

# TII Network Management Webinar

## Session 1: Asset Management and Sustainability

### Topic 1 - Asset Management Development in TII

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# Introduction

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- Asset Inventory 2019 - Overview
- Asset Valuation GRC 2020 – Overview
- GRC Data Interrogation - Tableau (BI)
- Asset Management Strategy Development
- Common Asset Registry
- ESRI ArcGIS Online Hub



# Asset Inventory 2019

# Asset Inventory 2019 Summary Dashboard



NUMBER OF TII CONTROLLED ASSETS

500K +



PROJECT TIMELINE

Q4 2019 Asset Inventory

Q1 2020 Asset Valuation

PAVEMENT



16.6M  
m<sup>3</sup>

STRUCTURES



3300+

LAND AREA



14K+ ha

ITS



6200+

INTERCHANGES



200+

TRAFFIC SIGNS



135K+

LIGHTING COLUMNS



42K+

SAFETY BARRIERS



3500+  
km

FOOTWAYS



1000+  
km



Asset Geolocation

Assets geolocated to

- Route
- Local Authority
- Subnetwork



Data Sources & Systems

10+

Data Sources

5+

Database Systems

220+

Datasets



Multiple Data sources and formats across various proprietary and generic database systems  
\*\*NB Point in time Asset Inventory\*\*

KEY ASSET GROUPS

Metrics



Software Systems



Pavement	Structures	Land Area	ITS	Interchanges
66.5M m <sup>2</sup> Paved Area	1.3M+ m <sup>2</sup> Deck Area	MMaRC - 5900 ha PPP - 2800 ha Single CW – 5600 ha	40+ Asset Types 700+ Spare Parts	3M m <sup>2</sup> Paved Area
Deighton dTIMS PAMS	Eirspan SQL Database	OSI Prime 2 Dataset MMaRC RMMS	Asset Fault Management System	Deighton dTIMS PAMS

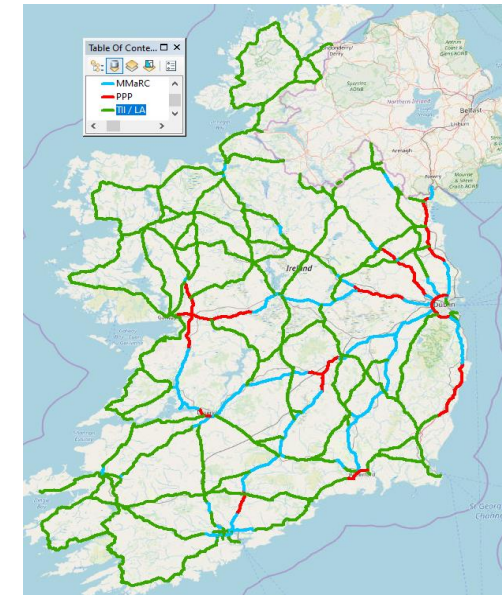
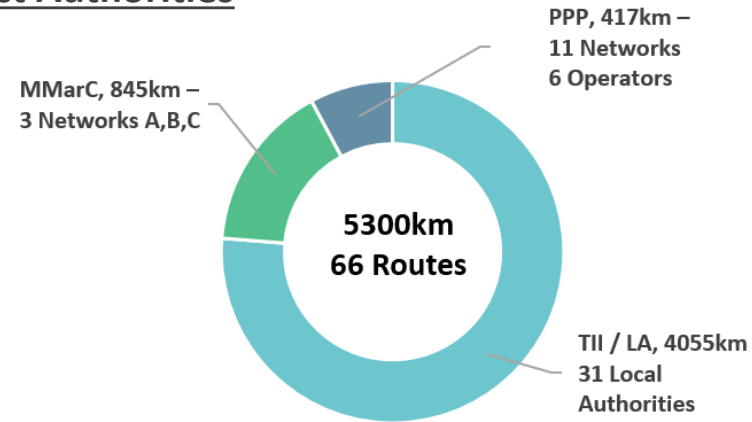
# Asset Inventory – Who and What

## What is included ?

- Mainline Rural
- Mainline Urban
- MMARC schemes
- PPP schemes



## Contract Authorities

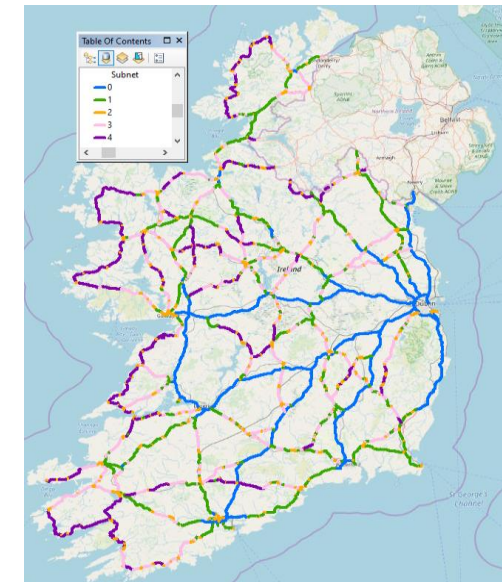
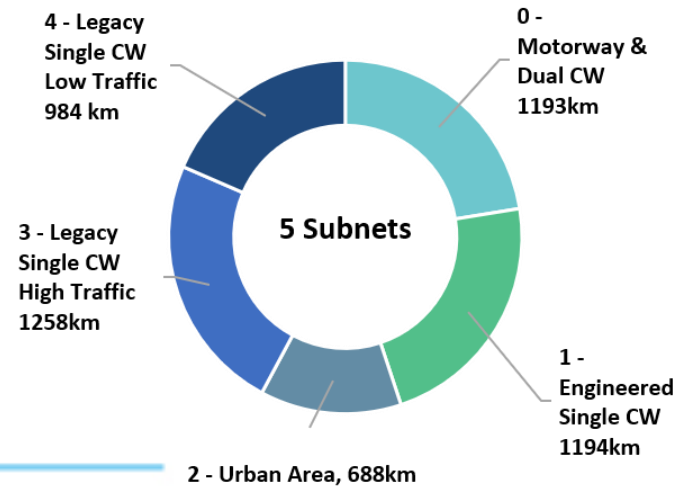


## Reporting

- Multi-faceted
- By Theme/Group
- By Local Authority
- By Route
- By Functional Classification



## Pavement Classification



# Asset Inventory – Data Sources & Systems

## dTIMS Pavement Asset Management System



## EIRSPAN Bridge Management System



Bridges, Retaining Walls, Gantries, High Masts

## Routine Maintenance Management System (RMMS)



## Asset & Fault Management System (AFMS)



## SCADA – IBM Maximo



## GIS Collector Apps



# Asset Inventory How- Data Management & Validation



## ESRI-Geodatabase Multiple Datasets Collated to one Source

- TIAssetInventory2019.gdb
  - TI\_00000\_Superceded
  - TI\_00001\_General
    - TI\_00001\_01\_CountyBounds
    - TI\_00001\_02\_CountyBounds\_ForSpatialQueries
    - TI\_00001\_03\_OSI\_Way\_Polygon
  - TI\_00100\_Geometry
    - TI\_00100\_01\_NetworkModel2016
    - TI\_00100\_02\_Subnet\_2019\_Model\_100m
    - TI\_00100\_03\_CwayType\_2019
    - TI\_00100\_04\_PPP\_Network
    - TI\_00100\_05\_MMaRC\_Network
    - TI\_00100\_06\_LaneWidth\_2014
    - TI\_00100\_07\_NetworkModel\_Jul2019\_100m
    - TI\_00100\_07\_NetworkModel\_Jul2019\_100m\_LA
    - TI\_00100\_07\_NetworkModel\_July2019
  - TI\_00300\_Fencing\_NoiseBarriers
    - TI\_00300\_01\_NoiseBarriers
    - TI\_00300\_02\_AsBuilt\_Fencing
  - TI\_00400\_VRS
    - TI\_00400\_01\_SafetyBarriers
    - TI\_00400\_02\_AsBuilt\_SafetyBarriers
  - TI\_00500\_Drainage
    - TI\_00500\_01\_AsBuilt\_Gullies
    - TI\_00500\_02\_AsBuilt\_Manholes
    - TI\_00500\_03\_AsBuilt\_DrainagePipe
    - TI\_00500\_04\_AsBuilt\_Drainage\_Misc
  - TI\_00600\_Earthworks
    - TI\_00600\_01\_OSI\_CutFill\_Locations
  - TI\_00700\_Pavement
    - TI\_00700\_01\_GPRData2013
    - TI\_00700\_02\_RSP\_2018\_ML\_100M
    - TI\_00700\_03\_SCRIM\_2018\_ML\_100M
    - TI\_00700\_04\_Paved\_Width\_Depth
    - TI\_00700\_04\_Paved\_Width\_Depth\_Subnet
    - TI\_00700\_04\_Paved\_Width\_Depth\_Subnet\_v1
  - TI\_01100\_KFPA
    - TI\_01100\_01\_OSIPrime2\_Footways
    - TI\_01100\_01\_OSIPrime2\_Footways\_Subnet2
  - TI\_01200\_TSRM
    - TI\_01200\_01\_LRI\_LRM
    - TI\_01200\_02\_AsBuilt\_Signs
    - TI\_01200\_03\_AFMS\_THRDO\_Signs
    - TI\_01200\_04\_AsBuilt\_Signs\_Polygons
  - TI\_01300\_RoadLightingColumns
    - TI\_01300\_01\_LA\_LightingPoints\_Q4\_2016
    - TI\_01300\_02\_MMaRC\_LightingPoints
    - TI\_01300\_03\_AsBuilt\_PublicLighting
  - TI\_01500\_ITS
    - TI\_01500\_01\_EmergencyPhones
    - TI\_01500\_02\_TrafficCounters
    - TI\_01500\_03\_WIM\_Sensors
    - TI\_01500\_04\_Network CCTV
    - TI\_01500\_05\_VMS\_Locations
    - TI\_01500\_06\_GoSafeCameras
    - TI\_01500\_07\_NicanderAssets
    - TI\_01500\_07\_NicanderAssets\_join
    - TI\_01500\_07\_NicanderAssets\_LA
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    - TI\_01700\_01\_Structures\_Dataset\_Apr19\_soils\_join
    - TI\_01700\_02\_Gantries
    - TI\_01700\_03\_MammalUnderpass
    - TI\_01700\_04\_AsBuilt\_BadgerUnderpass
  - TI\_02600\_Miscellaneous
    - TI\_02600\_01\_MSA\_RestAreas
    - TI\_02600\_02\_RoadsideArt
    - TI\_02600\_03\_ChargingLocations
    - TI\_02600\_03\_ChargingLocations\_50
    - TI\_02600\_04\_WeatherStations
    - TI\_02600\_05\_TollPlazas
    - TI\_02600\_06\_MaintenanceDepots
  - TI\_02700\_Uilities\_AccomWorks
    - TI\_02700\_01\_AsBuilt\_AccomTracks
    - TI\_02700\_02\_AsBuilt\_Uilities\_Lines
    - TI\_02700\_03\_AsBuilt\_Utility\_Duct\_Points
    - TI\_02700\_04\_AccomWorks\_Boundaries
    - TI\_02700\_05\_AccomWorks\_Environmental
  - TI\_03000\_MMaRC\_Data\_Area\_A
  - TI\_03000\_MMaRC\_Data\_Area\_B
  - TI\_03000\_MMaRC\_Data\_Area\_C
  - TI\_04000\_LandArea



## Geospatial Data Drill Down – Gap Analysis

AssetCode	Usage	New Reference	JUNCTION	STICKERNUM	COLUMNM	BRACKET	MOUNTING	SETBACK	LOCATION	HEADTYPE	LUMINAIR	LUMINAIRC
LP-2940	CA-18	CA	18	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2955	CA-19	CA	19	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2959	CA-28	CA	28	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2958	CA-27	CA	27	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2958	CA-32	CA	32	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2967	CA-23	CA	23	10m	2m	2m	2m	2m	No Barrier	Single Head	Prepass/VTL	Good
LP-3002	CA-28	CA	28	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-3171	CA-28	CA	28	8m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-6179	CA-28	CA	28	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-6173	CA-28	CA	28	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-6174	CA-18	CA	18	8m	2m	2m	2m	2m	No Barrier	Single Head	Prepass/VTL	Good
LP-2969	CA-31	CA	31	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2940	CA-12	CA	12	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good



## Asset Data Gap Filling – Geotagging - Video Review

AssetCode	Usage	New Reference	JUNCTION	STICKERNUM	COLUMNM	BRACKET	MOUNTING	SETBACK	LOCATION	HEADTYPE	LUMINAIR	LUMINAIRC
LP-2940	CA-18	CA	18	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2955	CA-19	CA	19	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2959	CA-28	CA	28	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2958	CA-27	CA	27	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2958	CA-32	CA	32	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2967	CA-23	CA	23	10m	2m	2m	2m	2m	No Barrier	Single Head	Prepass/VTL	Good
LP-3002	CA-28	CA	28	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-3171	CA-28	CA	28	8m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-6179	CA-28	CA	28	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-6173	CA-28	CA	28	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-6174	CA-18	CA	18	8m	2m	2m	2m	2m	No Barrier	Single Head	Prepass/VTL	Good
LP-2969	CA-31	CA	31	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good
LP-2940	CA-12	CA	12	10m	2m	2m	2m	2m	inside Barrier	Single Head	Prepass/VTL	Good

# Asset Valuation 2020

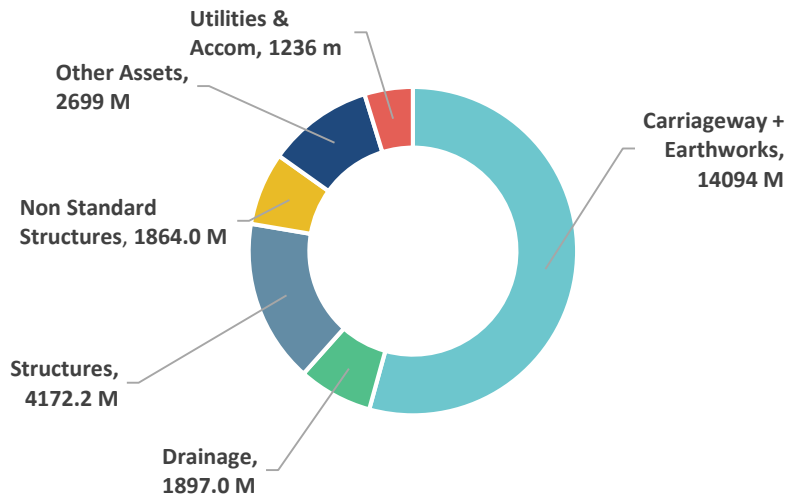




# GRC 2020 Current

 €25.9bn

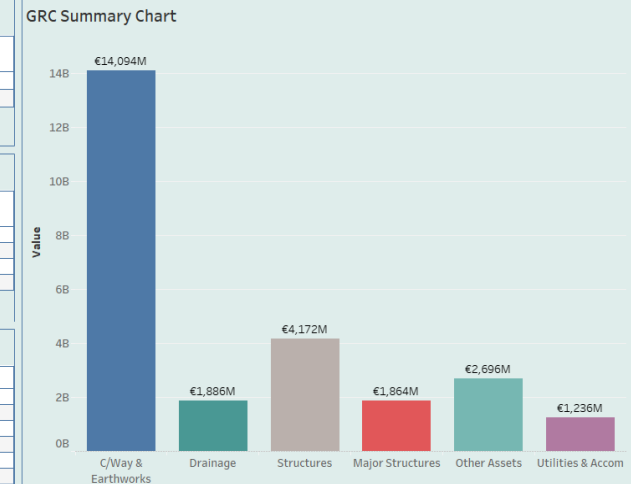
Asset Type	GRC 2020	
Carriageway + Earthworks	€	14,094 M
Drainage	€	1,897 M
Structures	€	4,172 M
Non Standard Structures	€	1,864 M
Other Assets	€	2,699 M
Utilities & Accom.	€	1,236 M
<b>Grand Total</b>	<b>€</b>	<b>25,948 M</b>



GRC Summary Stats									
Network	C/Way & Earthworks	Drainage	Structures	Major Structures	Other Assets	Utilities & Accom	Total GRC	Length (km)	€/km
Network	€14,094M	€1,886M	€4,172M	€1,864M	€2,696M	€1,236M	€25,948M	5,314	€5M
<b>Grand Total</b>	<b>€14,094M</b>	<b>€1,886M</b>	<b>€4,172M</b>	<b>€1,864M</b>	<b>€2,696M</b>	<b>€1,236M</b>	<b>€25,948M</b>	<b>5,314</b>	<b>€5M</b>

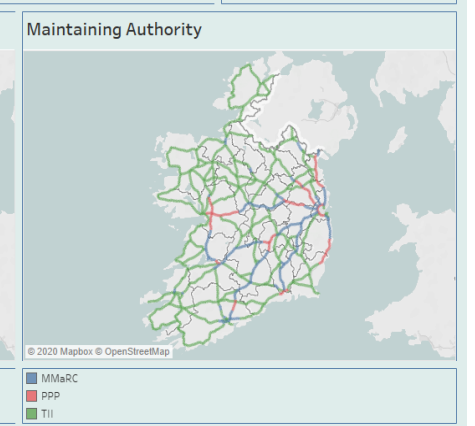
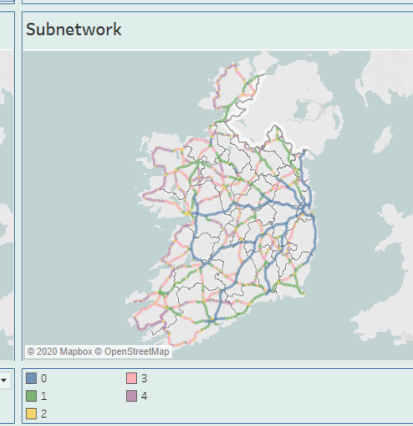
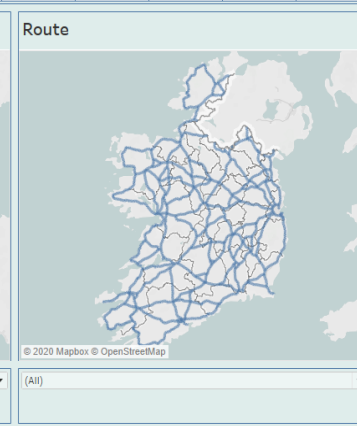
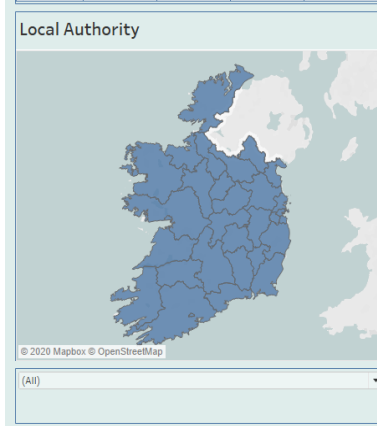
GRC Maintaining Authority									
Network (group)	C/Way & Earthworks	Drainage	Structures	Major Structures	Other Assets	Utilities & Accom	Total GRC	Length (km)	€/km
MMaRC	€5,874M	€726M	€1,791M	€267M	€1,226M	€494M	€10,377M	819	€13M
PPP	€3,018M	€367M	€1,171M	€528M	€805M	€294M	€6,184M	412	€15M
TII	€5,202M	€793M	€1,210M	€1,069M	€665M	€447M	€9,387M	4,083	€2M
<b>Grand Total</b>	<b>€14,094M</b>	<b>€1,886M</b>	<b>€4,172M</b>	<b>€1,864M</b>	<b>€2,696M</b>	<b>€1,236M</b>	<b>€25,948M</b>	<b>5,314</b>	<b>€5M</b>

GRC Subnet									
Subnet	C/Way & Ear..	Drainage	Structures	Major Struct..	Other Assets	Utilities & Ac..	Total GRC	Length (km)	€/km
0	€8,720M	€1,089M	€2,945M	€1,761M	€2,034M	€827M	€17,376M	1,194	€14.56M
1	€3,357M	€388M	€512M	€28M	€309M	€230M	€4,823M	1,193	€4.04M
2	€703M	€244M	€403M	€62M	€271M	€84M	€1,767M	685	€2.58M
3	€835M	€93M	€160M	€0M	€51M	€57M	€1,196M	1,258	€0.95M
4	€479M	€72M	€152M	€13M	€32M	€37M	€786M	984	€0.80M
<b>Grand Total</b>	<b>€14,094M</b>	<b>€1,886M</b>	<b>€4,172M</b>	<b>€1,864M</b>	<b>€2,696M</b>	<b>€1,236M</b>	<b>€25,948M</b>	<b>5,314</b>	<b>€4.88M</b>



Total GRC (bn)  
**€25.9B**

O/H Rate  
17.50%



# Asset Inventory & Valuation – Lessons Learnt

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- Level of assets and asset data under the control of TII is vast and diverse
  - Multiple asset data formats and data management systems
  - Data structure and geolocation of data is critically important – cross asset reporting
  - Inventory data structure can be designed to interlink with financial data
  - Not currently possible to link all datasets to central real-time source
  - **\* Point in time dataset \***
  - Need to update Asset Register on an ongoing basis
  - Project successes: **Central Geodatabase, Aligning Assets to TII LRS, BI Dashboard Reporting toolkit, Paved Widths, Earthworks and Land database**
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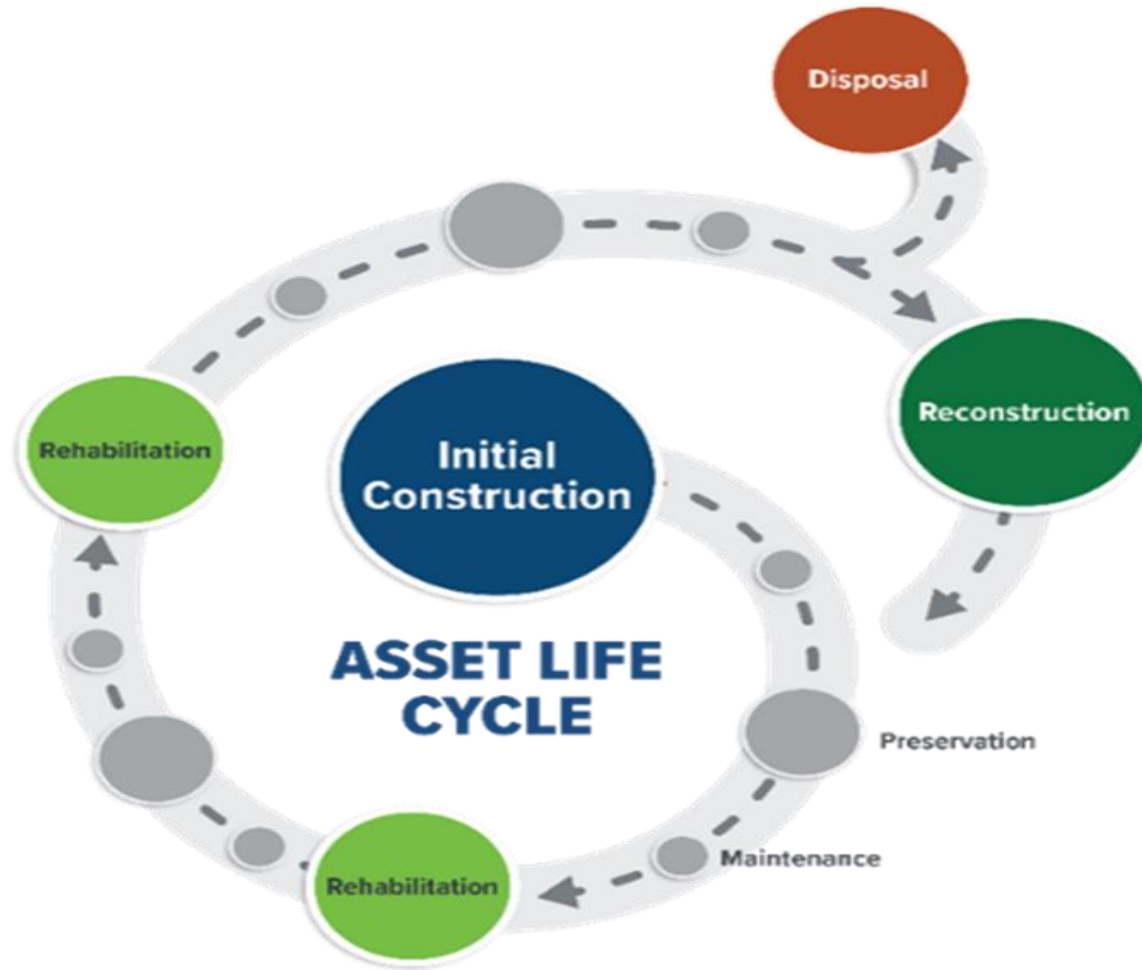
# Asset Management Strategy Development

# TII Statement of Strategy 2021 to 2025



# Asset Life Cycle

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# Life Cycle Cost Approach

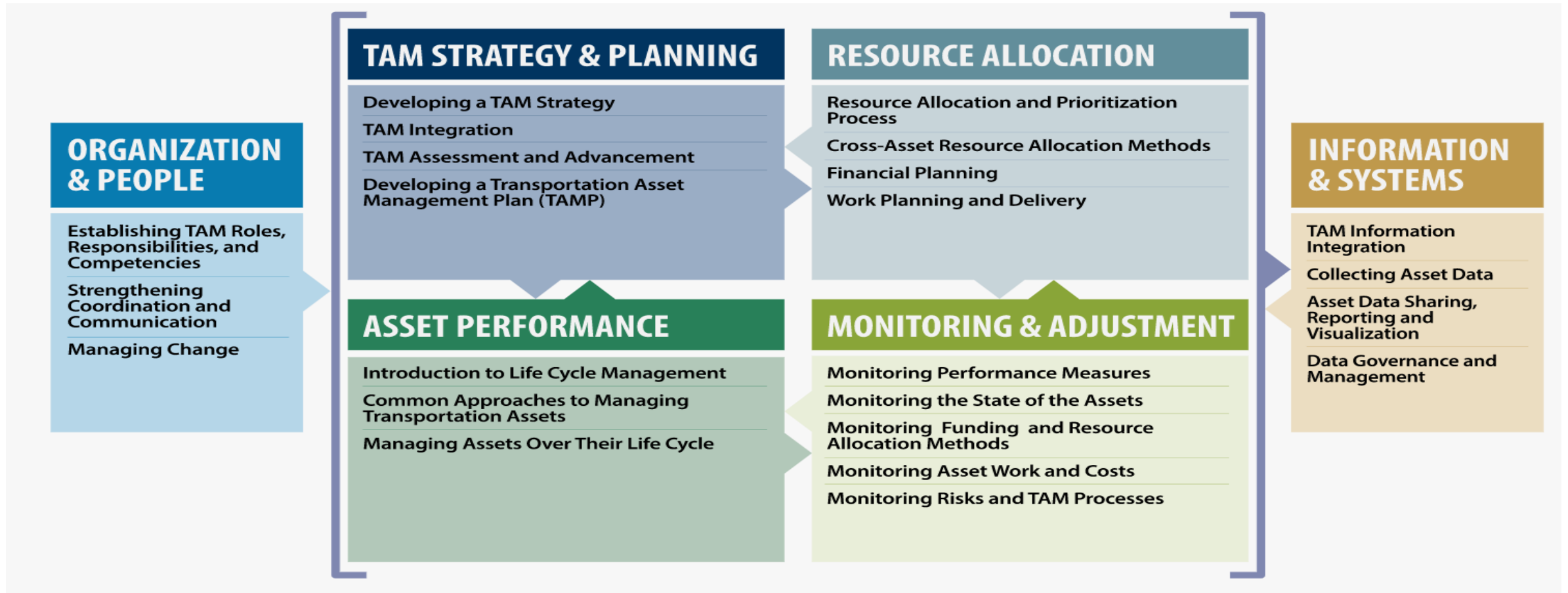
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Construction Costs

Operations Costs  
Maintenance Costs  
Rehabilitation Costs  
Replacement Costs  
Disposal Costs

# Transport Asset Management - TAM





# Asset Management Strategy in TII

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**Two Phased Approach – Development and Implementation**



**Integration of Projects under Development**

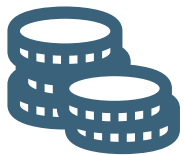


**Development of Deterioration Models**



**Lifecycle Modelling**

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**Required Budget Estimations**

**Integration of Asset Inventory and Valuation into Financial Systems**



**Development of KPIs around Effectiveness and Efficiency**



**Automated Report Generation for Key Stakeholders**

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# Other AMS Supporting Projects under Development

# Integration of ESRI Roads & Highways

## Key Functions

- Authoritative LRS
- Interoperability

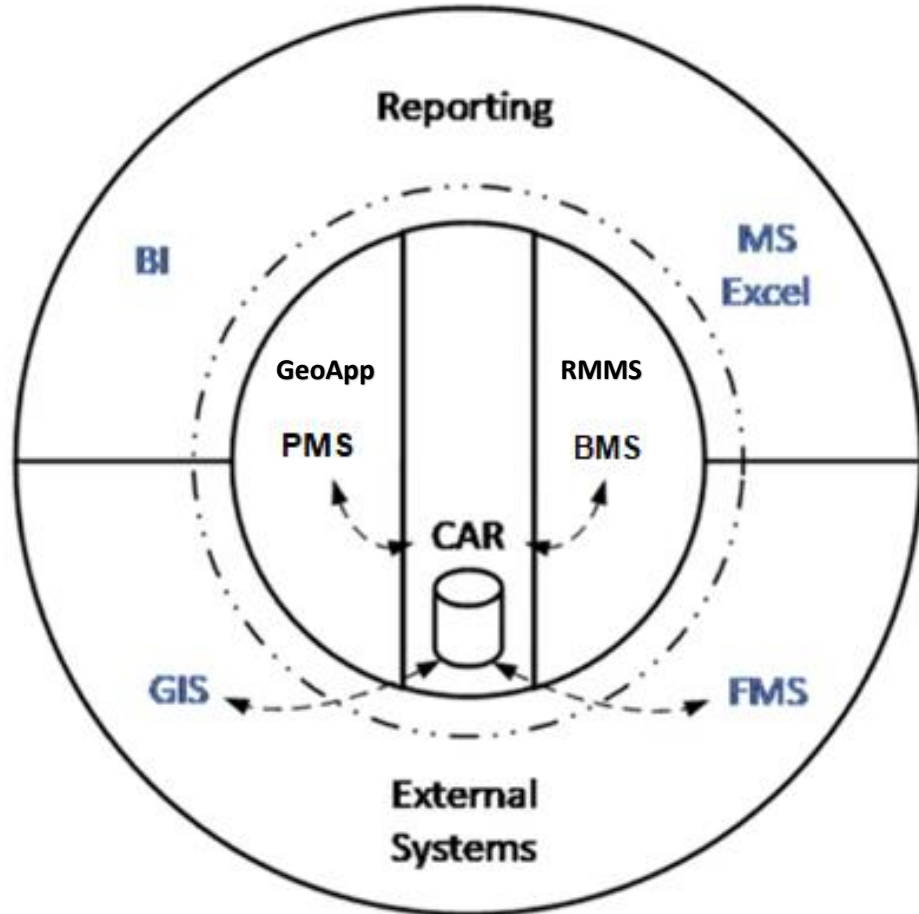


# Integration of Eirspan BMS to dTIMS

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# Common Asset Registry (CAR)



- A living tally of assets you are responsible for
- Common basis for all critical decision making based on current, consistent and reliable Information
- Eliminates the duplication of data and having multiple sources of the "truth"

# CAR – Online – Optioneering ArcGIS Hub



TII Common Asset Registry

## TII Common Asset Registry

Search, Visualize, Download, Create

🔍 Search...

This is the platform for exploring and downloading TII GIS data, discovering and building apps, and engaging others to solve important issues. You can analyze and combine datasets using maps, as well as develop new web and mobile applications. Let's achieve our goals together

# Thank you for listening..

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