



Asset Management “Hands-on Approach”

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Metropolitan Atlanta Rapid Transit Authority (MARTA)

- Started bus and rail combined service in 1979
- 9th largest transit system in the U.S.
- 500,000 passengers daily (bus and rail)
- 338 rail cars, 48 miles of service via four lines

Gold, Red, Blue and Green

- 120 miles of track
- 530 buses, 92 routes
- 175 Mobility (paratransit) vehicles





MARTA's Vision for Asset Management and SGR

Implement a single MARTA-wide system for condition-based asset replacement, using a consistent set of prioritization criteria.

Solid, accurate database

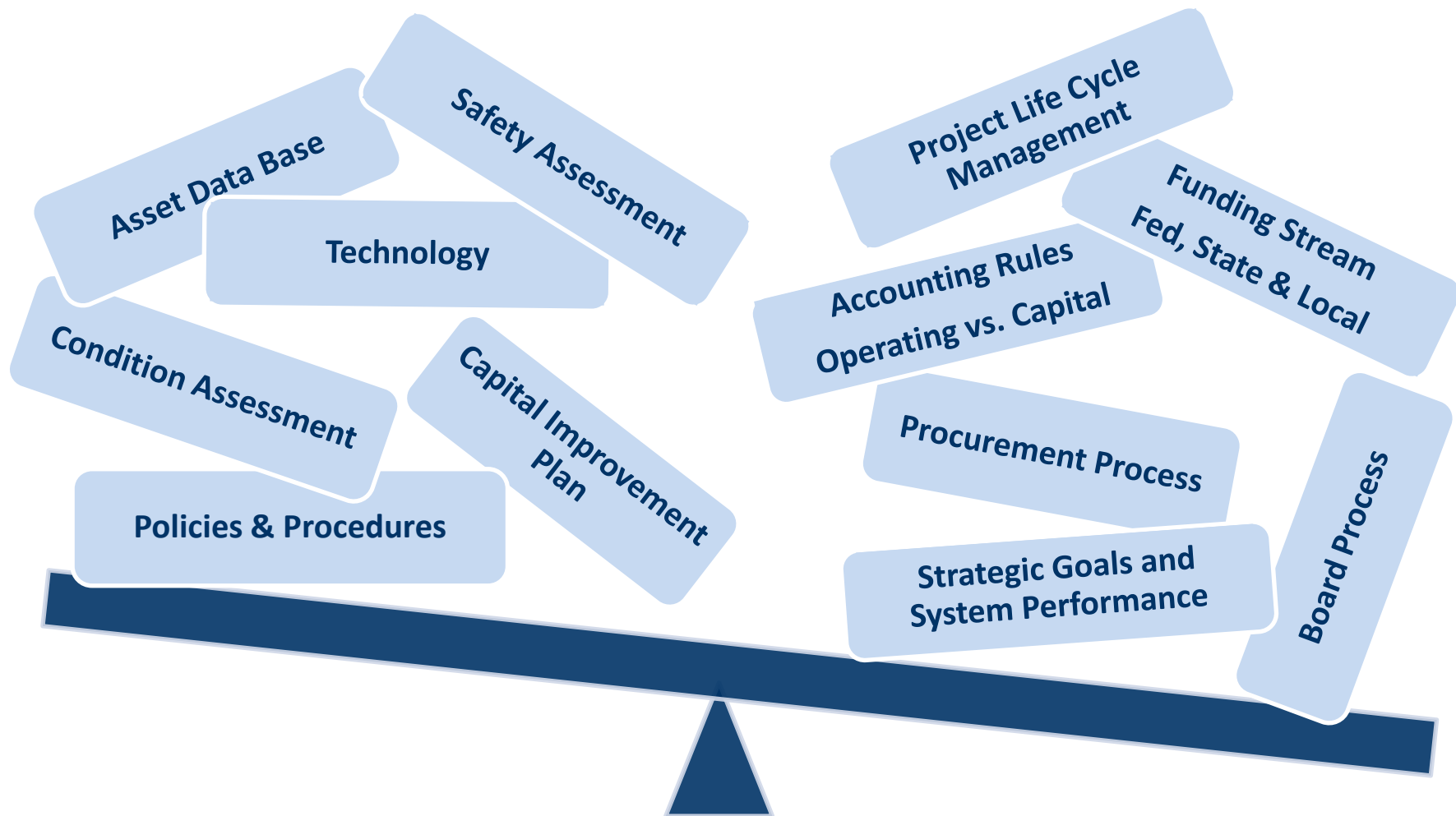
Provide a continuing flow of information for establishing the priority of capital initiatives properly aligned with MARTA's Strategic Priorities.

Process for Asset Management Plan (AMP) to feed Capital Improvement Plan (CIP)

AMP → CIP

Establish a systematic program to prioritize and identify projects in the long-range Capital Improvement Plan.

CIP decision-making tools

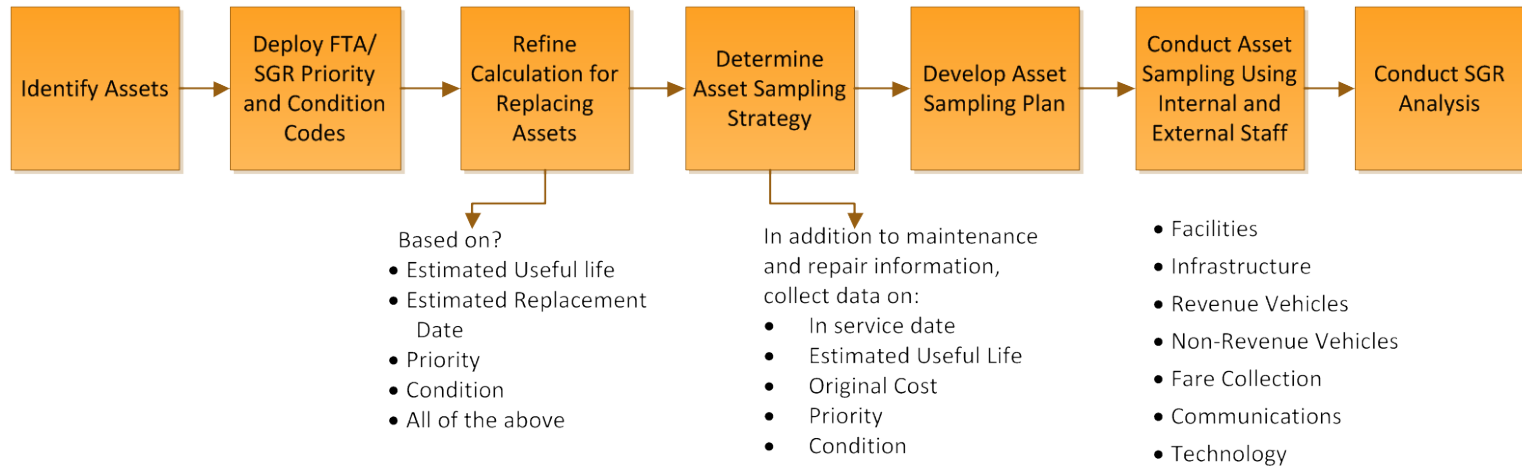


The Right Balance

MARTA's Asset Management/ State of Good Repair Methodology

Three-pronged approach

Condition Assessment Process



Asset Analysis Tools



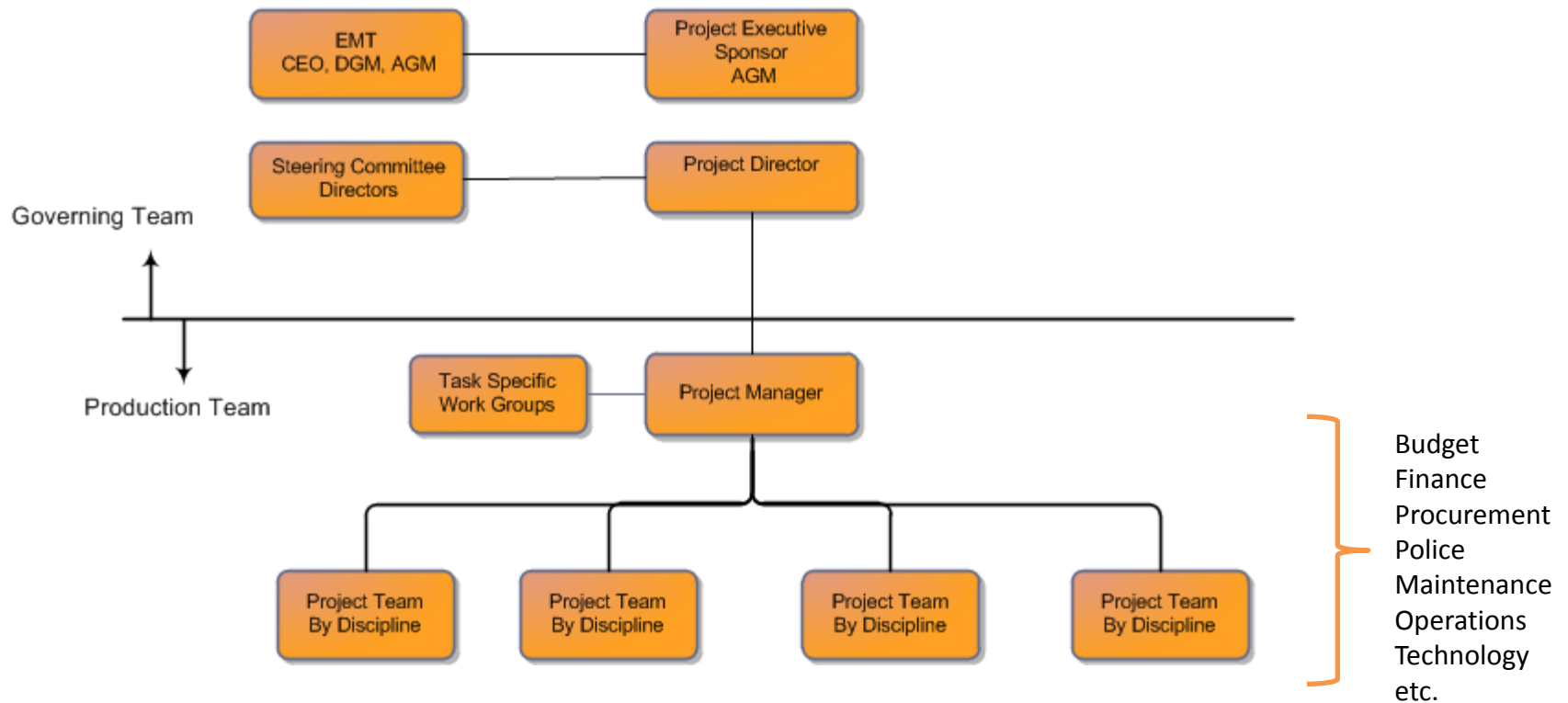
Asset Management Decision-making

- Progress from a project to a program: must fund it, account for it, staff it
- Develop and refine asset management policies, procedures and strategy, SGR Team; who, what, how long?
- Provide input to AMP and CIP

Project Team Structure



SGR Asset Management Project Team Structure





Condition Assessment Survey



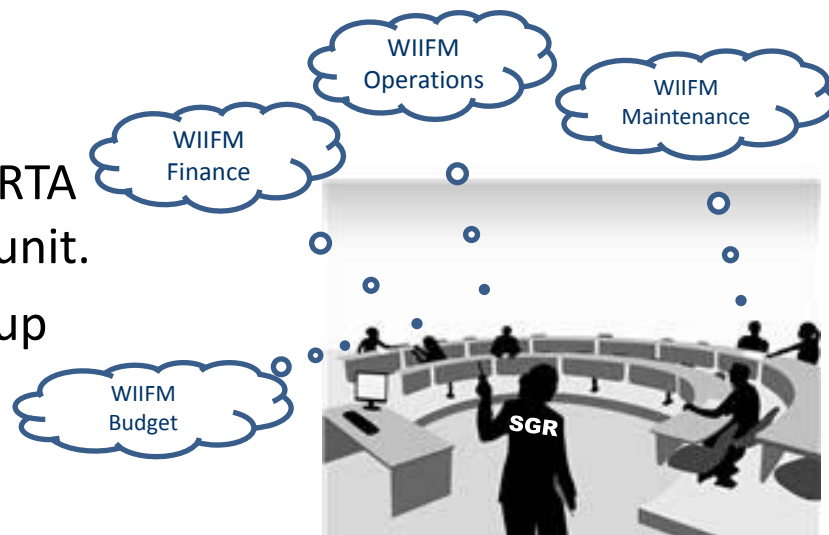
MARTA developed a comprehensive condition assessment methodology. Effort was comprised of updated and scrubbed asset data, third party assessors, randomly generated asset samples and statistically significant data.*

*Some assets categories to be assessed at 100%



What Assets Do You include in your Database for SGR Analysis?

- MARTA's Decision Criteria
 - How MARTA defines a “capital” asset.
 - The level of detail and “drill-down” MARTA required for each business / operating unit.
 - Agency tolerance to manage and keep up with asset information.
 - What's In? vs. What's Out?
Ex. Bridges Furniture



WIIFM ?



Do you Really know the Status of Your Assets?

As the result of an earlier study in 2005, MARTA had already loaded over 41,000 assets into the system. However, asset information was complete for only 18% of the items. This included information on:

- Physical Location
- Value
- Priority
- Condition
- Estimated Useful Life
- Asset Breakdown Structure

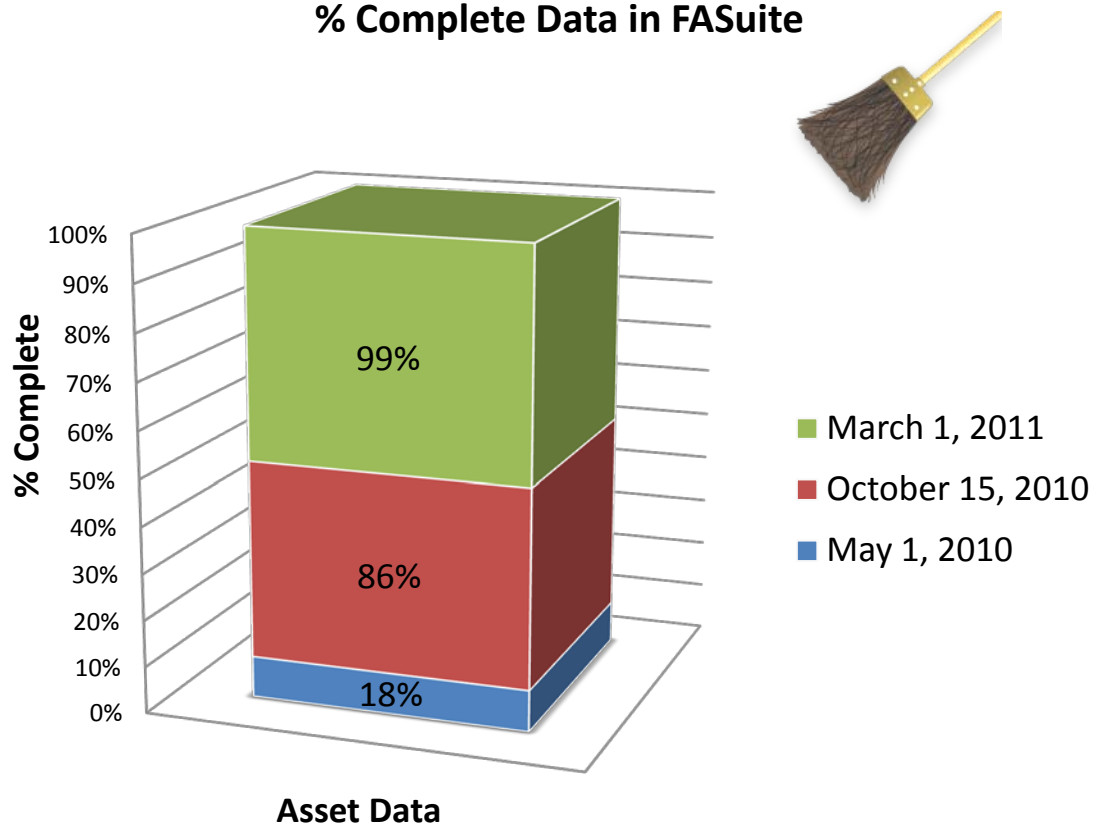
Over the past year, MARTA staff have added over 10,000 additional assets. Now 99+% of the assets have complete information and more assets may be added.



Asset Database – Clean Up

The effort to scrub and update the asset database included adding asset groups not previously identified (tunnel dampers, fare boxes). MARTA is now in the process of a comprehensive assessment using third party assessors to validate asset condition.

% Complete Data in FASuite





Criteria Methodology

Consistent with FTA's State of Good Repair initiative, MARTA used FTA's Condition codes and MARTA's Priority rating system when assessing assets.

Assets were further filtered to exclude inactive assets (salvage, decommissioned etc.). This avoids under or over reporting of SGR assets.





Assessment Criteria

Asset Priority Criteria:

1. Safety Critical
2. Operations Critical
3. Operations Support
4. Operations Expansion
5. Operations Enhancement
- 6. Decommissioned**
- 7. Salvage**

Asset Condition Criteria:

5. Excellent
4. Good
3. Adequate
2. Marginal
1. Poor
0. Failed



Moving toward a more Meaningful Replacement Decision



- In the previous asset database, replacement date was calculated using end of estimated useful life (EUL) only.
- Now, replacement date is calculated using EUL and asset priority and condition criteria as part of MARTA's SGR program.
- CIP decisions are more meaningful now that priority and condition are part of the replacement calculation.



Sampling Strategy

- Single sampling is performed for each stratified asset category.
- A sample is large enough to be “representative” of the category.
- A sample is right-sized to conserve resources and time.
- Sampling is randomly generated.
- Sample properties are comparable to those of the stratified asset group by equipment type.



Roster of Randomly Selected Samples: Equipment

COUNT	EQ_EQUIP_NO	CLASS_CLASS_MAINT	DESCRIPTION	EUL	ORIGINAL_COST	Condition	IN_SERVICE_DATE	Eq Priority
3	STA-E3	TRK-STA-GRD	STATION; INMAN PARK; DF; E160	50	1200000	3	6/30/1979 0:00	1
10	QDRAVHTHEL26	TRK-TO-BAL-10	SW#26 EL TRK AVONDALE THROAT	15	56895	4	6/30/1979 0:00	1
17	TRK-EY-MR1	TRK-YARD	AVONDALE YARD TRK MR-1	50	1245828	3	6/30/1979 0:00	2
24	QDREYTF3-202	TRK-TO-BAL-8	SWITCH #202 TF3 TRACK; AVONDALE YARD	15	45000	2	6/30/1979 0:00	2
31	BRG-ARIZ-ER	TRK-BRG-BAL	CE170-ARIZONA AVEN; BALLASTED DECK	50	178750	3	6/30/1979 0:00	1
38	BRG-INPK-PED	TRK-BRG-PED	CE160-PEDESTRIAN BRG AT INMAN PARK STA	50	314496	3	6/30/1979 0:00	1
45	STA-E4	TRK-STA-GRD	STATION; CANDLER PARK; BALLAST; E180	50	1200000	3	6/30/1979 0:00	1
52	QDREYTF3-43	TRK-TO-BAL-10	SW#43 TF-3 TRK AVONDALE THROAT	15	56895	3	6/30/1979 0:00	2
59	QDREYRA2-49	TRK-TO-BAL-8	SWITCH #49;RA2 TRACK; AVONDALE YARD	15	45000	3	6/30/1979 0:00	2
66	QDREYRA3-12	TRK-TO-BAL-8	SWITCH #12 RA3 TRACK; AVONDALE YARD	15	4500	3	6/30/1979 0:00	2
73	QDREYSM3-253	TRK-TO-BAL-8	SWITCH #253 SM3 TRACK; AVONDALE YARD	15	45000	3	6/30/1979 0:00	2
80	QDREYRA2-10	TRK-TO-BAL-8	SWITCH #10 RA2 TRACK; AVONDALE YARD	15	45000	3	6/30/1979 0:00	2
87	TRK-EY-TF4	TRK-YARD	TF-4 TRK AVONDALE THROAT	50	1253733	3	6/30/1979 0:00	2
94	TRK-EY-CT11	TRK-YARD	AVONDALE YARD TRK CT-11	50	243474	3	6/30/1979 0:00	2
101	TRK-EY-SL4	TRK-YARD	AVONDALE YARD TRK SL-4	50	1849770	3	6/30/1979 0:00	2
108	TRK-EY-BT5	TRK-YARD	AVONDALE YARD TRK BT-5	50	1519341	3	6/30/1979 0:00	2
115	TRK-EY-SI4	TRK-YARD	AVONDALE YARD TRK SI-4	50	1943049	3	6/30/1979 0:00	2
122	TRK-EY-SM4	TRK-YARD	AVONDALE YARD TRK SM-4	50	1207884	3	6/30/1979 0:00	2
129	TRK-EY-SI2	TRK-YARD	AVONDALE YARD TRK SI-2	50	1609458	3	6/30/1979 0:00	2
136	BRG-MORE-EL	TRK-BRG-BAL	CE170-MORELAND AVE. BRG; BALLASTED DECK	50	434320	4	6/30/1979 0:00	1
143	QDREYTF2-34	TRK-TO-BAL-10	SW#34 TF-2 TRK AVONDALE THROAT	15	56895	4	6/30/1979 0:00	2
150	QDREYSI2-46	TRK-TO-BAL-8	SWITCH #46 SI2 TRACK; AVONDALE YARD	15	45000	4	6/30/1979 0:00	2
157	TUN-ASHBY-W	TRK-TUN-DF	W370 TUNNEL; ASHBY PORTAL; DF	50	25472920	3	12/22/1979 0:00	1
164	BRG-HOTB-WR-WL	TRK-BRG-DF	CW565-HIGHTOWER TURNBACK AERIAL; DF	50	2343000	3	12/22/1979 0:00	2
171	STA-W4	TRK-STA-GRD	STATION; WEST LAKE; DF; CW530	50	1200000	3	12/22/1979 0:00	1
178	BRG-W2-PED	TRK-BRG-PED	CW160/165 OMNI PEDESTRIAN BRIDGE	50	186667	4	12/22/1979 0:00	1
185	STA-N2	TRK-STA-GRD	CN-145 CIVIC CENTER STATION; DF	50	1500000	3	12/4/1981 0:00	1
192	TUN-PTRE-N	TRK-TUN-DF	N130 ROCK TUNNEL; DF N. OF P-TREE	50	8113040	3	12/4/1981 0:00	1
199	QDRGARX53	TRK-TO-DF-10	SW#53 X TRK INTERLINE CONNECTOR S105	15	56895	4	12/4/1981 0:00	1



Assessment Approach

Once the assets for analysis are determined:

- Develop schedule for completion.
- Conduct physical assessment of each selected asset/component using teams of MARTA subject matter experts and independent consultants.
 - Review preventive maintenance procedures, records and data.
 - Conduct on-site inspection of each asset selected for sampling and determine current condition.
 - Record condition assessment results manually or by using electronic data capture “tablets”.
- Resolve any condition rating or priority discrepancies.





Tunnel Fan Assessment Schedule (for example)

Station	Date	# of Fans	Emergency Fans	Mid Tunnel Fans	Total Fans	
Five Points	Wed 29th June	6	2	4	8	Dilip Shah, Rolando Gallardo, Charles Baker
Omni	Wed 29th June	2		2		
Vine City	Thurs 30th June	5	3	2	8	Dilip Shah, Rolando Gallardo, Charles Baker
Kensington	Thurs 30th June	3	3			
Decatur	Fri 1st July	6	4	2	6	Dilip Shah, Charles Baker
Ashby	Tues 5th July	7	3	4	7	Rolando Gallardo, Charles Baker
Garnett	Wed 6th July	4	2	2	8	Rolando Gallardo, David Plotkin, Charles Baker
Peachtree Center	Wed 6th July	4	4			
Civic Center	Wed 6 July & Thurs 7th July	6	4	2	6	Rolando Gallardo, David Plotkin, Charles Baker
North Avenue	Thurs 7th July & Friday 8th July	6	4	2	6	Rolando Gallardo, David Plotkin, Charles Baker
Midtown	Friday 8th July & Mon 11th July	6	4	2	6	Rolando Gallardo, David Plotkin, Charles Baker
Art Center	Mon 11th July & Tues 12th July	8	6	2	8	Rolando Gallardo, David Plotkin, Charles Baker
Medical Center	Tues 12th July	3	3		3	Rolando Gallardo, David Plotkin, Charles Baker
Sandy Springs	Tues 12th July & Wed 13th July	8	8		8	Rolando Gallardo, David Plotkin, Charles Baker
North Springs	Wed 13th July	4	4		4	Rolando Gallardo, David Plotkin, Charles Baker
East Lake	Wed 13th July & Thurs 14th July	2	2		2	Rolando Gallardo, David Plotkin, Charles Baker
Ashby - EM # 5	Thurs 14th July	1	1		1	Rolando Gallardo, David Plotkin, Charles Baker
Midtown - MT Fans 19 & 20	Thurs 14th/Fri 15th July	2		2	2	Charles Baker

I would like to see if we can speed up the schedule a bit by running the fan assessments in a straight line from South to North, starting at Garnett and running up the line. Looking at the new schedule one can see that some locations have multiple days assigned to them. The first of the two days is assigned so if we have time we can get some of the fans in that location assessed instead of waiting until the next day. Then we will need drawings for all locations assigned for that day so if we do have time we can move on to the next location.

Station drawings needed on days:

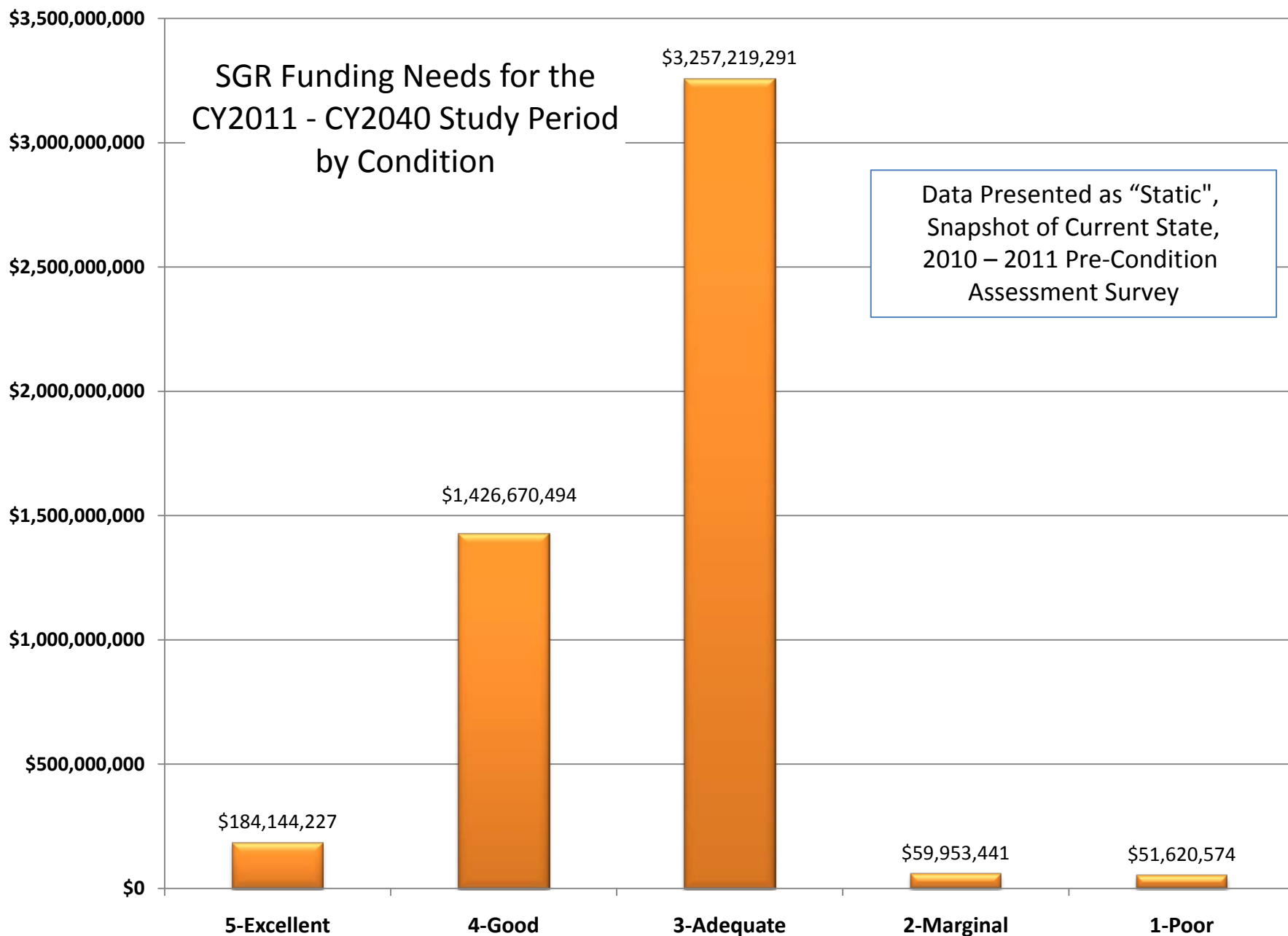
Medical Center, Sandy
Tues 12th July Springs
Wed 13th July Sandy Springs, North Springs, East Lake
Thurs 14th July East Lake, Ashby EM # 5
Fri 15th July Midtunnel Fans 19 & 20 @ Midtown



Preliminary SGR Analysis

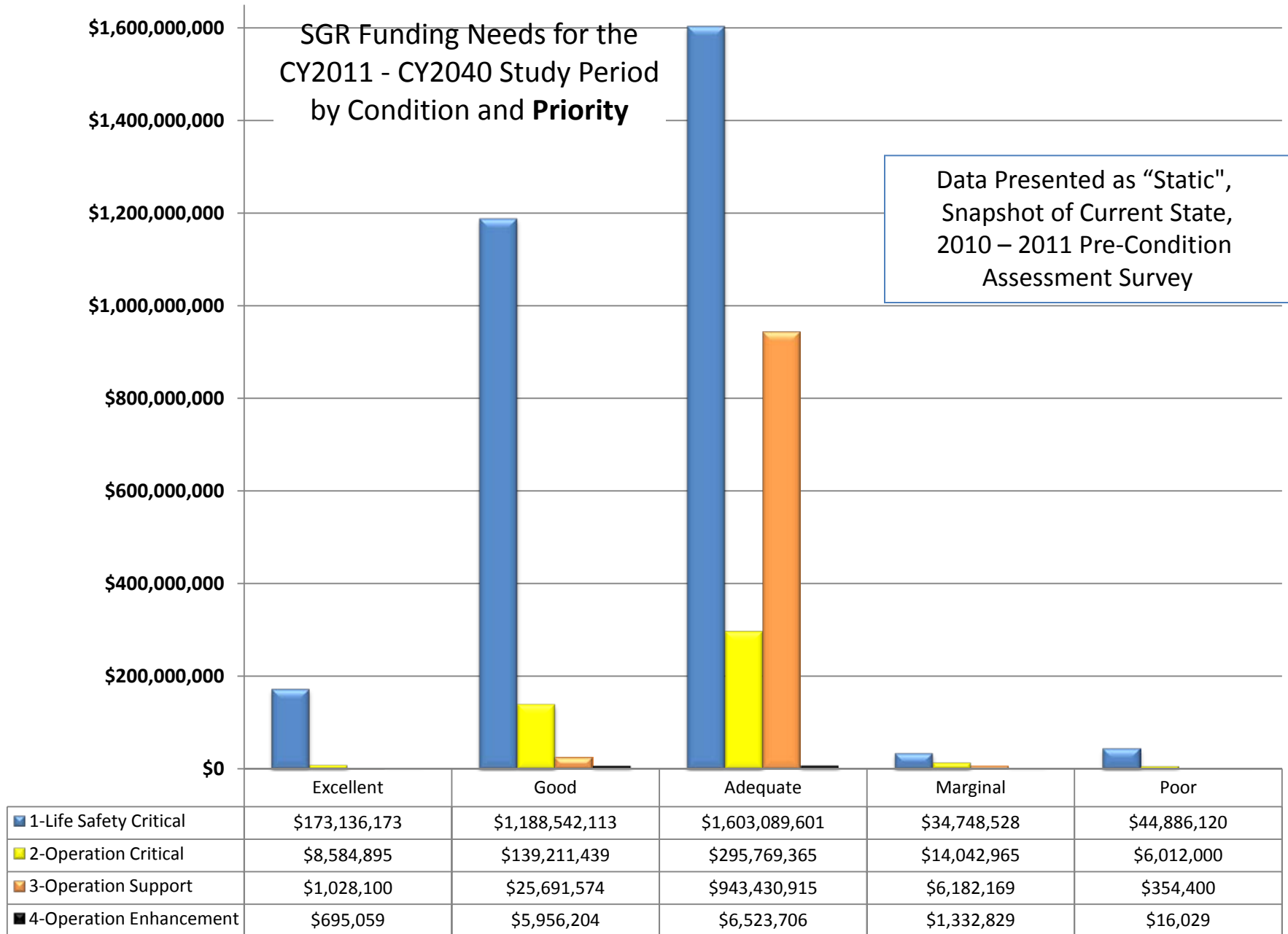
Calculated MARTA's SGR using the following parameters:

- **Percent** Backlog/Non-Backlog by **Condition** Code by Estimated Replacement Date
- **Dollar** Backlog/Non-Backlog by **Condition** Code by Estimated Replacement Date
- **Percent** Backlog/Non-Backlog by **Priority** Code by Estimated Replacement Date
- **Dollar** Backlog/Non-Backlog by **Priority** Code by Estimated Replacement Date



SGR Funding Needs for the CY2011 - CY2040 Study Period by Condition and **Priority**

Data Presented as "Static",
Snapshot of Current State,
2010 – 2011 Pre-Condition
Assessment Survey





Asset Analysis Tools





Assessment of Analysis Tools in Use

Enterprise Asset Management (EAM) System provides the ability to collect asset information but we still have some shortfalls:

- Software tools to update, sort, group, filter and create reports from the condition database.
- Ability to obtain preliminary cost and funding data information directly from the EAM database.
- Life cycle costing and the ability to perform “what-if” scenarios to develop sensitivity analysis to identify how asset life impacts the CIP.
- A MARTA-wide set of decision tools for prioritizing projects.



Asset Project and Beyond

Realized that we needed to supplement the current EAM system.

- Partnership with software provider, AssetWORKS, to develop a capital asset planning module.



- In talks with vendors and evaluating capital project prioritization software.

As a result of these two initiatives, we will now be able to electronically link the EAM asset information to the CIP.



What Are the Right Technology Tools?

- Consider multi-stakeholders, multi-criteria and multi-priorities.
- Marry strategic plan and objectives with potential projects.
- Integrate the asset management and financial systems.
- Institute comprehensive performance tracking.

Project delivery and controls assures cross-departmental coordination.

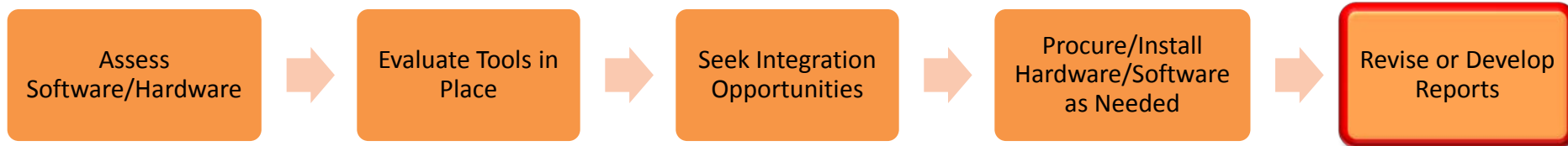




Hardware/Software Procurement

Approach:

- Specify detailed asset management and SGR requirements in your procurement documents.
 - Cost
 - Size
 - Application
 - Upkeep
 - Maintenance
- Determine stakeholder requirements/requirements matrix.
- Build realistic time into your schedule to allow for procurement (capacity).
- Account for the Board Approval Process; it can be a show stopper.
- Project delivery and controls during implementation phase.



Report Development and Revision

Assets can be reported on by:

- Physical Location (Ashby Station)
- Description (Mid Tunnel Fan #6, West Line Track)
- Asset Category (Electrical Power & Equipment)
- Asset Type (Linear)
- Equipment Type (Fan)
- Estimated Useful Life (25 years)
- Life Cycle Status/Priority (1-Life Safety Critical)
- Condition Code (4-Good)
- Original Cost (\$50,000)
- In Service Date (12/22/1979)
- Estimated Replacement Date (12/22/2004)

Minimum
Criteria

Sample Report



Equipment Hierarchy by Stored Location

Stored Location ID: PB

Report Date: 7/13/2011

<u>Equipment ID</u>	<u>Asset Cat.</u>	<u>Equipment Type</u>	<u>Level</u>	<u>Asset Type</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model</u>	<u>In Serv. Date</u>	<u>LCS C</u>	<u>Cond. Code</u>	<u>Original Cost</u>	<u>Est. Repl. Date</u>
14128	NON REVENUE	TRUCK-01-M650	1	ASSET	2001 FORD / STERLING ACTERRA M-6500 10 F	STERLING	M650	01/10/2001	3	3	61,238	01/10/2011
14210	NON REVENUE	TRUCK-02-F250	1	ASSET	2002 5.4L EFI F-250 4X2 PICK UP 4 SPEED	FORD	F250	01/09/2002	3	3	18,530	01/09/2012
14222	NON REVENUE	TRUCK-02-F650	1	ASSET	10 FOOT BOX SERVICE TRUCK	FORD	F650	01/01/1992	3	3	59,949	01/01/2002
14666	NON REVENUE	TRUCK-06-F650	1	ASSET	2006 FORD F-650 10 FOOT BOX SERVICE TRUC	FORD	F650	01/26/2006	3	3	70,204	01/26/2016
14828	NON REVENUE	TRUCK-08-F250	1	ASSET	5.4L V8 P/U AUTOMATIC 5 SPD	FORD	F250	02/12/2008	3	3	15,365	02/12/2018
15835	NON REVENUE	VAN-08-E150	1	ASSET	8 PASS VAN E150 4.6 EFI V8 ENG 2008 FORD	FORD	E150	01/03/2008	3	3	16,162	01/03/2018
18701	NON REVENUE	TRUCK-07-F450	1	ASSET	2007 FORD F450 STAKEBODY	FORD	F450	03/02/2007	3	3	35,348	03/02/2017
2175	BUS	OR-G40-04-2100	1	ASSET	2004 ORION COMPRESSED NATURAL GAS 40 FOO	ORION	1177C	10/04/2004	1	5	285,900	10/04/2016
CS-B-2175	COM	COM-SYS-BUS	2	COMPONE NT	COMMUNICATIONS SYS FOR BUS/LVAN	NA	NA	11/21/2005	3	4	10,699	11/21/2017
1LINE-CR0001943	COM	AVL-SIGN-INT	3	COMPONE NT	AVL-SIGN INTERNAL	TRAPEZE	10T0014-001	05/23/2005	1	4	627	05/23/2020
APC-41274	COM	APC	3	COMPONE NT	AVL-AUTOMATIC PASSENGER COUNTER	TRAPEZE	32T0056-001	05/23/2005	1	4	2,624	05/23/2020



Decision making

- SGR progressing from a project to a program: must fund it, implement it, sustain it.
- Development and refinement of asset management policies, procedures and strategy.
- Provides input to AMP and CIP.



Policies & Procedures

Asset Management touches nearly every major department within a transit Authority.

It is essential that policies and procedures (that support Agency business practices) be put in place prior to implementation and then tested against the operating system.

- Must have agency-wide buy-in to comprehensive asset management policies and procedures.
- Policies and procedures must require full use of the Asset Management System.
- Your system must be able meet the requirements of all stakeholders in order to ensure compliance.

Recommend: Multi-discipline Internal User Group to address issues.



Implementation

Lessons Learned...so far:

Procedures must be comprehensive to expose gaps during system implementation even after extensive “to-be” work sessions.

Trainers must understand both the system and agency business processes so issues can be addressed.

All related disciplines must participate in policy and procedure development with their needs fully communicated and understood.

Agencies must operate in a live environment so the system can be fully tested by the end users and related offices/departments.

Standardization among all users is critical to a successful outcome.



MARTA Asset Management Now and in the Future

2009

No automated links to
Capital Improvement Plan
(CIP)

Limited user training

Lack of operating
procedures

Not all departments using
FASuite

Maintenance driven

Senior management not
involved in the process



2013

Integrated systems with link
to CIP

Detailed user training

Standard operating
procedures across all
MARTA departments

All departments using
FASuite

Asset driven

Senior management
invested in the process



Decision-making Essentials

- **Not a one time thing!!!** It's a process.
- It may start as a project but it will become **your process**.
- Understanding, buy-in & good planning will save endless resources later on.
- Know your assets: **Asset Break Down Structure (ABS)** is critical.

Is information available to jump start the process (reports, data, tools etc.)?

Field inspection is time consuming and costly .

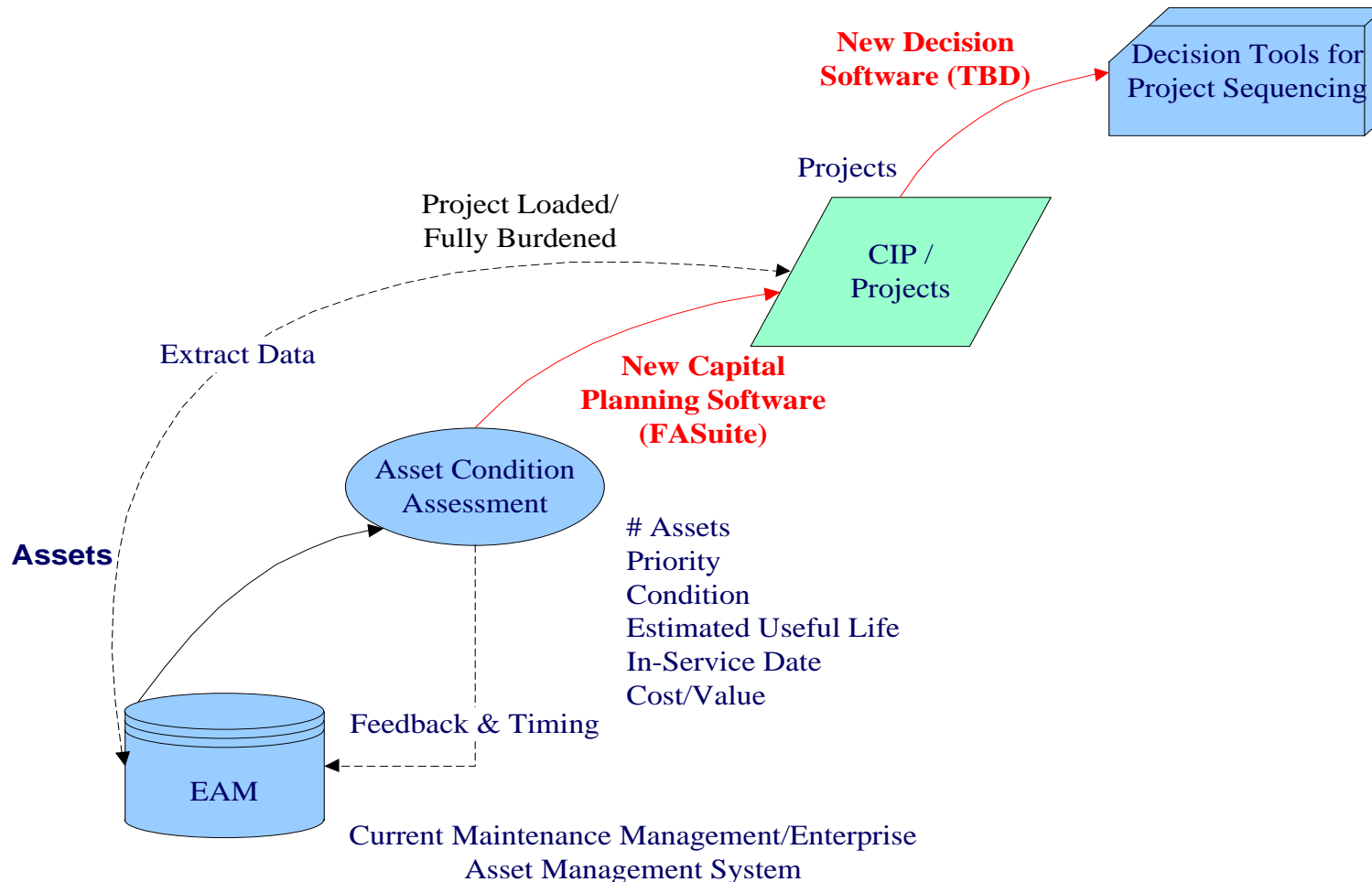
- What level of **granularity** is recommended? It depends...

Know who will use the data and at what reporting level.

- Do I have **standards, processes and procedures** that support collection, analysis, management and use of the data?
- Culture Change (**Authority**: maintenance, operations, engineering, materials, procurement, accounting, finance.... **Contractors & Vendors**)



How Do we Get from Condition Assessment to an Approved and Funded Capital Improvement Plan?





Questions...