

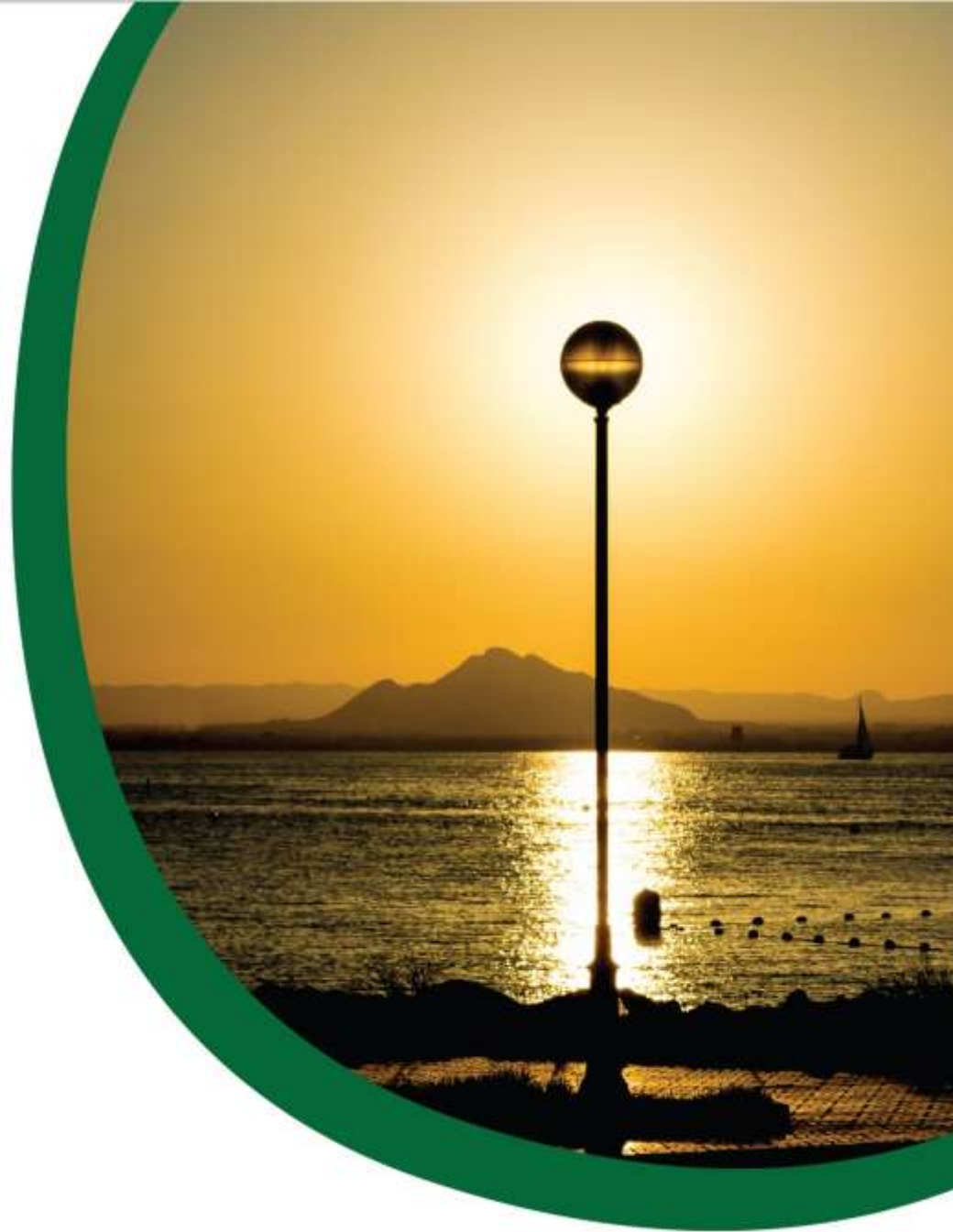


**Muscat Electricity Distribution Company**  
**Member Of Nama Group**

# GIS Benefits

April 2016

Presented By: Malika Al Amri  
Head of GIS Application





# Agenda

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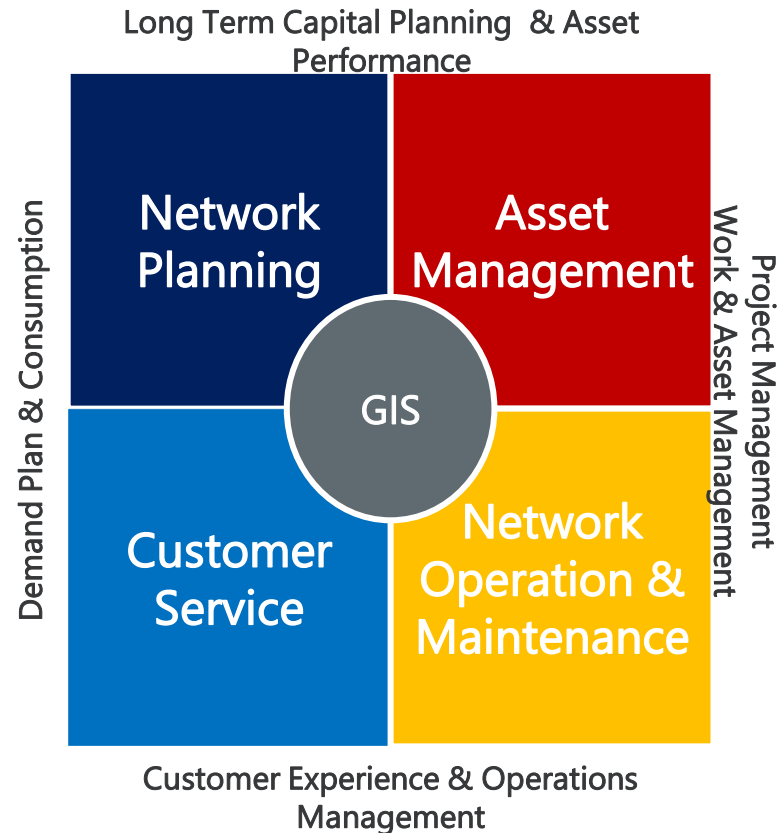
- Objective
- History
- Major Projects
- Status
- Use of GIS in :
  - ❖ Network Operation
  - ❖ Planning
  - ❖ Regulatory Compliance & Strategy
  - ❖ Asset Management
  - ❖ Distribution Control Center
  - ❖ Extensions
  - ❖ Maintenance & Protection
  - ❖ Sales & Revenue
  - ❖ Metering
  - ❖ Customer Service
  - ❖ Contact Center
- Challenges
- GIS Roadmap



# MEDC GIS Objective

## GIS Objective:

- ❑ Reliable Network Data (Substation, Lines & Cables) with the customers.
- ❑ Link the Network Data and customers with geographic locations.
- ❑ Facilitate Distribution, Extension, O&M, Billing, Call Centre Activities.(Network Map, Customers Location, Affected Area etc..).



## The GIS Business Transformation integrates across processes and Divisions in order to:

1. Enable leaders to align strategic decision making with operational capabilities
2. Create a strategic planning platform that will support MEDC's operational and planning
3. Enable effective strategic decision making for assets and stakeholders



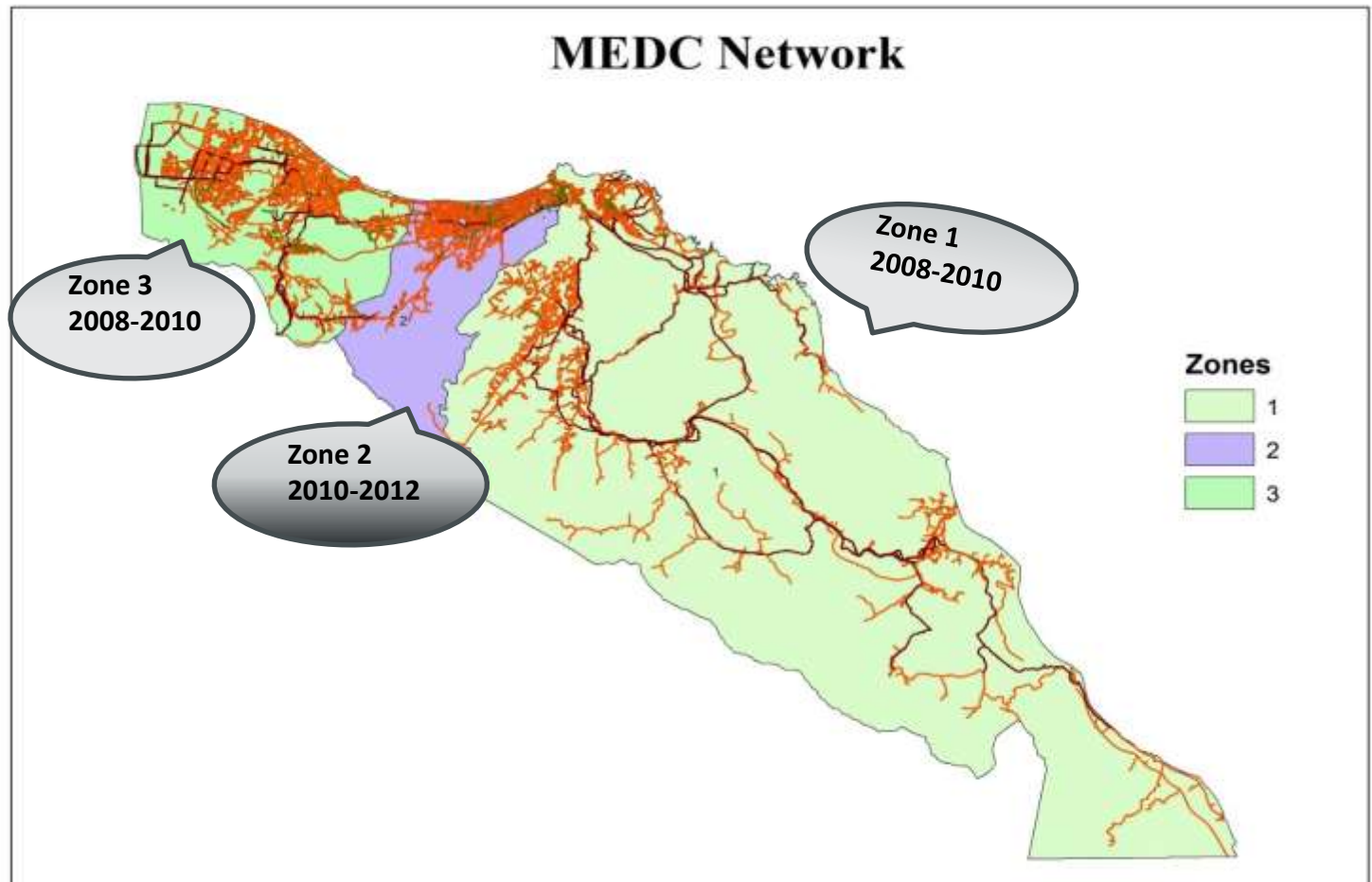
# The History

**2006:** Consultancy Service.

**2007:** Application Development.

**2008-2010:** Zone 1 & 3 Network Survey Completed.

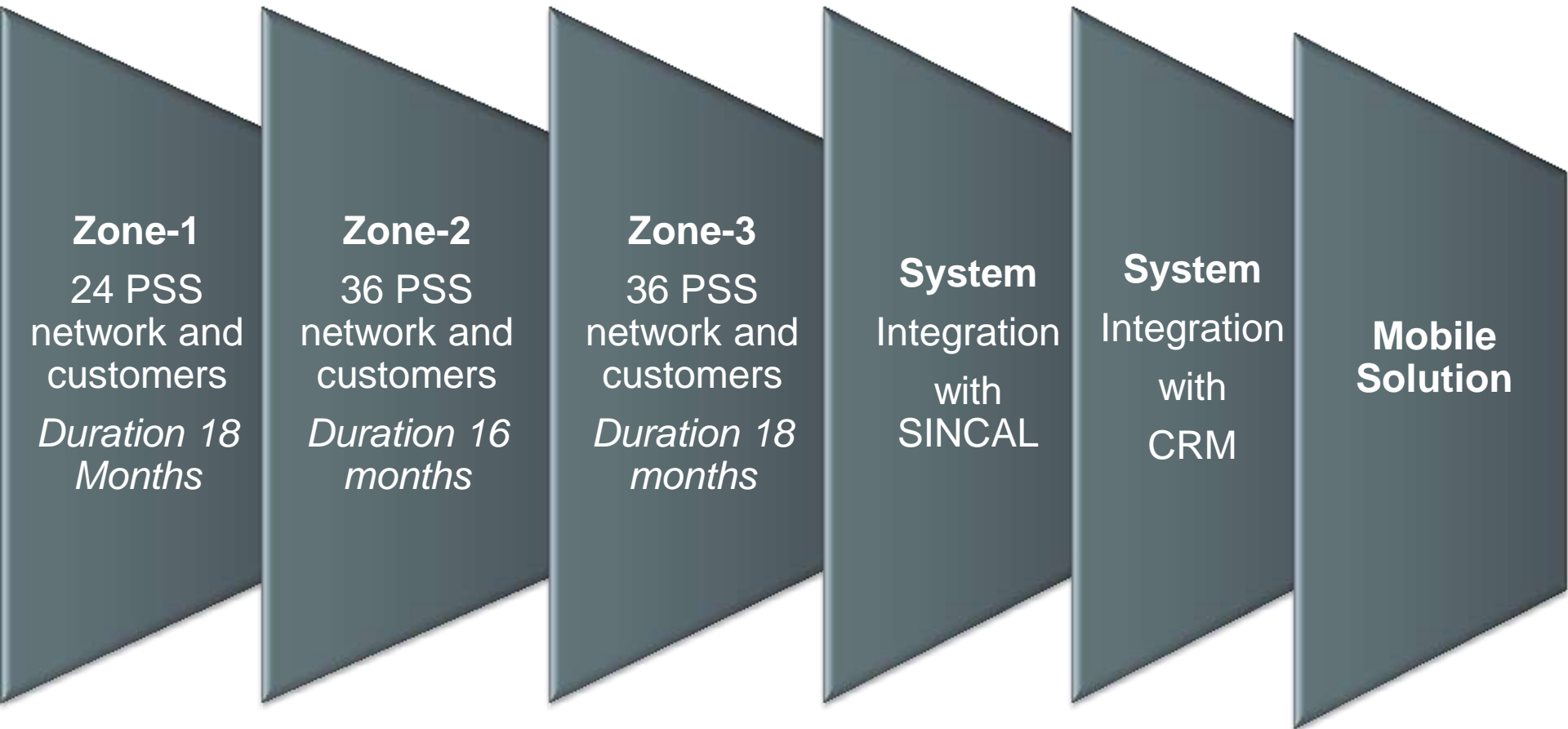
**2010-2012:** Zone 2 Network Survey Completed.





## Major Projects

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Item	Zone 1	Zone 2	Zone 3	Total
33kV Feeders (km)	959	317	822	2098 KM
11kV Feeders (km)	1654		1567	4122 KM
LV Feeders (km)	2887		3376	7966 KM
Primary S/S		46	57	167
Distribution S/S		2078	3057	8366
Customers accounts	111367	94860	121165	327392



## GIS End User

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**Customer  
Services**

**Planning**

**Project**

**Contact  
Center**

**Distribution  
Control  
Center**

**Operation  
&  
Maint**

**Sales  
&  
Revenue**



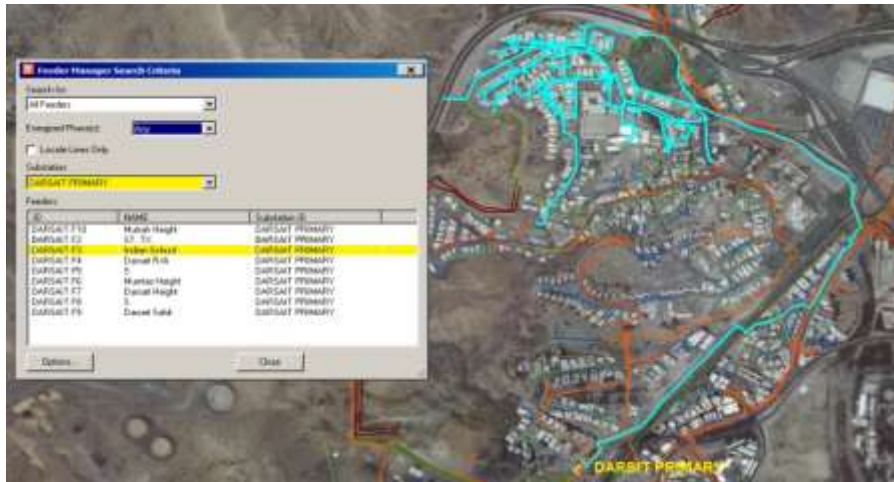
**Asset  
Mngmnt**





# GIS Usage

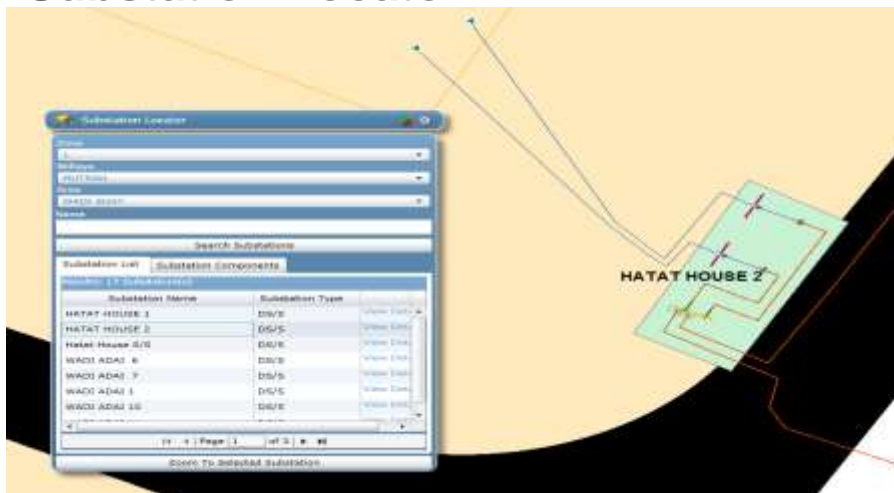
## Network Tracing



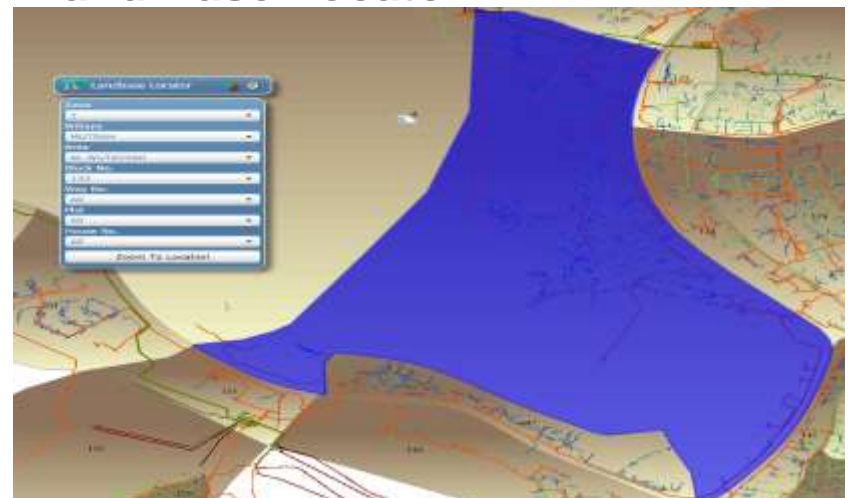
## Customer Tracing



## Substation Locator



## Land Base Locator







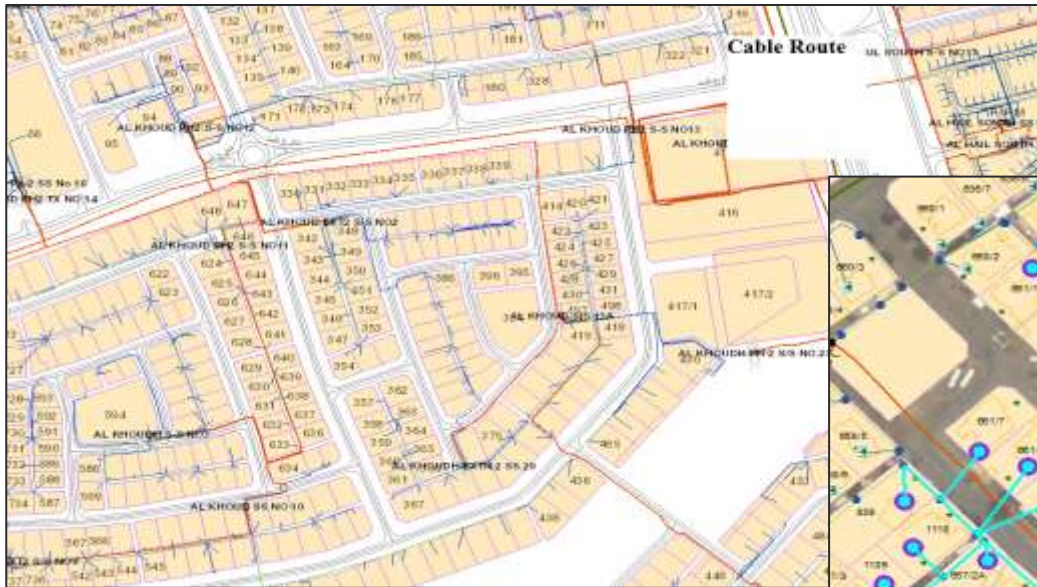
# GIS for Network Operation

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- ☐ Planned shutdown and emergency work.
- ☐ Making proposals and optimal location and capacity of substation.
- ☐ Making network reinforcement proposals.
- ☐ Knowing the cable route for the planned shutdown and emergency.
- ☐ Review and correct the Single Line Diagram (SLD).
- ☐ Support the excavation permits process.
- ☐ Checking the substation low voltage outgoing feeders to be used in emergency and outages.



# GIS for Network Operation



GIS Function	Measured KPI	Before GIS	After GIS
Network Tracing & Proposal Making	Time and cost needed to obtain information about Network availability , nearby connections and possible sources	Time (per staff)	
		1 days	3 hour



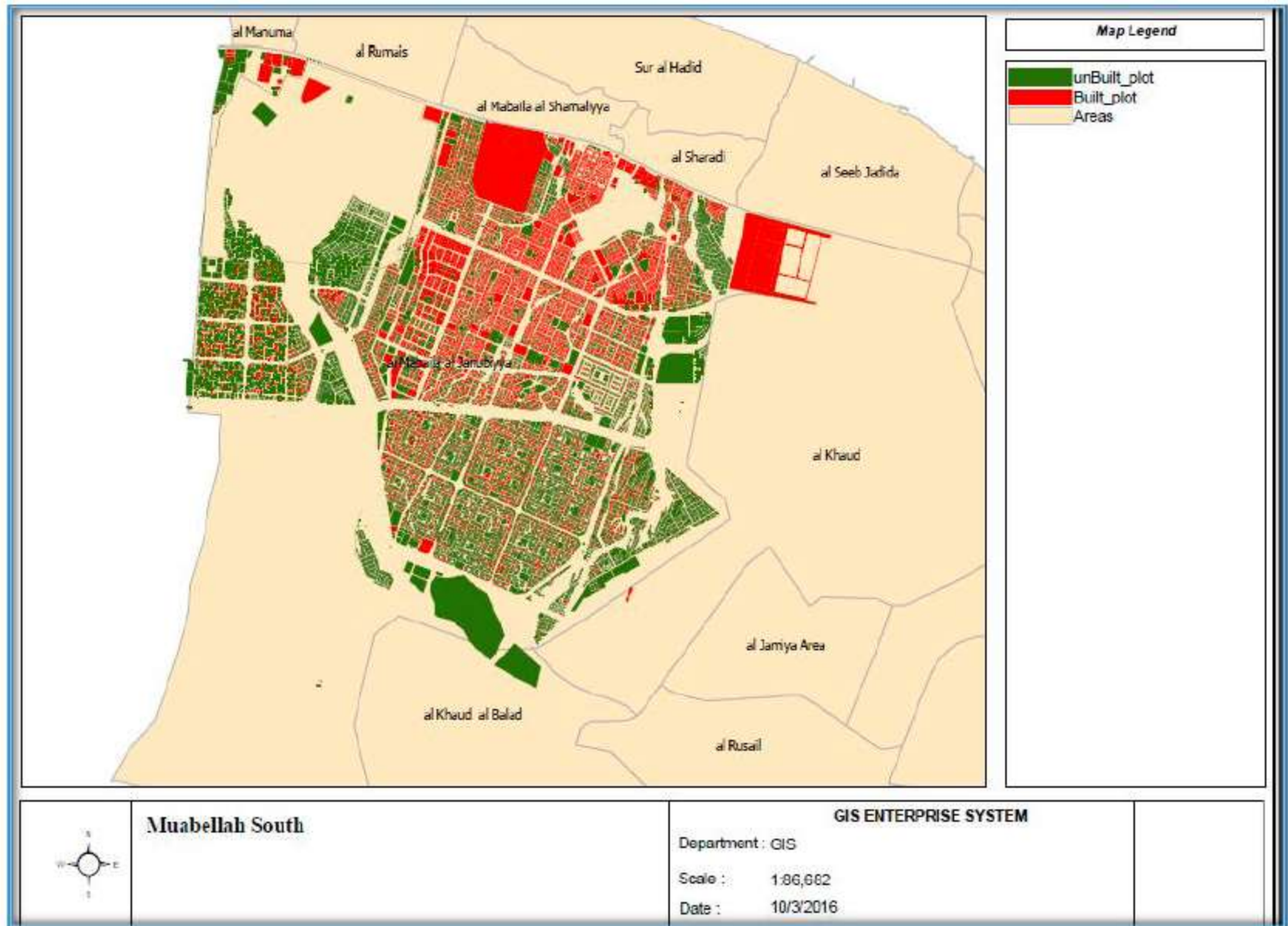
# GIS for Planning

- ☐ Power System Analysis.
- ☐ Network Performance Report.
- ☐ Pre Investment Appraisal Documents (PIADs).
- ☐ New network expansion and cost estimating.

GIS Function	Measured KPI	Before GIS	After GIS
Network Tracing & Proposal Making	Time and cost needed to obtain information about Network availability , nearby connections and possible sources	Time (per staff)	
		Minimum 4 hours ( depend on location )	5 to 10 minutes
Interface to PSS Sincal	Time spent to model plan networks and populate data	Time (per staff)	
		7 days	4 hours



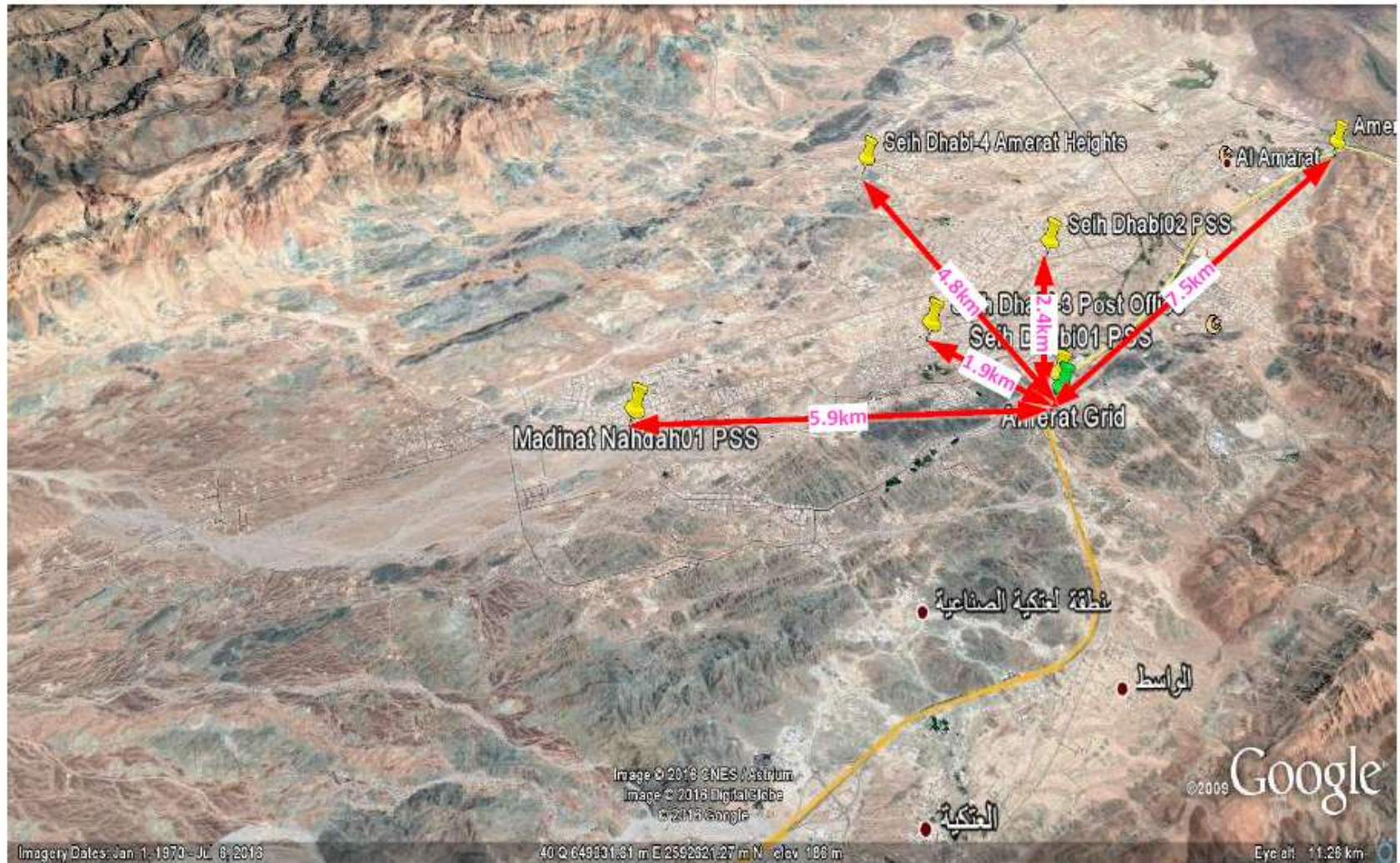
# GIS for Planning







# GIS for Planning

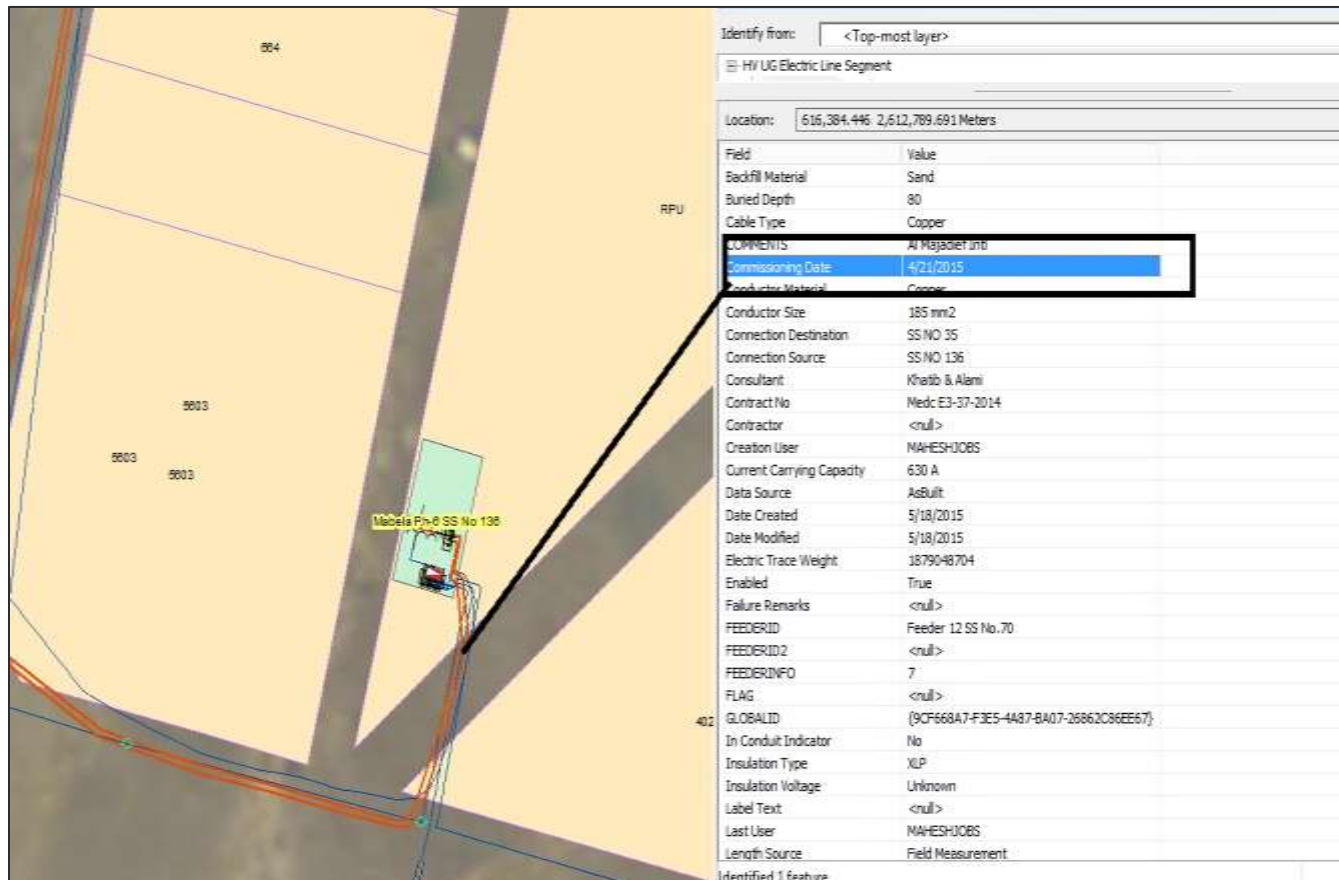


Indicative diagram for PSS connections in Amerat area with 2016 load MVA



# GIS for Regulatory Compliance & Strategy

- ❑ Locating the customer plots and identifying any customer.
- ❑ Having reliable source of information about the statistical of the network length.
- ❑ Having information about the type and installation date of the assets.
- ❑ Regulatory request like mapped accounts per grid and Asset Age.

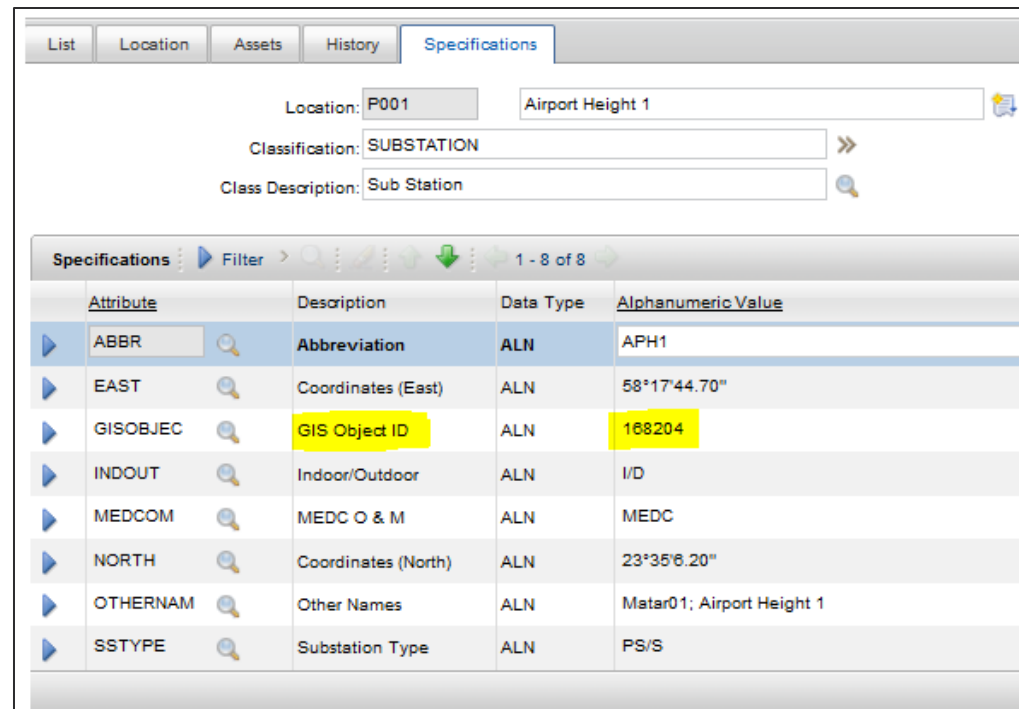




# GIS for Asset Management

## ❑ MAXIMO System:

GIS was the data source for built the MAXIMO database. The availability of GIS data saved the consultancy service and amount for collecting the data again from site. The process of fetching the data is continuously for any new Pss.



The screenshot shows the 'Specifications' tab in the MAXIMO interface. It includes search filters for Location (P001), Classification (SUBSTATION), and Class Description (Sub Station). Below the filters is a table with 8 rows of specifications. The 'GIS Object ID' is highlighted in yellow, with the value '168204' also highlighted.

Attribute	Description	Data Type	Alphanumeric Value
ABBR	Abbreviation	ALN	APH1
EAST	Coordinates (East)	ALN	58°17'44.70"
GISOBJEC	GIS Object ID	ALN	168204
INDOUT	Indoor/Outdoor	ALN	I/D
MEDCOM	MEDC O & M	ALN	MEDC
NORTH	Coordinates (North)	ALN	23°35'6.20"
OTHERNAM	Other Names	ALN	Matar01; Airport Height 1
SSTYPE	Substation Type	ALN	PS/S

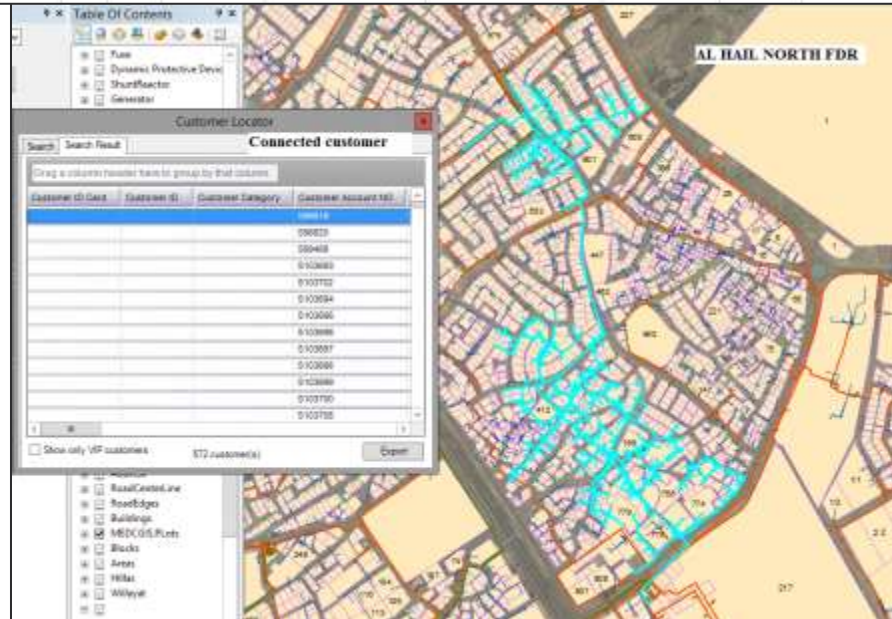




# GIS for Distribution Control Center

- ❑ Take the number of customer was affected during planned & unplanned shutdown & outages for CAIDI report.
- ❑ Comparing the SLD between operation Site and GIS SLD.

Maximo	Ref	Date	Zone	Voltage	Grid	Primary	Feeder Name	Indication	Category	Reason	Area Affected	Action
114996	Seeb	16-Nov-16	3	LT		Sultan School P029	SULTHAN SCHOOL FDR-2		TRIP	F/P Side 400A HRC Fuse blown, Due to Overload	AL HAIL SOUTH	Replaced 400A Changed In 'R'
114998	Seeb	17-Nov-16	3	LT		AZBA GRID TX-3 Gp01	FDR -5		Emergency	LT Main Cable Jumper Blown, Due to Overload	MAWALEH NORTH	LT Main Cable Clamp In 'R'
114997	Seeb	17-Nov-16	3	LT		Sultan School P029	FDR-3		Emergency	F/P Side Busbar Fire, Due to overload	AL HAIL SOUTH	Replaced New HRC Fuse 3m
114998	Seeb	19-Nov-16	3	LT		Al Hail North 1 #027	AL HAIL NORTH FDR		TRIP	F/P Side 400A HRC Fuse Ino Changed In 'R', Due to Overload	AL HAIL NORTH	Replaced 400A Changed In 'R'
Total Number of Customers									125,042			
SAIDI									14,50505			
SAIFI									0.08147			
CAIDI									178.84457			
MW Lost									18.7			





# GIS for Extensions

## Support the initial application connection by:

- ☐ Confirm the electric network availability.
- ☐ Estimate the electric line routing.
- ☐ Selecting suitable sites for locating new feeders.
- ☐ Optimal design and choice of substation location and capacity.

GIS Function	Measured KPI	Before GIS	After GIS
Network Tracing & Proposal Making	Time needed to obtain information about Network availability , nearby connections and possible sources	Time per staff	
		2 days	1 hour

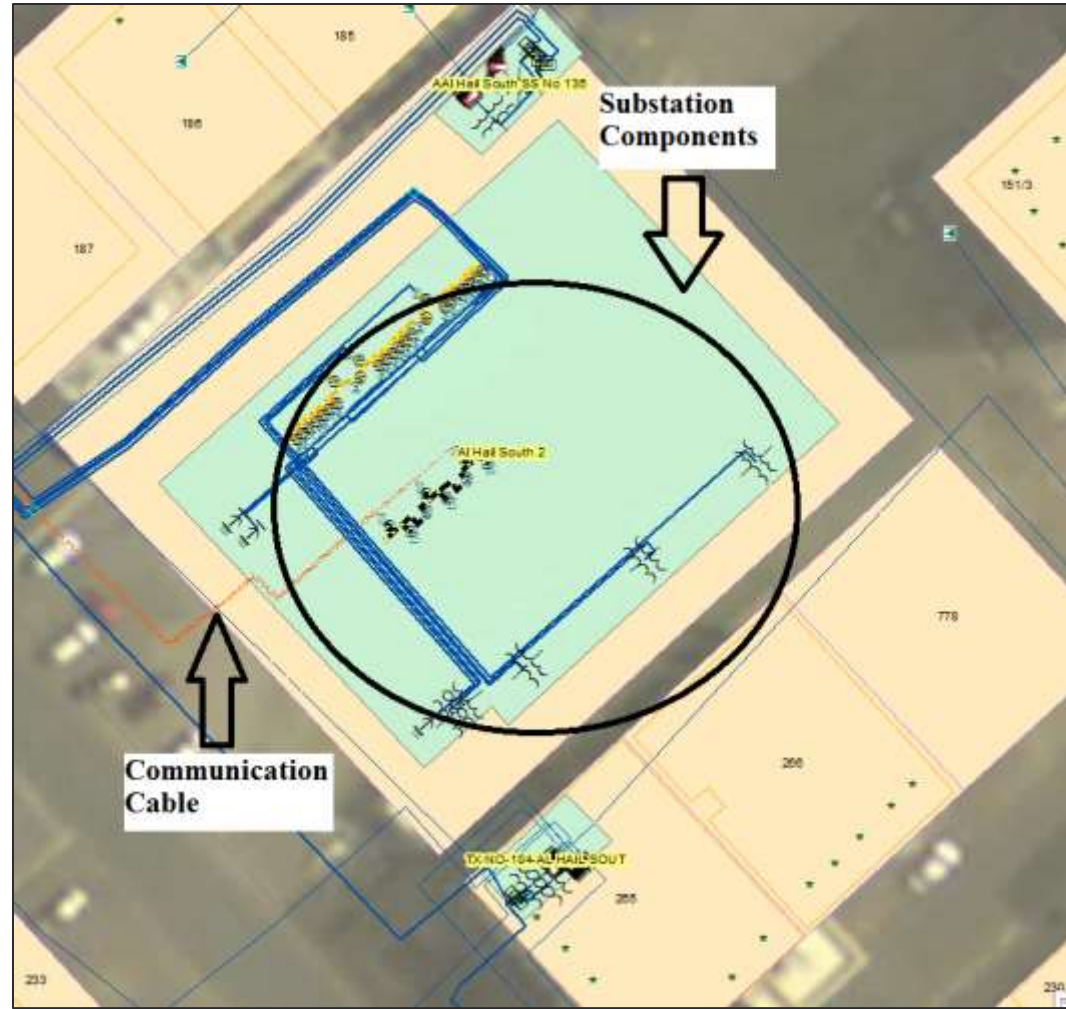


# GIS for Extensions



# GIS for Maintenance & Protection

- ❑ Asset components diagrams in reality like the transformer manufacture year, manufacturer, serial number, capacity, operating voltage, etc.
- ❑ Also GIS can give the geographical for communication cable routes and fiber optic







## GIS for Sales & Revenue

- ❖ Provide customer's locations and source connections to trace and identify the area with high losses.
- ❖ **Indicate the customer with high consumption (VIP).**
- ❖ **Non-technical Losses Reduction:**

GIS system mapped the accounts to grid/zone which can help to calculate the conception from IBS system to check the losses at grid/zone level.

ACCOUNT_NO	FEEDERID	Dss	PSS Name	Grid SS
1058208	DEBHA PRIMARY SSNO 1 F1	DEBHA SSNO1	Debah	Quriyat G
1058209	DEBHA PRIMARY SSNO 1 F1	DEBHA SSNO1	Debah	Quriyat G
1058210	DEBHA PRIMARY SSNO 1 F1	DEBHA SSNO1	Debah	Quriyat G
1058211	DEBHA PRIMARY SSNO 1 F1	DEBHA SSNO1	Debah	Quriyat G
2200001	Qurayat FEEDER 2	AL AFA 500 kva SS 1	Qurayat	Quriyat G
2200002	Qurayat FEEDER 2	AL AFA 500 kva SS 1	Qurayat	Quriyat G
2200003	FDR 05 SS No 220	ramala	Al Shahbari	Quriyat G
2200004	FDR 05 SS No 220	ramala	Al Shahbari	Quriyat G
2200005	FDR 05 SS No 220	ramala	Al Shahbari	Quriyat G
2200006	FDR 05 SS No 220	ramala	Al Shahbari	Quriyat G
2200007	Qurayat FEEDER 03	AL GININ SS NO 7	Qurayat	Quriyat G
2200008	Qurayat FEEDER 03	AL JINAIN S-S NO47	Qurayat	Quriyat G
2200009	FDR 05 SS No 220	ramala	Al Shahbari	Quriyat G
2200011	Qurayat FEEDER 03	AL MALAH S-S NO5	Qurayat	Quriyat G
2200012	Qurayat FEEDER 03	AL MALAH S-S NO5	Qurayat	Quriyat G
2200013	Qurayat FEEDER 03	AL MALAH S-S NO5	Qurayat	Quriyat G
2200014	Qurayat FEEDER 03	AL MALAH S-S NO5	Qurayat	Quriyat G
2200015	Qurayat Feeder 6	QURIYAT SOUQ S-S NO15	Qurayat	Quriyat G
2200016	Qurayat FEEDER 03	AL MALAH S-S NO5	Qurayat	Quriyat G



# GIS for metering

Metering department benefits from GIS spatial power to indicate the customer location by providing the correct coordinates for the meters locations.

GIS assist the metering team to do the below activates:

- ❑ Metering inspection and testing.
- ❑ Metering replacement.
- ❑ Meter reading like (MMR, AMR).

GIS Function	Measured KPI	Before GIS	After GIS
Customer location and Routing	Time needed to reach the customer location.	Time (per staff)	
		2 hours	1 hours



# GIS for Customer Service

- ☐ Network customers information like account number, meter number, addressing and connections source.
- ☐ Flag the spatial need customer location and feeding source.
- ☐ Time and cost saving when making proposals and estimation for any new connections application in CRM.

GIS Function	Measured KPI	Before GIS	After GIS
Customer location and tracing	Time and cost needed update the new connection application in GIS.	Time (per staff)	
		8 month	15 days





# GIS for Contact Center

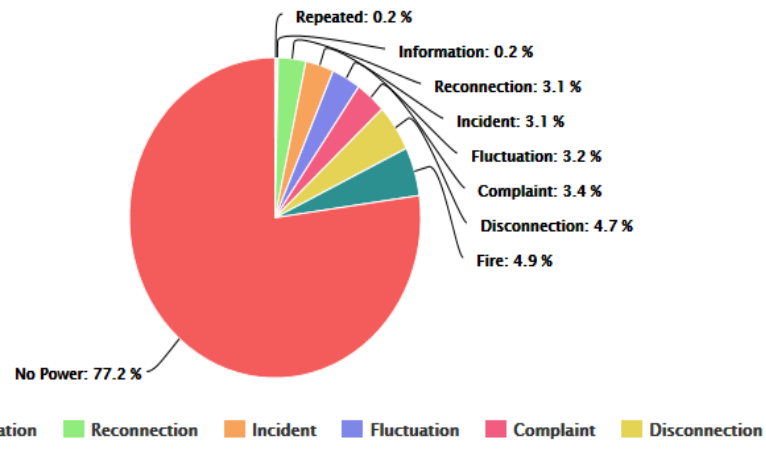
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- ☐ Registering and identifying the outages location using TroubleCall register.
- ☐ Fast inducting for the customer with special needs affected by the outage.
- ☐ Providing reports and dashboard for the outage per compliance type, status and zone.
- ☐ Disconnection reports cases and compare with the metering reports for Quality assurance and work efficiency..

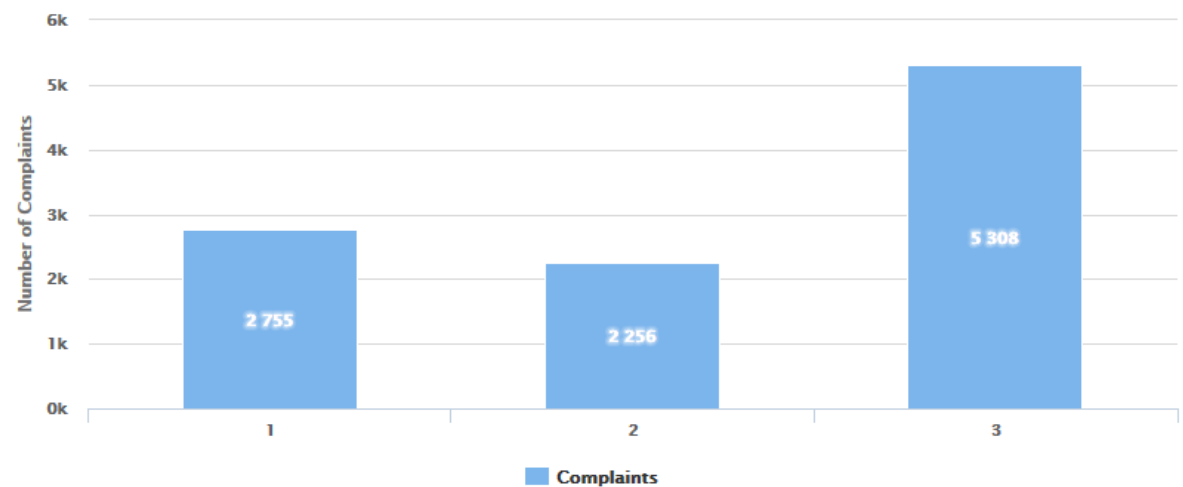


# GIS for Contact Center

Complaints Distribution By Type



Total Number of Complaints Per Zone





# Challenges

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## ISSUE

- Unknown and inaccessible Customers :  
(Unknown Cancelled, Demolished, inaccessible etc...)



## SOLUTIONS

- Update the Active Account List.
- To be surveyed by consultant and OIFC Meter reader/MEDC Customer Service.



# Challenges



## ISSUE

- Data Update for emergency works:  
Most of works implemented by MEDC Sub-contract  
(Cyclone, Flood, Emergency Fault etc....)



## SOLUTIONS

- Commitment from field staff for data updating
- Utilizing GIS mobile solution for emergency works



# Challenges

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## ISSUE

- Lack of Electrical Engineering Background within GIS Team



## SOLUTION

- Full Involvement of Technical Teams in Data Quality Check



# Challenges

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## ISSUE

- Not Full Commitment of other Concern Department (Additional Task vs My Job)



## SOLUTION

- Strategic Project: full commitment from Management & Staff.
- The message: our ALL Job.
- KPI/annual appraisal of concern staff



# Challenges

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## ISSUE

- Usage of Mobile Solution:  
The Mobile network not fully covered/not reliable/ limitation of MEDC internet bandwidth



## SOLUTIONS

- Enhancing off-line applications
- Implement GIS Mobile solution for smart phones



# GIS RoadMap

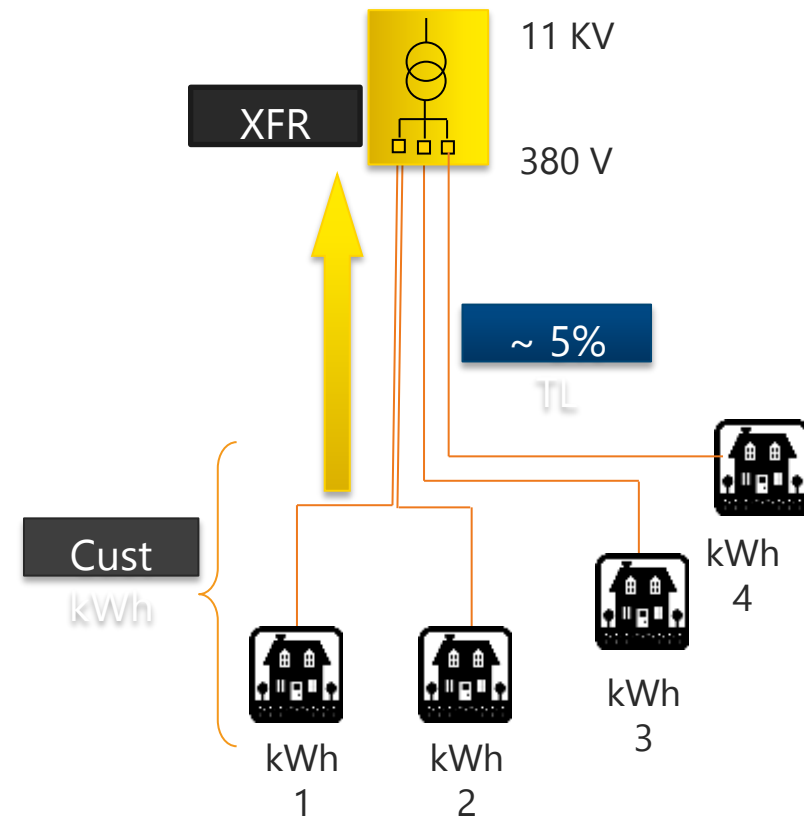


# MEDC GIS Business Transformation Initiatives

## Customer Service

CS1

**Develop Outage Management Application** (tracking of system calls, incidents and outages, Provide Linkage between Call Center and GIS, Provide Tools to allow MEDC engineers to visualize outage incidents, Provide Linkage with SCADA to generate "pin" maps indicating the location)

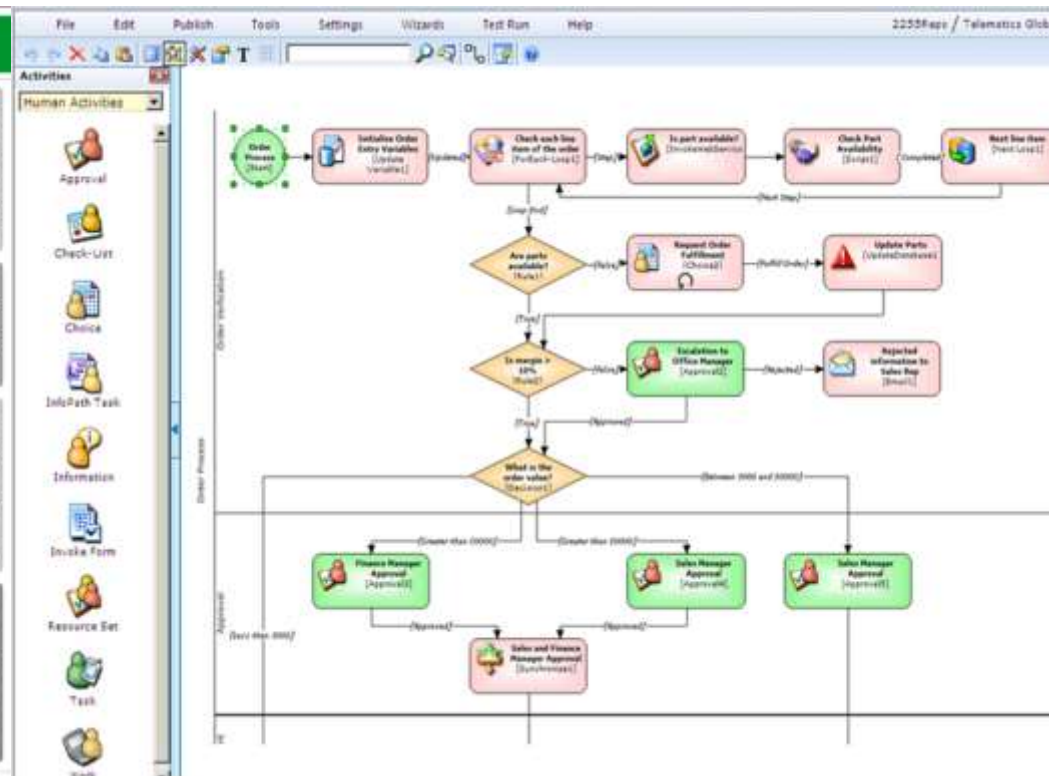
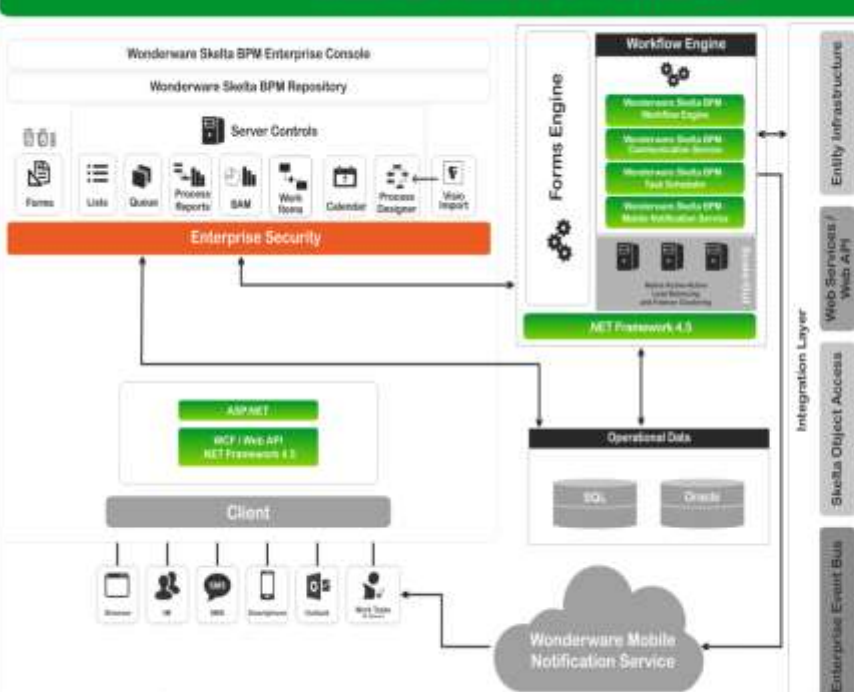


# MEDC GIS Business Transformation Initiatives

## Network Planning

- NP1 Develop GIS Data QA/QC tools to increase the accuracy of the network plan exported to PSS Sincal. .
- NP2 Develop an online workflow management system of the data sharing process with external stakeholders to support development plans.

### Wonderware Skelta BPM – Architecture



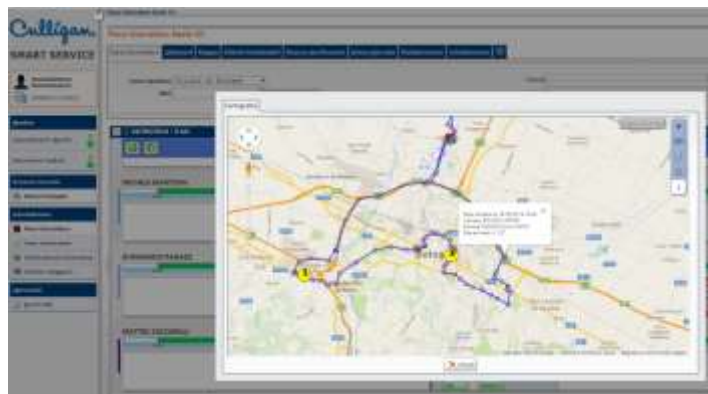


# MEDC GIS Business Transformation Initiatives

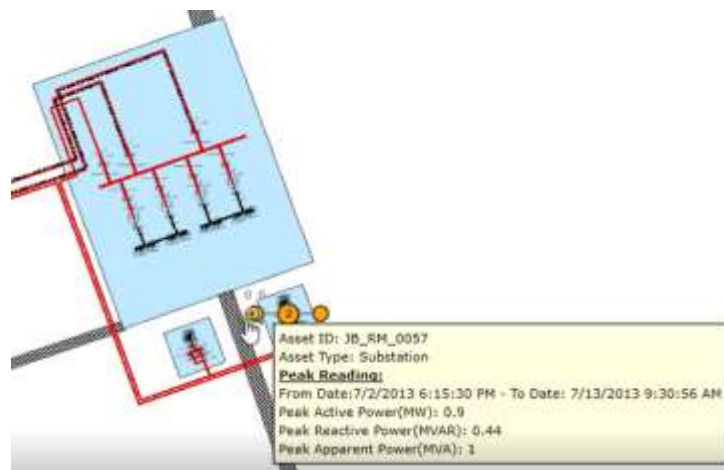
## Network Operation and Maintenance

- OM1 **Implement GIS Mobile solution for smart phones** for optimal utilization of MEDC's field crews and material through an enhanced dispatch process focused on incident response and maintenance and repair work.
- OM2 **Integrate GIS with SCADA** to acquire live data feeds into GIS and spatially enable SCADA/DMS features with GIS

## Advanced Workforce management Mobile Solution



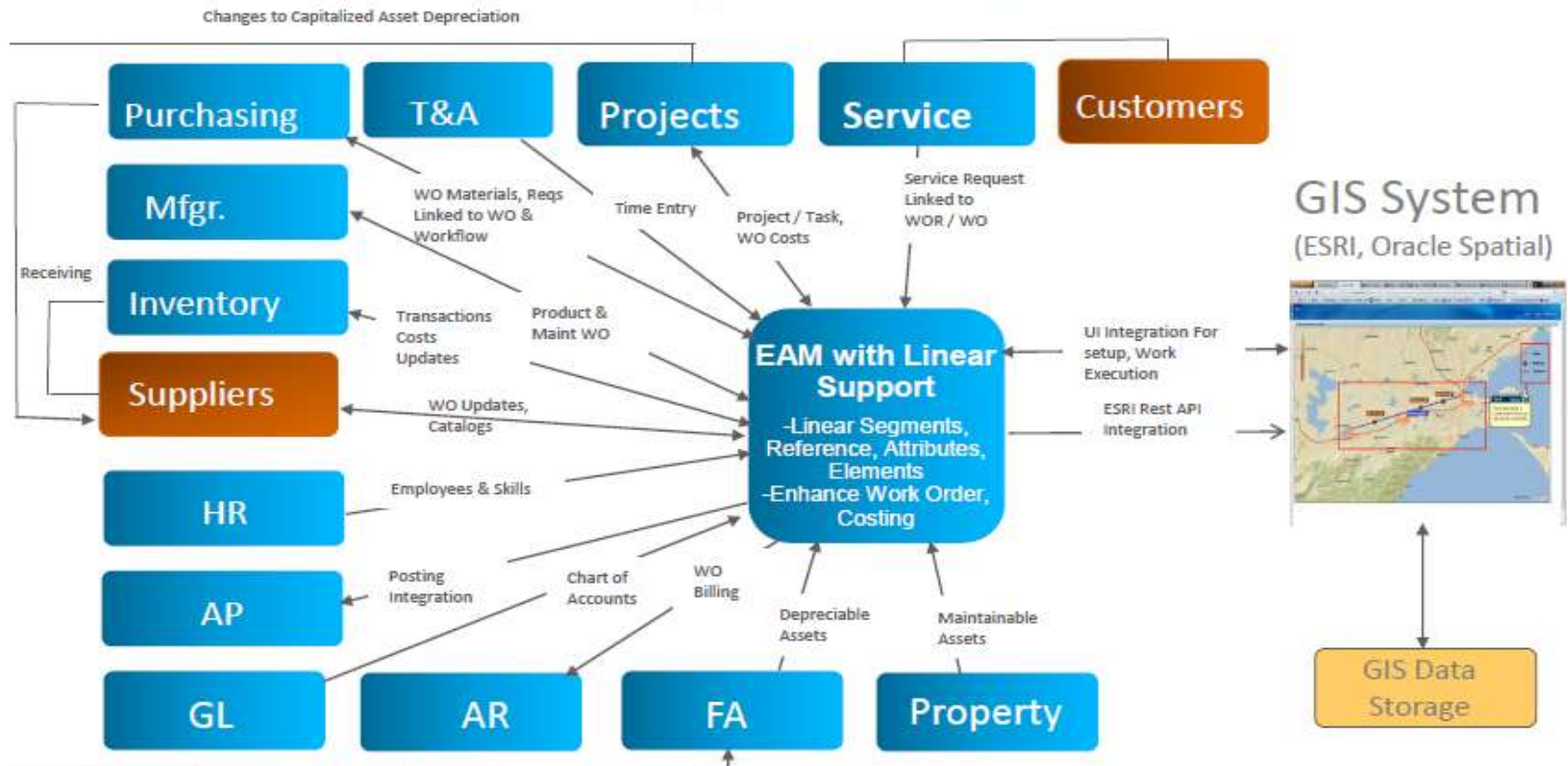
## DCC/SCADA Integration with GIS



# MEDC GIS Business Transformation Initiatives

## Asset Management

- AM1 **Integrate GIS with the Asset Management System** at MEDC to exchange information between both systems and support CAPEX/OPEX investment planning as part of the overall asset lifecycle.
- AM2 **Integrate GIS with Project Management tools** to better manage and control integrated projects through a spatially enabled project tracking system







THANK YOU