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Your Community.
Your Plan.

Empowering asset management professionals with the decision support tools they need to plan for the sustainable growth of their communities.

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Managing Partner, Decision Optimization Technology-United States, L.P. (DOT-US)

AGENDA

- DOT-US Background
- Asset Investment Planning (AIP)
- Decision Support Tools
- Decision-Making Methods
- Mixed-Asset Optimization and Corridor Rehabilitation
- Conclusion
- Question & Answer

DOT-US BACKGROUND

HANSON

Engineering Expertise

+

Infrastructure Solutions

Technology Expertise

In 2022, DOT™ was named a market leading Asset Investment Planning (AIP) solution in 5 out of 8 core capabilities By Verdantix's Smart Innovators Report.

Sample DOT Users (100+ users across North America)

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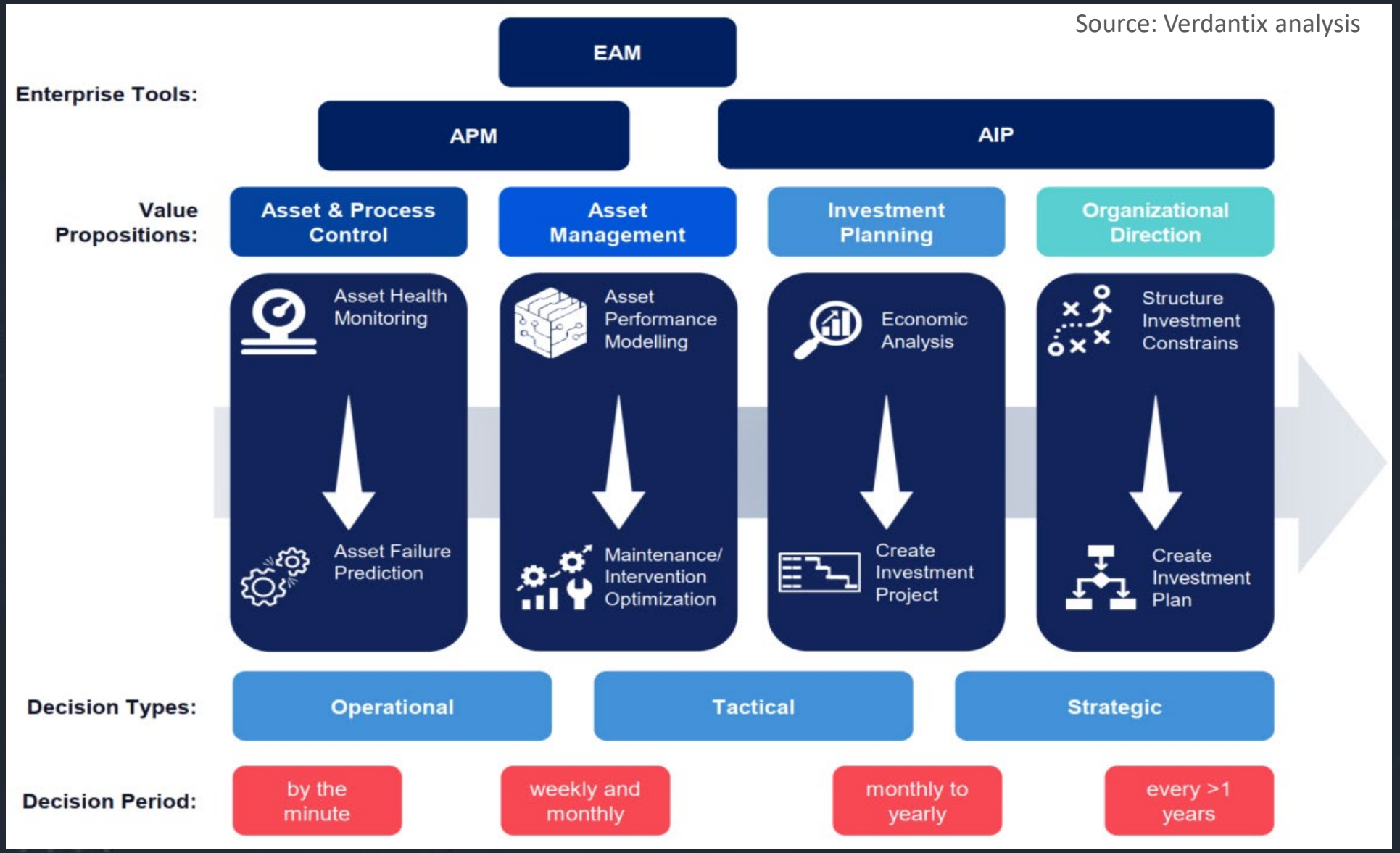
ASSET INVESTMENT PLANNING (AIP) - CHALLENGES

- Aging assets coupled with urban populations rise
- Limited budget and regulatory requirements
- Non-financial soft decision factors
- Limitations of simplistic tools such as Excel programs
- Functionality gaps in existing EAM’s
- Infrastructure interdependency

ASSET INVESTMENT PLANNING (AIP) - LANDSCAPE

Source: Verdantix analysis



ASSET INVESTMENT PLANNING (AIP) - CRITERIA

Functionality	Definition
Data storage and easy input of strategic data	Ability to automatically input data into the system, utilize industry-specific, off-the-shelf models, fill missing data gaps and store strategic data.
Connection and integration with external data sources and software applications	Ability to integrate with, detect, import and export asset information from relevant data sources such as APM, EAM, ERP, GIS, etc.
Financial analytical tools	Ability to quantify the level of investment required for each intervention option (such as repair or replace) across the entire asset base.
Long-term investment planning for asset lifecycle strategy	Ability to create and compare long-term investment plans, taking into consideration the fidelity of optimizers, asset life cycle and scalability.
Asset performance modelling	Ability to predict current and future performance rates based on operational data. Models used to predict failure rates and deterioration models with a focus on asset performance data and scalability.
Configurable risk framework	Ability to quantify the risk of investment scenarios in relation to user acceptance levels, strategic visions and non-financial goals. Models are supported by mathematical equations and consider physical, environmental and socio-economic attributes.
Easily configurable reporting and visualization tools	Ability to create and customize a wide variety of reports based on user needs, including creating dashboards, presenting geospatial views and comparing multiple scenario anal yses in a single view.
Bundling interrelated assets or projects for cost savings and efficiencies	Ability to create investment plans and projects that consider the interrelated relationships of assets (such as geolocation proximity, regulatory changes, climate change risks, etc).

Source: Verdantix analysis

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DECISION SUPPORT METHODS

SIMPLE RANKING

Sections are ranked and investments are determined based on current asset condition (worst-first). Budget is used until it is fully exhausted. This results in the lowest level of investment efficiency.

- X Multi-criteria analysis
- X Guaranteed best performance setting
- X Target level of performance
- X Considering multiple constraints
- X Investment timing and delay analysis

PRIORITIZATION & CBA

Sections are prioritized using multiple criteria such as condition or risk, or based on a cost-benefit analysis. The analysis is performed on a year-by-year basis to identify projects.

- ✓ **Multi-criteria analysis**
- X Guaranteed best performance setting
- X Target level of performance
- X Considering multiple constraints
- X Investment timing and delay analysis

TRUE OPTIMIZATION

A true multi-constraint multi-year analysis that results in a scientifically proven and mathematically guaranteed best possible solutions.

- ✓ **Multi-criteria analysis**
- ✓ **Guaranteed best performance setting**
- ✓ **Target level of performance**
- ✓ **Considering multiple constraints**
- ✓ **Investment timing and delay analysis**

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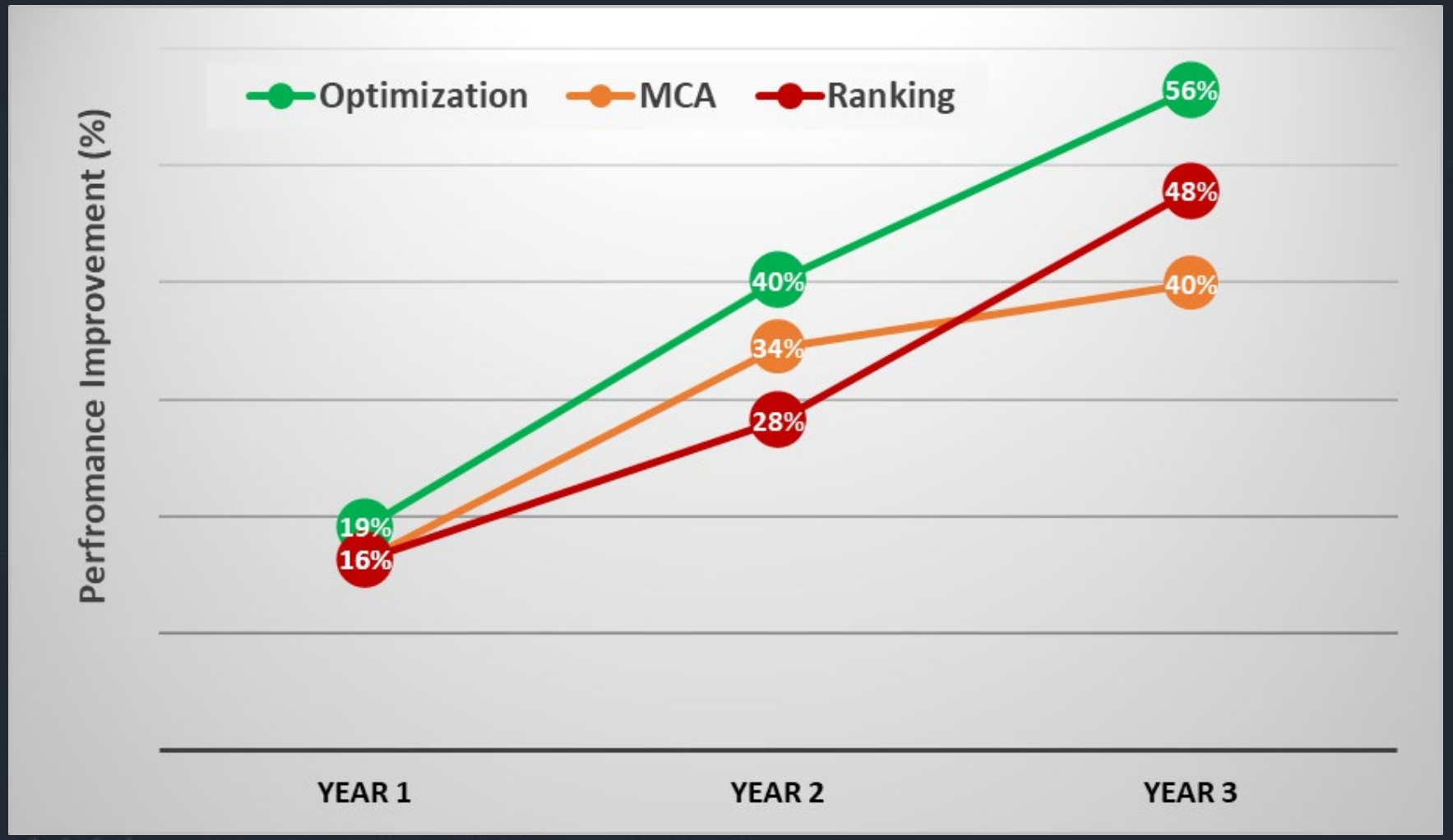
DECISION SUPPORT METHOD - RESULTS



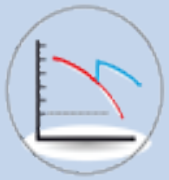
AIP DEPLOYMENT

Data Import & Management

- Build & Manage Asset Portfolio
- Asset Hierarchy
- Integration and Imports/Exports

Data Analytics & Reporting

- Asset Profiles
- Analysis
- Charts
- Dashboards



Risk & Performance Modeling

- Deterioration
- Criticality & Risk
- Cost & Treatment Models
- Levels of Service

Optimization & Renewal Planning

- Optimize CapEx
- Optimize OpEx
- Determine Funding Strategy

Optimal AMPs & Funding Allocations

- Funding Allocation
- Projects
- AM Status
- Budgets Analysis
- Dashboards/Reports

Integration of Recommended Projects

Continuous Optimization and Improvement

EAM/CMMS

Updates: Inspections, Operations Work Orders, Rehab Projects, Capital Projects, Budgets

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OPTIMIZED AIP KEY BENEFITS

MINIMIZE LIFE CYCLE COSTS AND RISKS

CREATE STAKEHOLDERS' BUY-IN / SUSTAIN LEVELS OF SERVICE ACROSS THE ENTIRE PORTFOLIO OF ASSETS

CONSIDER SOCIO-ECONOMIC AND ENVIRONMENTAL BENEFITS

BUILD DATA-DRIVEN ASSET INVESTMENT PLANS ALIGNED WITH POLICIES AND LOS OBJECTIVES

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DOT™ SCENARIO OPTIMIZATION PROCESS

Scenario Objectives & Constraints

Community Benefit | Level of Service | Project Alignment | Long-term Objectives

Engineering Models

Decision Trees | Performance Models | Treatment Options

Extremely **high level of flexibility** in scenario settings with the ability to incorporate **community benefit** considerations into the decision-making process.

Optimization Engine

- Perform Mixed-Assets Analysis
- Maximize Long-Term Performance
- Minimize Cost & Risk Impact
- Target Levels of Performance
- Satisfy Multiple Constraints
- Investment Timing & Delays
- Maximize Operational Efficiency

Maximum ROI Investment Plan

Decision Variables

- ✓ Asset Types
- ✓ Asset IDs
- ✓ Treatment Types
- ✓ Treatment Alternatives
- ✓ Budgeted Costs
- ✓ Intervention Timings

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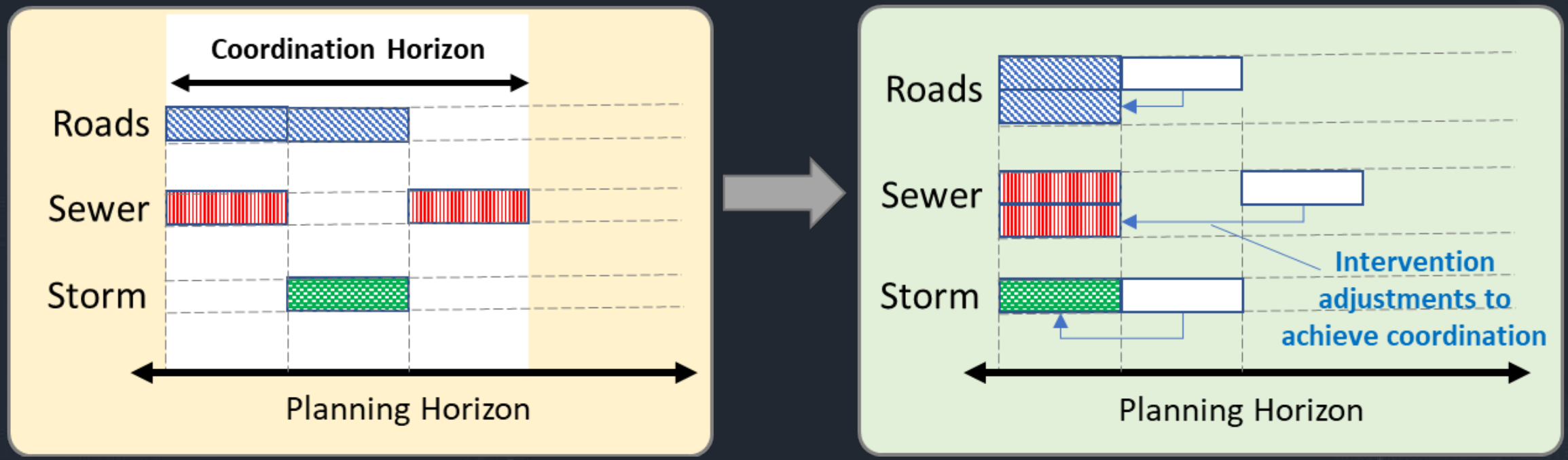
INTERVENTION COORDINATION ANALYSIS

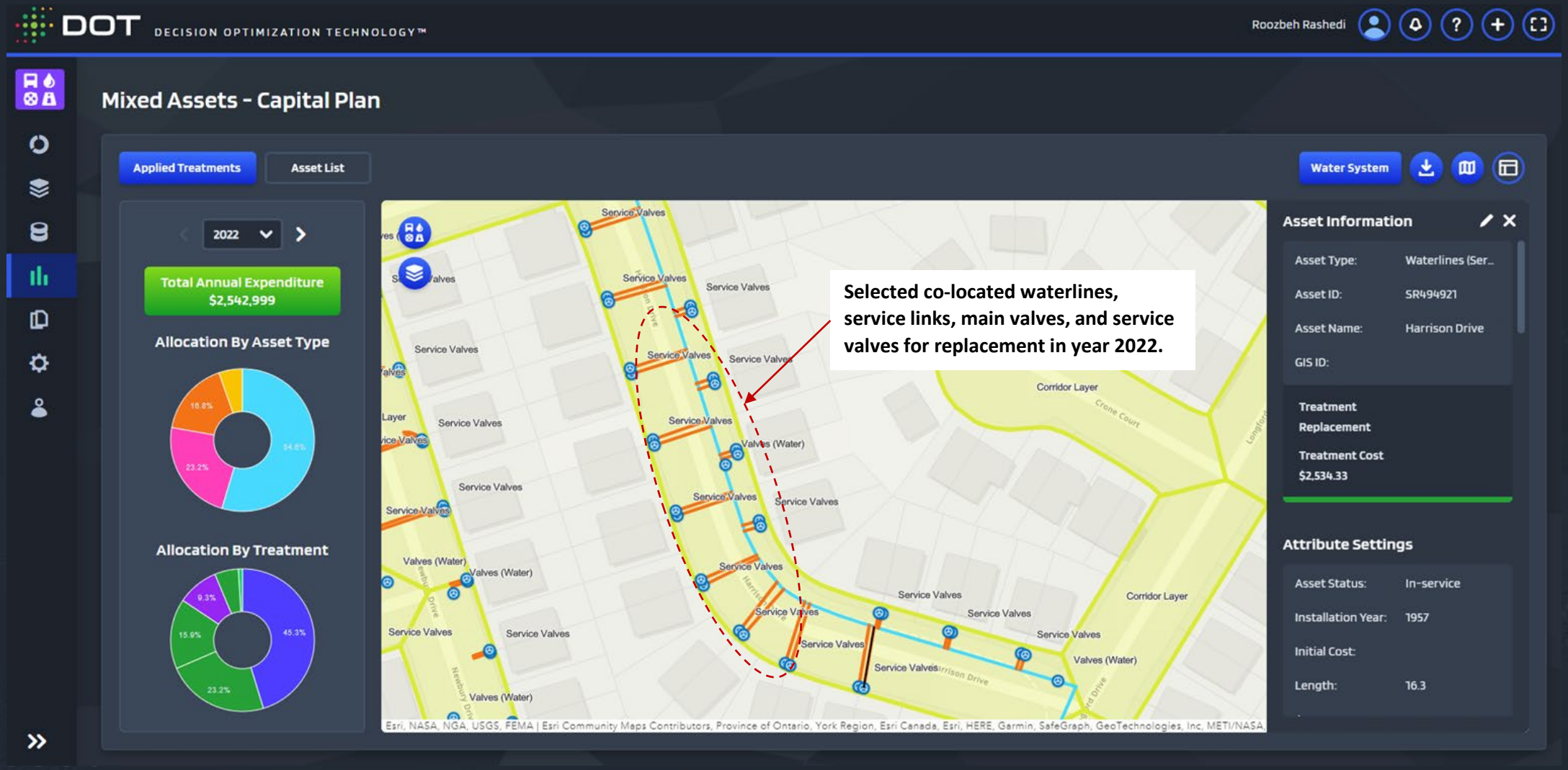
a) Dispersed activities over the next years

b) Coordinated intervention plan



Under DOT™'s Mixed-Assets Optimization

COORDINATED CORRIDOR REPLACEMENT



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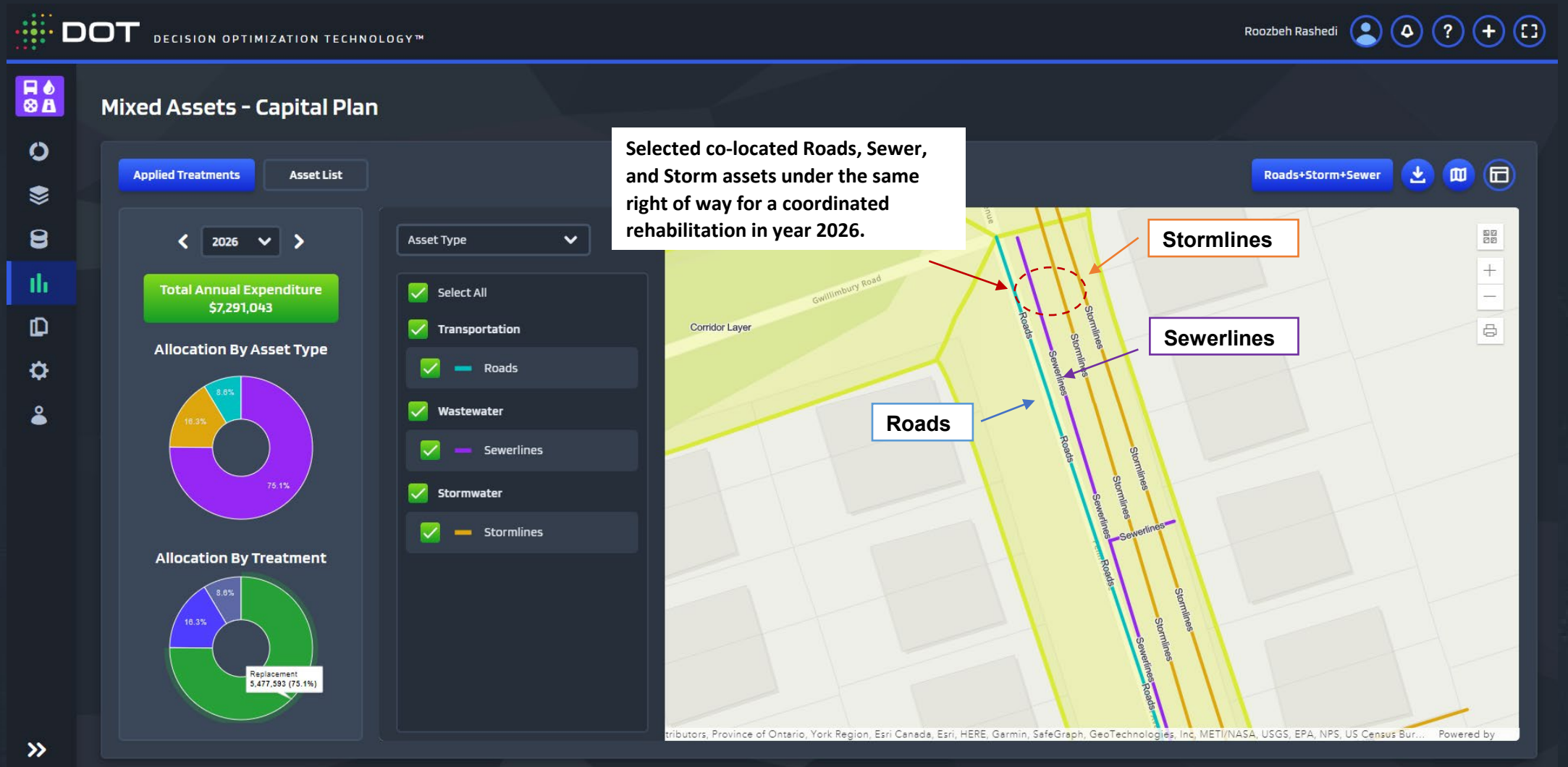
CROSS DEPARTMENTAL REHABILITATION



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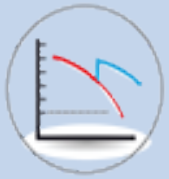

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CONCLUSION

- Projects are interdependent within the right of way
- Sophisticated decision support tools align projects
- Intervention coordination finds optimal timing for all assets
- Funding performance improvement of up to 25%

QUESTION & ANSWER

Thank you for attending!

To inquire about DOT™ please contact:
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For more information, visit **www.bettercapitalplanning.com**