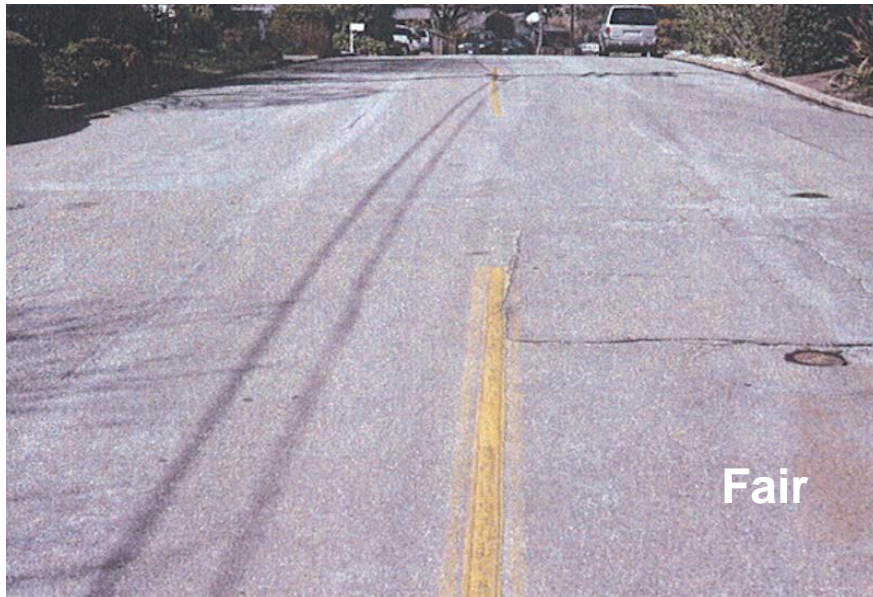
Signs

~390 km

~380 km



Highway Condition



Bridge and Culvert (Excellent Condition)



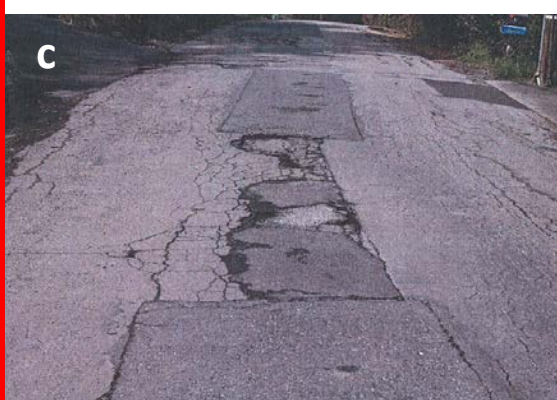
Bridge and Culvert (Fair Condition)



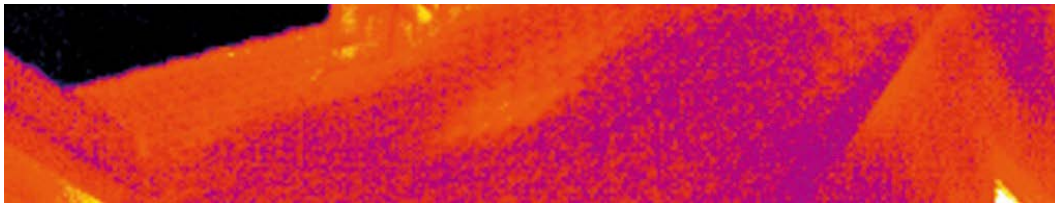
Bridge and Culvert (Poor Condition)



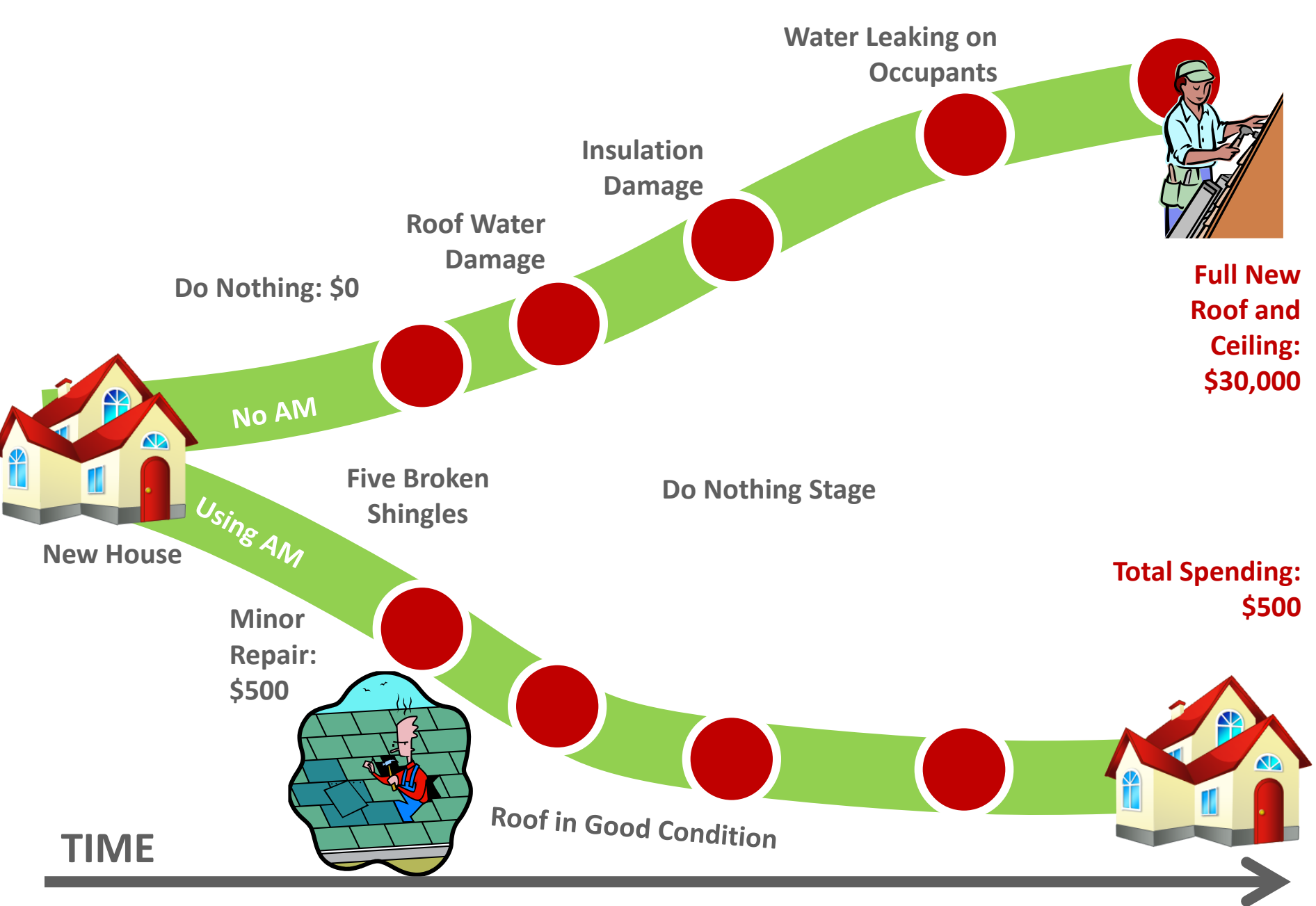
Which will you fix first?



Roofs



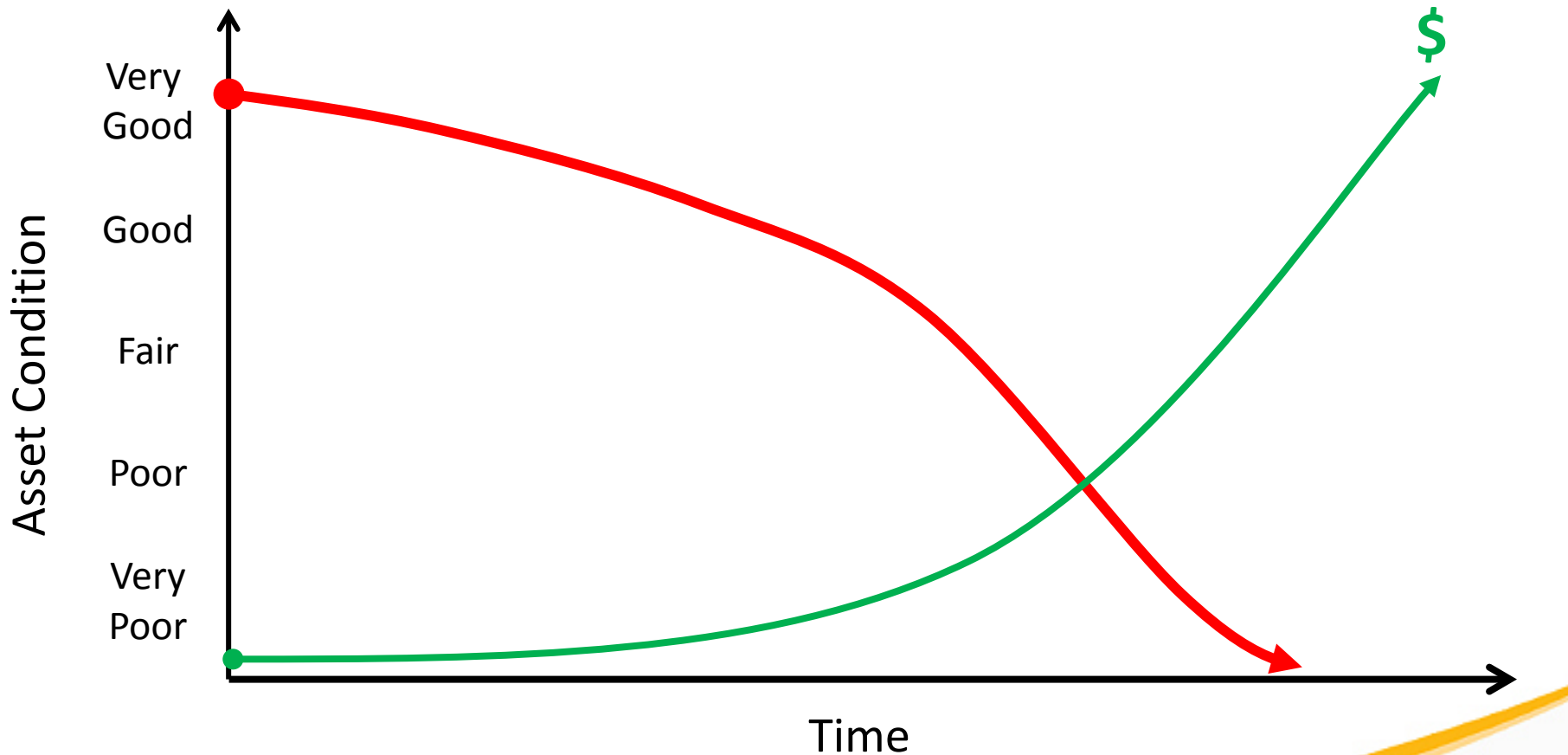
ASSET MANAGEMENT



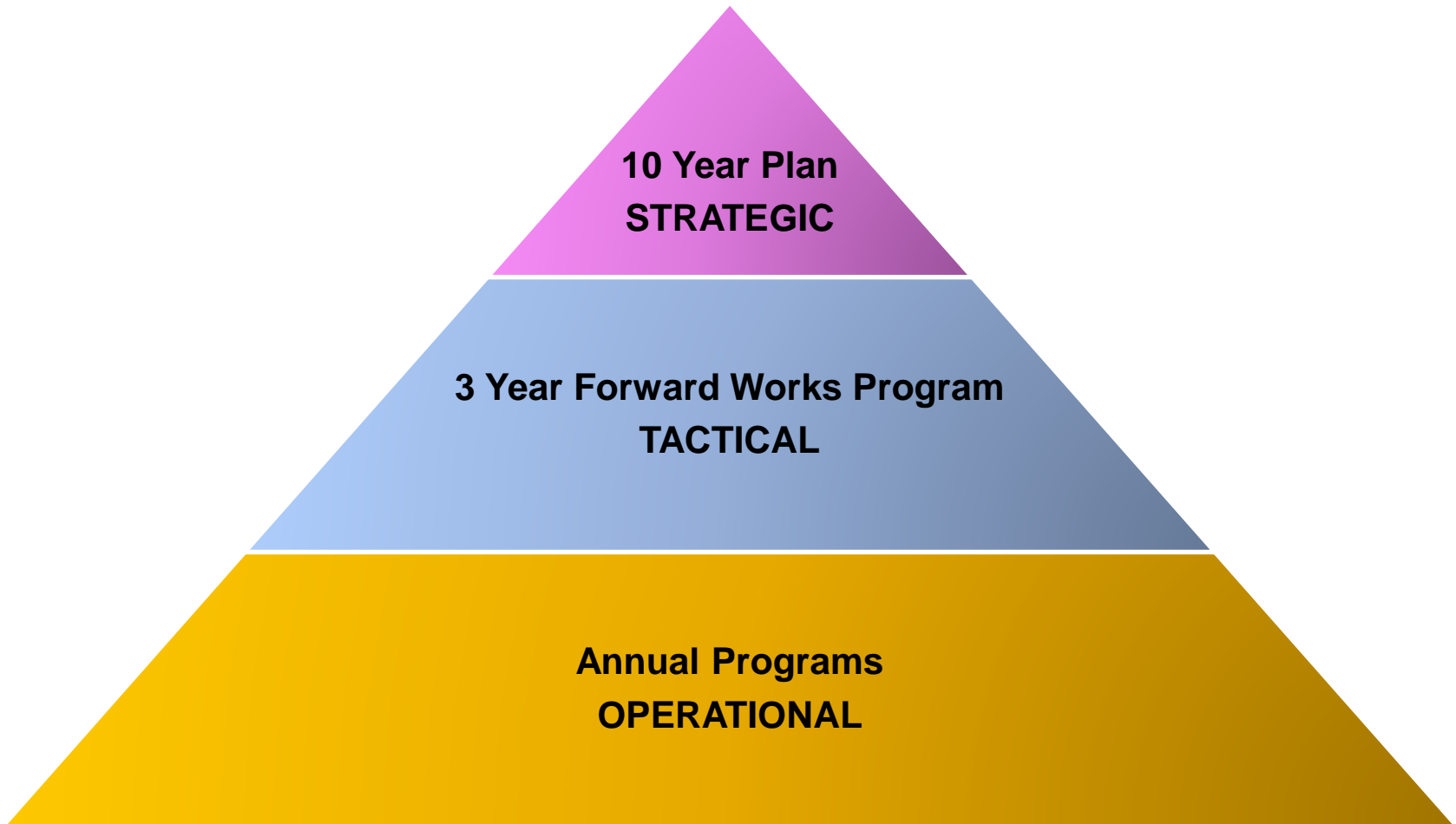
What is Asset Management?

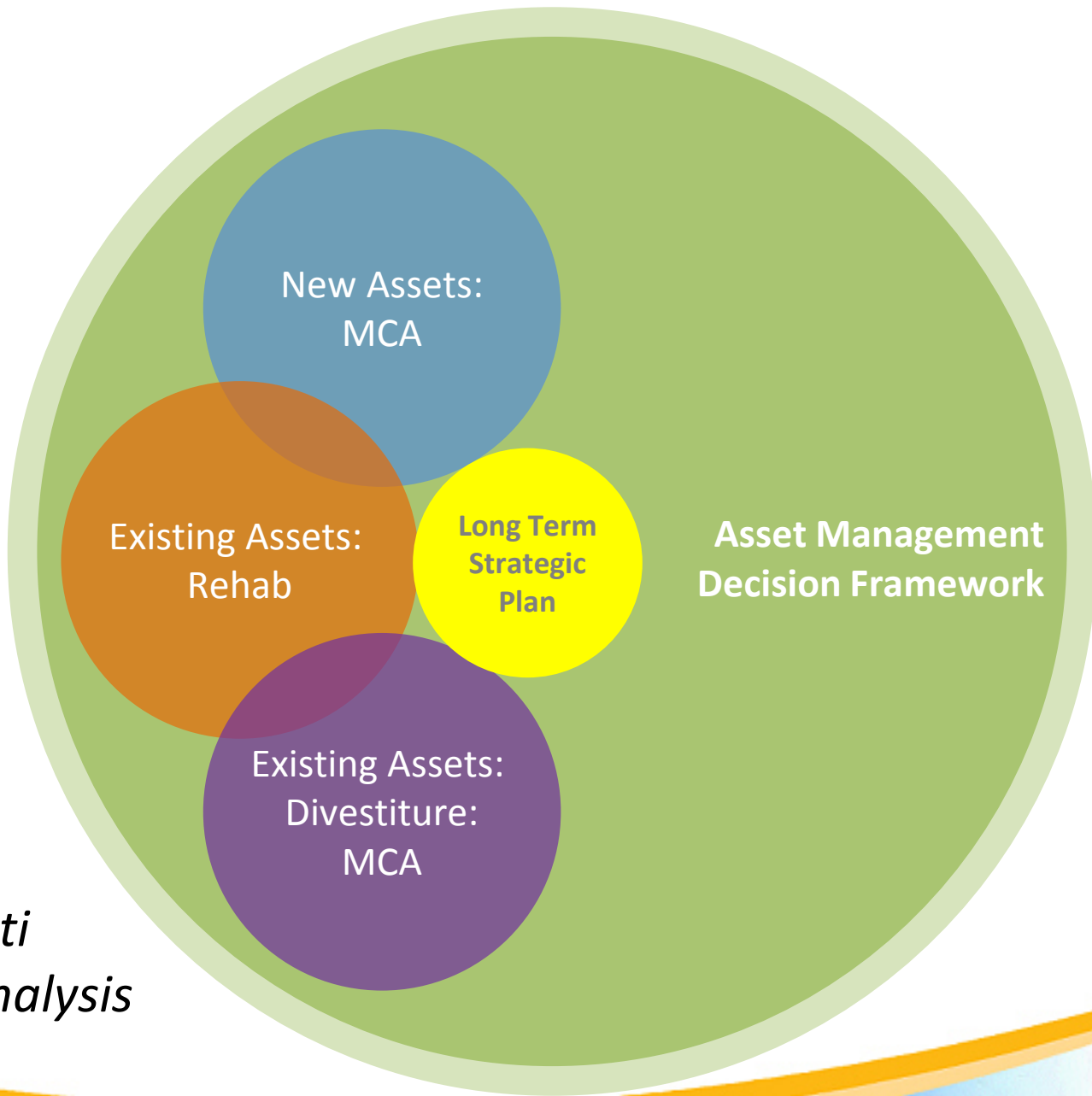
- It is **not a black box** but rather a framework for decision making
- **Systematic process based on:**
 - Economics
 - Engineering
 - Business principles
- **Improves decision making:**
 - Evidence based decision making
 - Transparent
 - Resource allocation
 - Performance and metrics based

Rehab Cost vs. Condition



Strategic Planning supported by AM





*MCA: Multi
Criteria Analysis*

AMDF: New Assets and Asset Divestiture

QBL	Provincial Objectives	Criteria	Indicator Weight*	Indicators
Economic (Wt = 50)	More Jobs (Wt = 26)	Job Creation	7	Jobs created after construction
			5	Regional unemployment rates
		Foster Private Sector Business Growth	8	Impact on transportation costs to input and output markets (i.e. labour, supplier, and customer markets).
		Supports Economic Development Plans	6	Level of support for initiatives in provincial economic development plans
	Fiscal Responsibility (Wt = 24)	Effective Service Delivery	8	Infrastructure provides the required capacity to meet present and future needs at acceptable levels of service
			8	Impact on network operating, maintenance, and rehabilitation costs
Maximizes Leveraging Opportunities		8	Potential for sharing infrastructure costs with a public or private sector partner	
Environment (Wt = 15)	Mitigate risks of climate change	7	Resilience to severe climate events	
	Environmental Impacts	4	Impact on GHG emissions	
		4	Other environmental impacts	
Social (Wt = 25)	Best Place to Raise a Family (Wt = 50)	Health and Safety Impacts	10	Impact on risk of a casualty collision (i.e. injury or fatal collision)
		Access to services that meet primary needs	6	Impact on access to emergency services
			6	Impact on access to non-emergency services (i.e. work, shelter, food, education, health, etc.)
		Supported by community plans	3	Level of local community support
Cultural (Wt = 10)		First Nations	5	Impact on First Nations lands, culture, or community
		Preserves or Enhances Heritage Resources	5	Impact on heritage resources

* Preliminary weights developed by DTI Project Teams. Weights should be reviewed periodically.

Rehab of Existing Assets

- The traditional “**fix the worst first**” approach does not maximize the value of assets
- Asset Management (rehabilitation) models generate the best series of treatments for the life-cycle of the assets
- The rehabilitation schedules from the model may be further adjusted based on additional information from DTI district offices, elected officials, and industry stakeholders

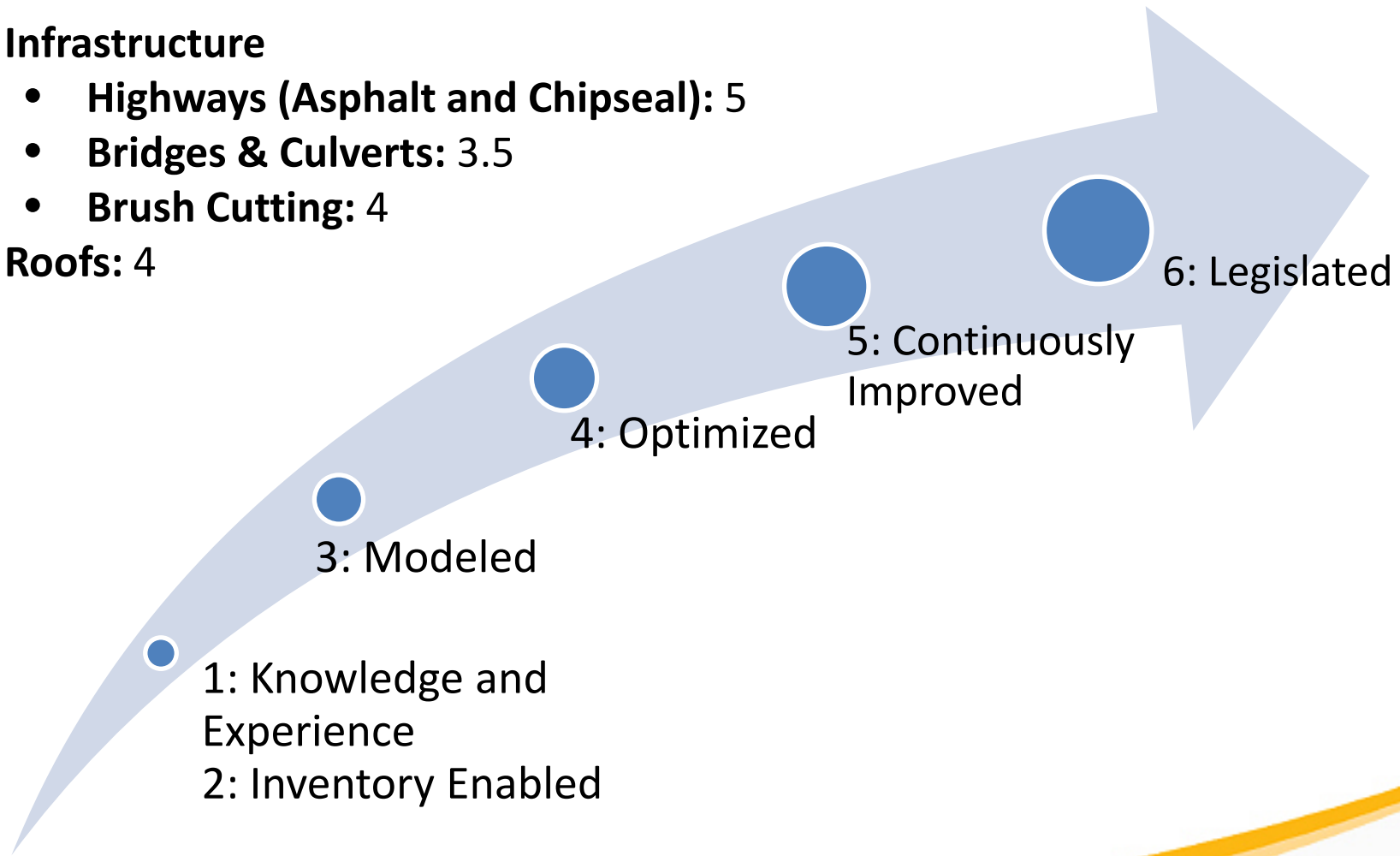
OPTIMIZE



mamegenerator.net

Models in Action

- **Infrastructure**
 - **Highways (Asphalt and Chipseal): 5**
 - **Bridges & Culverts: 3.5**
 - **Brush Cutting: 4**
- **Roofs: 4**



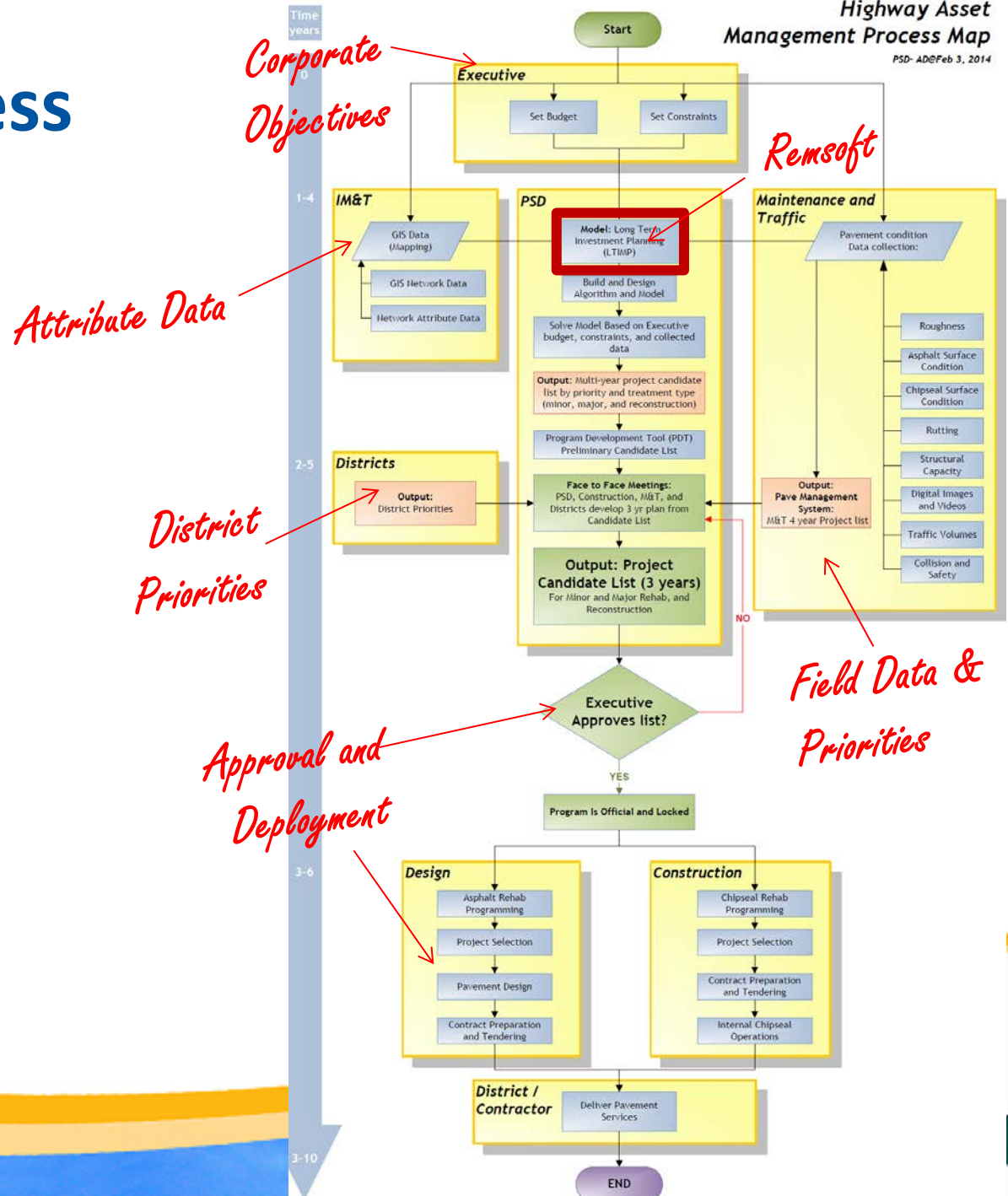
Infrastructure Model

Minimize expenditure over 75 year planning horizon

Such that:

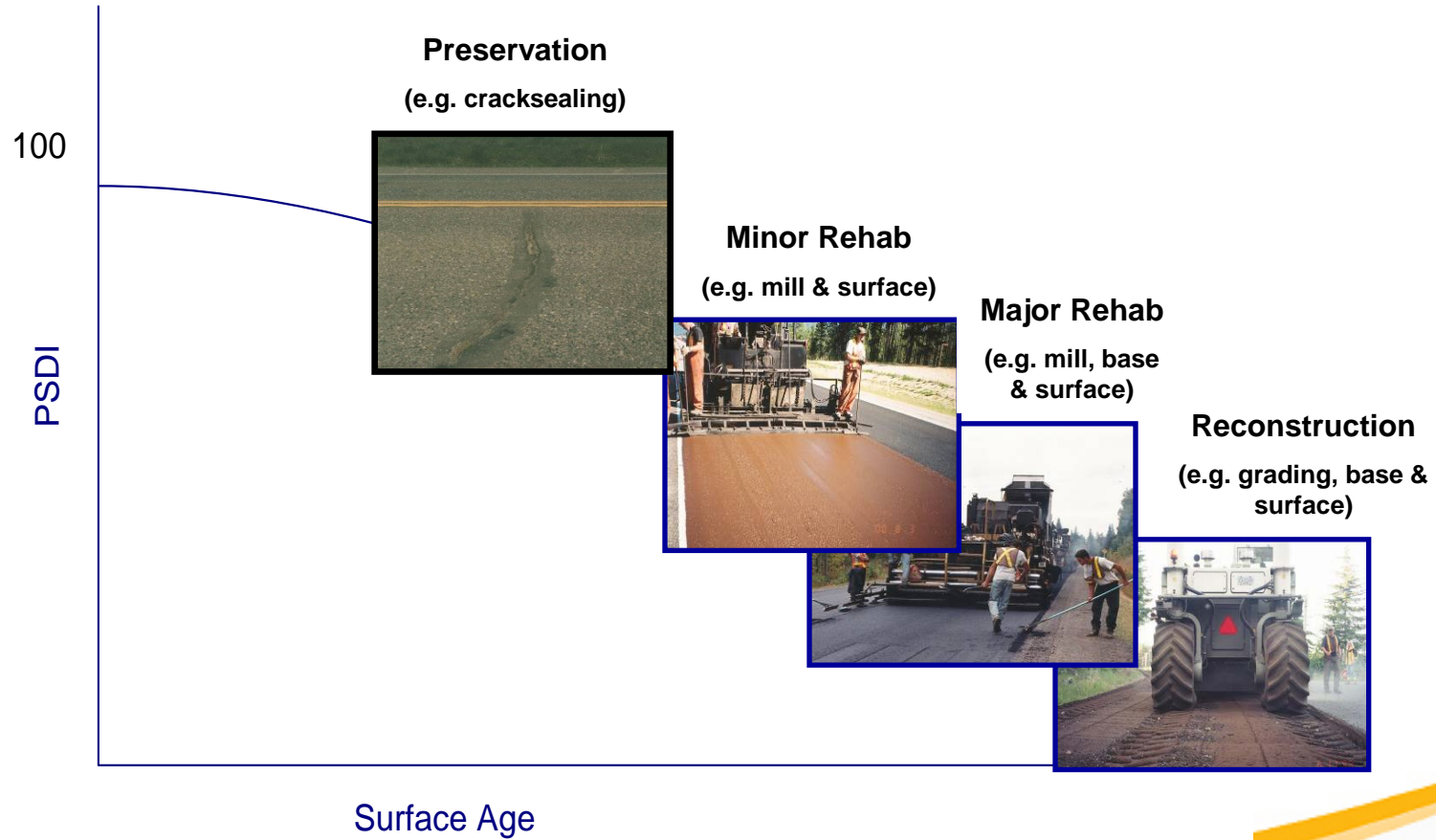
- All preventative and inspection based work to be complete
- Threshold for assets based on condition are met:
 - Poor and very poor
 - Excellent and very good

Current Process

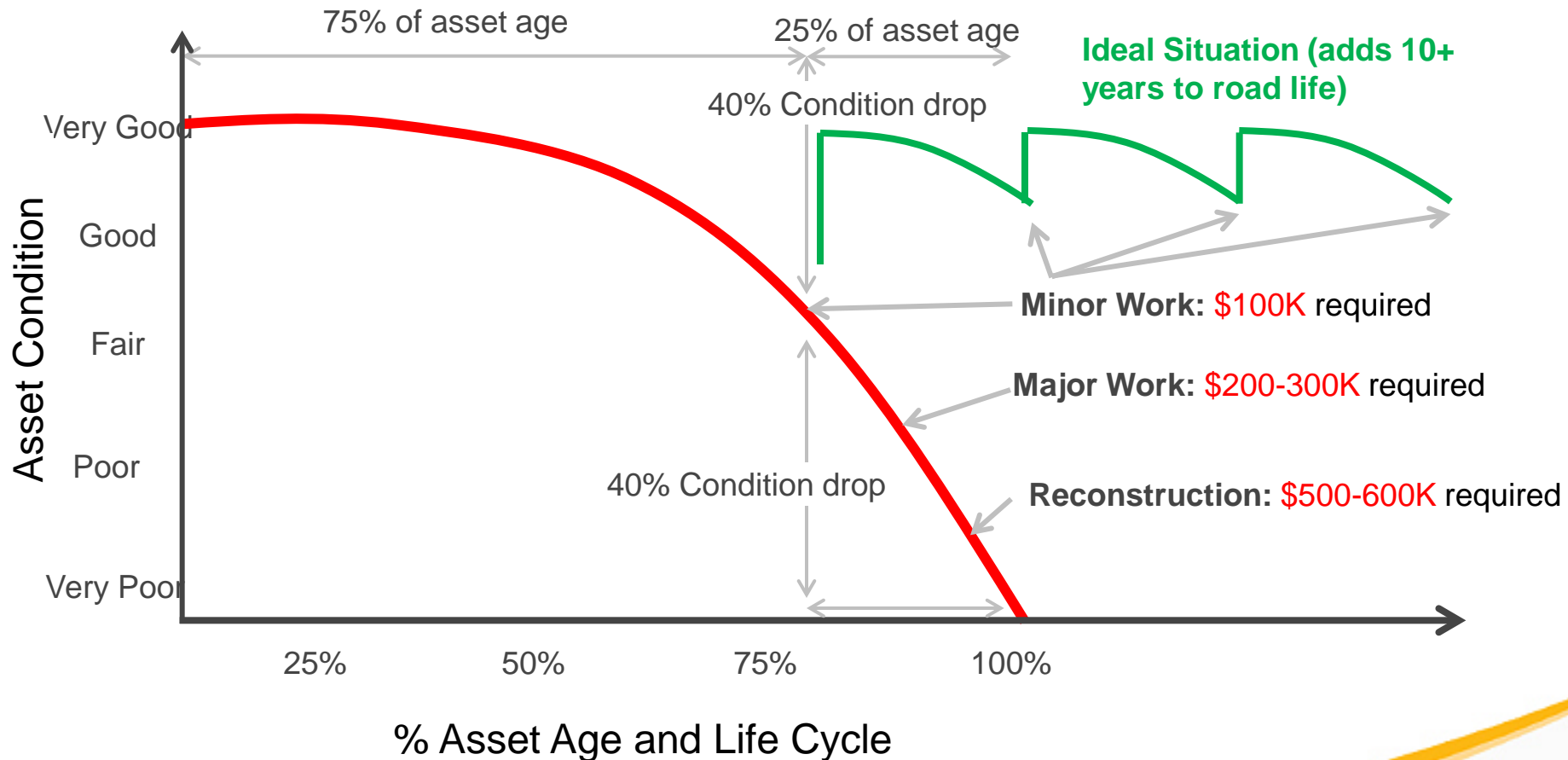


Importance of Minor Treatments

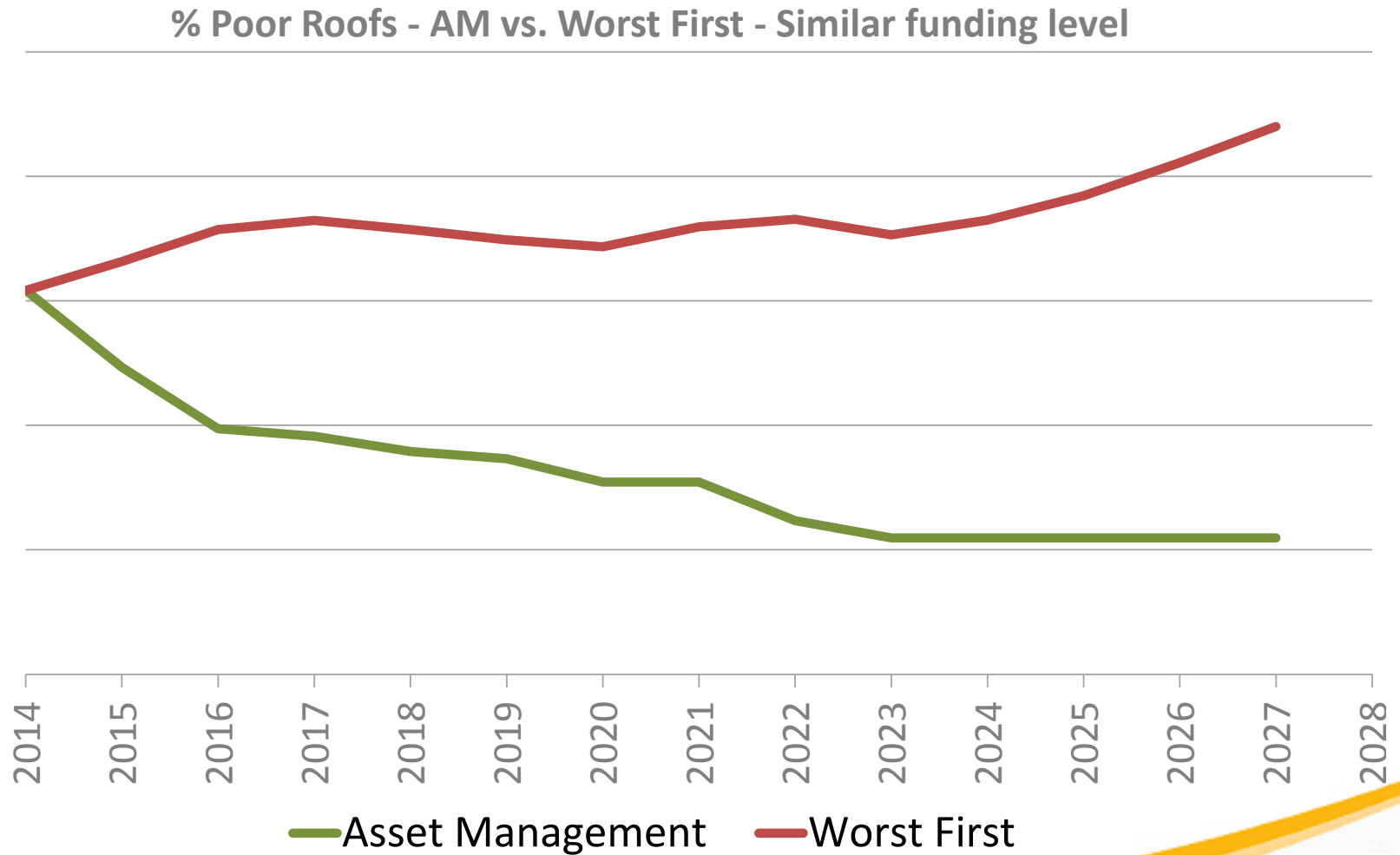
AM - Right Repair, Right Place, Right Time



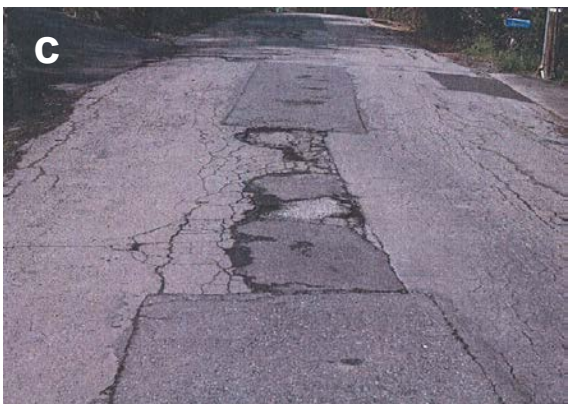
Asset Management on Asphalt



Benefits of Asset Management



Which will you fix first?



PROCESS, & CONTINUOUS IMPROVEMENTS

Data

- Systems Integration with GIS
- Standardization
- Backend Validation

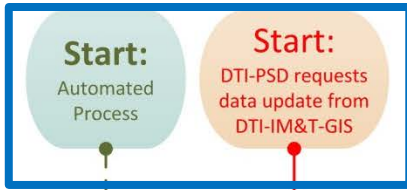
CIP

- Add new features
- Improve data collection methods

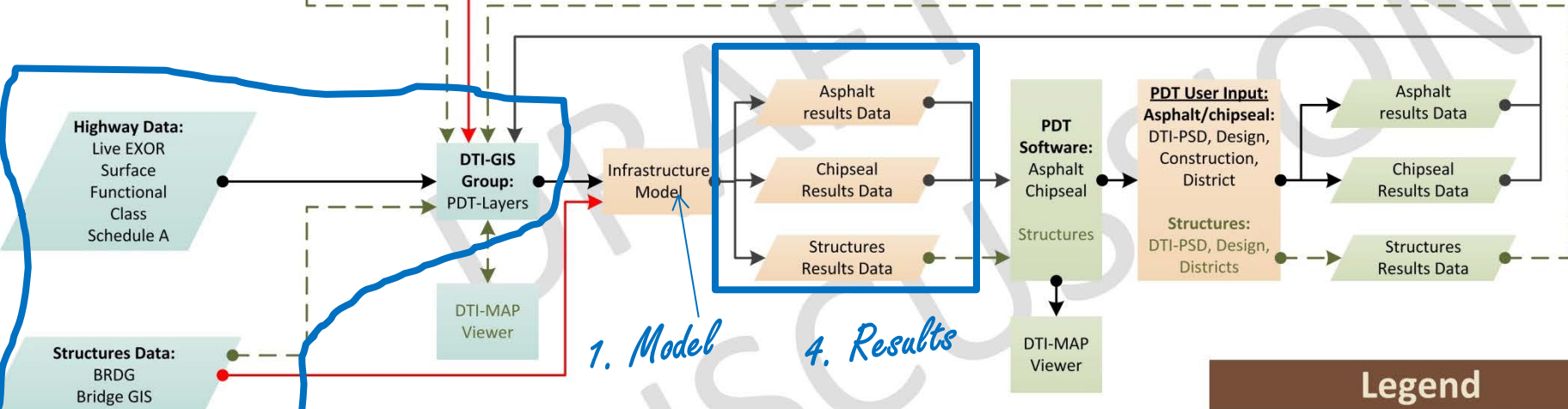
Innovation

- Cross Asset Optimization
- Cross Asset Scheduling

3. Process
Initiation



5. Feedback Loops



2. Data

1. Model

4. Results

Legend	
DTI-IM&T-GIS	Proposed linkage
DTI-PSD-AM	Existing linkage
DTI-IM&T-ASM	Existing linkage to be eliminated

Common Data Structure

Asset class	Dissolved Salt as % of tot. anions
Asset ID	Water hardness
Bridge Major component / Highway Maintenance	Culvert Pipe size i.e. large enough for a liner/invert?
County where asset is located	Culvert and Bridge Priority code from inspection data
District where asset is located	Culvert and Bridge Overall Assessment
Asset Material Type	Any form of load rating on the asset?
Culvert and Bridge Components / Highway Functional Class	Traffic Counts nearest the asset
Asset Component Condition Index	Collision Factors nearest to the asset
Fill over the Culvert / Highway current state	Is asset on a Strategic corridor?
Salt Concentration	Is asset Scheduled in Future

PDT (1/2)

PDT (3.6.0.0) donma@PDTDEV - PAVEMENT - 20142015-15 - [Workspace - 20142015-15]

File View Tools Window Help

20142015 | 20152016 | 20162017 | 20172018 | 4 Year Plan

Export Assign To Select... Add Work Item Delete Work Item Clone Work Item District(s): All

LTImp Year	District	County	Route Name	Route	Description	CS Start	CS End	Start	End	Cost	Functional Class	Quantity	Treatment Category	Age	ED	Volume	Collision Index	Match	Factor
20142015	01	Gloucester		57600		1	1	1.3	2.813	\$69,988	LNAME	1.513	AHWMINORREHAB	1				0	0
20142015	01	Gloucester		61970		1	1	0	2.606	\$457,879	LNAME	2.606	AHWMINORREHAB	11				0	0
20142015	01	Gloucester		61990		1	1	8.98	10.5	\$93,864	LNAME	1.520	AHWMINORREHAB	1				0	0
20142015	01	Gloucester	322	R0322		1	1	0	0.5	\$74,315	LNUMB...	0.500	AHWMINORREHAB	3				2	2
20142015	01	Gloucester	365	R0365		1	1	5.7	11.846	\$343,671	LNUMB...	6.146	AHWMINORREHAB	9				0	0
20142015	02	Northumber...	450	R0450		2	2	3.36	9.45	\$821,497	LNUMB...	6.090	AHWMINORREHAB	1				0	0

Unassigned Work Items

Assign To Select... Add Work Item Delete Work Item Clone Work Item

LTImp Year	District	County	Route Name	Route	Description	CS Start	CS End	Start	End	Cost	Functional Class	Quantity	Treatment Category	Age	ED	Volume	Collision Index	Match	Factor
20162017	01	Restigouche		16300		1	1	0	1.16	\$71,480	LNAME	1.160	AHWMINORREHAB	16				0	0
20162017	01	Gloucester		51980		1	1	0	0.101	\$15,202	LNAME	0.101	AHWMINORREHAB	14				0	0
20152016	01	Gloucester		57230		2	2	1.6	2.325	\$98,660	LNAME	0.725	AHWMINORREHAB	1				0	0
20152016	01	Gloucester		57230		2	2	3.331	3.664	\$58,782	LNAME	0.333	AHWMINORREHAB	1				0	0
20162017	01	Gloucester		57240		1	1	3.392	3.814	\$60,517	LNAME	0.422	AHWMINORREHAB	18				0	0
20162017	01	Gloucester		57490		1	1	0	0.92	\$32,451	LNAME	0.920	AHWMINORREHAB	10				0	0
20162017	01	Gloucester		58060		1	1	1.7	2.425	\$101,300	LNAME	0.725	AHWMINORREHAB	18				0	0
20152016	01	Gloucester		58360		1	1	0	0.384	\$56,271	LNAME	0.384	AHWMINORREHAB	28				0	0
20152016	01	Gloucester		58370		1	1	4.3	6.443	\$26,585	LNAME	2.143	AHWMINORREHAB	1				0	0
20162017	01	Gloucester		58400		1	1	0	0.513	\$73,088	LNAME	0.513	AHWMINORREHAB	18				0	0
20162017	01	Gloucester		58820		1	1	0	1.696	\$233,298	LNAME	1.696	AHWMINORREHAB	10				0	0
20152016	01	Gloucester		58880		1	1	0	0.299	\$44,161	LNAME	0.299	AHWMINORREHAB	27				0	0
20162017	01	Gloucester		58960		1	1	2	5.938	\$175,120	LNAME	3.938	AHWMINORREHAB	11				0	0
20152016	01	Gloucester		59100		1	1	0	0.705	\$21,120	LNAME	0.705	AHWMINORREHAB	18				0	0
20162017	01	Gloucester		59180		1	1	0	0.747	\$109,194	LNAME	0.747	AHWMINORREHAB	18				0	0
20162017	01	Gloucester		59210		1	1	0	0.2	\$22,073	LNAME	0.200	AHWMINORREHAB	15				0	0
20162017	01	Gloucester		59260		1	1	0	1.2	\$45,315	LNAME	1.200	AHWMINORREHAB	14				0	0
20152016	01	Gloucester		59340		1	1	0	0.09	\$13,292	LNAME	0.090	AHWMINORREHAB	1				0	0
20162017	01	Gloucester		59440		1	1	0	0.433	\$63,295	LNAME	0.433	AHWMINORREHAB	14				0	0
20162017	01	Gloucester		59690		1	1	0	0.139	\$20,611	LNAME	0.139	AHWMINORREHAB	18				0	0
20162017	01	Gloucester		59720		1	1	0	0.142	\$20,611	LNAME	0.142	AHWMINORREHAB	18				0	0

PDT (2/2)

Work Item Details ROUTE R0322 CONTROL SECTION 1

Asset Information Job Details Video

RCS

Route Code R0322 Name 322

Control Section Start 001 End 001

District 1 - Bathurst

Display Details

Counties Gloucester

Electoral Districts 3 - Restigouche-Chaleur

Functional Class: Local Numbered

Multi-year:

Category: AHWMINORREHAB

Cost: \$0.00

Vote: 4061 - Local

Considerations:

Comments

Save Cancel

Surface Age	Surface Year	RCS	Begin Offset	End Offset	Comment
5	2010	R0322001	0	0.50	SS

Category	Type	CS	Start	End	Quantity	Calculated Cost	Override Cost	Comments
*						0.00	0.00	

Save Cancel

Continuous Improvements (1/5)

- General CIPs:

- Update CIPs for next several years
- Third party model validation
- ~~– Send List of updates to IM&T on PDT including mapping straight from PDT~~
- Risk Analysis on highways, culverts, and bridges
- Infrastructure Model (iAM V16) implementation
- ~~– Remsoft Training / User group Presentation~~
- ~~– Courtney Internal Remsoft Training~~

Continuous Improvements (2/5)

- Highways (1/2):

- Highway Safety
- ~~Write Highway Model Logic Executive summary~~
- ~~Include / relate rutting, IRI and VIR as part of the Model~~
- ~~Incorporate ramps and right turning lane in model~~
- ~~Auditor General Report Implementation~~
- ~~Highway LpSchedule~~
- Provincially Designated Roads within a Municipality
- R&D Gravel, Cracksealing, Microsurfacing, ditching, drainage, by km
- ~~Verify Yield and high curves (in house)~~
- ~~900 segments Unknown ages (finalize)~~
- ~~Incorporate Traffic Volumes in Highway Models (finalize)~~

Continuous Improvements (3/5)

- Highways (2/2):

- ~~Jurisdictional Revue of Quebec System~~
- ~~National Highway System based on 2013 data~~
- ~~MCMS Lookup table to PDT (RCSKEY) + Updates to PDT~~
- Match and Aggregator in PDT
- ~~Purchase of Network Analyst~~
- ~~Excel template to be sent to the districts for surface treatment priorities~~
- Finalize V16 Run
- Annexations
- Roles and Responsibility Chart
- Incorporate IRI and VIR into V16
- GIS data project with IM&T

Continuous Improvements (4/5)

- Culvert/Bridge CIPs:

- ~~– Update culvert Lookup date~~
- Write Bridges/Culvert Model Logic Executive summary
- Include traffic counts and collision rates on bridges / Culverts
- AMP for bridges and culverts
- ~~– BRI implementation in ArcGIS~~
- ~~– Inflation / Discount rates~~
- Roles and Responsibility Chart
- **Bridge Rehab and Reconstruction MIP**

Continuous Improvements (5/5)

- Building/Roof CIPs:

- Write Bridges/Culvert Model Logic Executive summary
- ~~Develop a Roof Asset Management Program and Schedule~~
- Send Model for third party validation
- ~~Compare Model to regional plan~~
- **Roof V15 Updates**
- Roles and Responsibility Chart

Innovation

- **Cross Asset Optimization:**
 - If you have \$1M to fix an asset, which one would you fix?
- **Cross Asset Scheduling:**
 - Do Brush cutting and culvert work before highway work

Enablers, Barriers, and Challenges

Enablers

Gov. commitment (Minister & AG)

Frameworks:

- AM Decision Framework (MCA + BCA)
- AM Models
- Road Surface Strategy

Continuous collection of data (Assets part of frameworks)

Inventory management

Asset Management models

Challenges

Lack of condition data on some assets

Internal and external communication, and education

Political intervention

Auditor General requirements

Fiscal reality

Barriers

Lack of Legislative framework

Cost and commitment to collect new data (New Types of Assets)

Summary

- **AM is:**
 - A comprehensive and strategic approach;
 - Transparent and accountable;
 - Performance based;
 - Involves economics, business, engineering, needs assessment/public involvement, and risk assessments;
 - Trade-off analysis
 - Fiscally responsible

Next Steps

- **Implementation:**
 - GIS for all models
 - Cross Asset Optimization and Scheduling
- Which other assets can/should we bring in?

***Asset Management is
a commitment to sustainability,
transparency, accountability and
customer service***

Thank you