

**STRATEGIC ENTERPRISE ARCHITECTURE (EA)
DESIGN AND IMPLEMENTATION PLAN
FOR THE
MONTANA DEPARTMENT OF TRANSPORTATION**

ADDENDUM TO THE EA FINAL REPORT

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STRATEGIC ENTERPRISE ARCHITECTURE (EA) DESIGN AND IMPLEMENTATION PLAN FOR MDT

ADDENDUM TO THE EA FINAL REPORT

A. INTRODUCTION AND BACKGROUND

Coincident with the creation of the initial draft of the “Strategic Enterprise Architecture (EA) Design and Implementation Plan for the Montana Department of Transportation (MDT)”, published July 2016 and hereafter referred to as the “EA Final Report”, the Governor of the State of Montana signed Executive Order No. 09-2016 in May 2016, titled “Executive Order Implementing the State Information Technology Convergence Plan”. At the time the EA Final Report was being finalized, little was known about the full impact to the overall implementation plan from the state Convergence Project. While the EA Final Report makes mention of the Convergence Project as a potential risk to the implementation plan, this addendum addresses the specific impacts to the Strategic EA Implementation Plan now that the MDT Information Services Division (ISD) has had the opportunity to assess the scope and impact of the governor’s executive order. Enterprise Architecture (EA) strategic plans require monitoring, refinement, and tuning as time passes, as well as changes from internal and external conditions. This addendum also takes the opportunity to address those areas affected by these factors as well. An updated Strategic EA Implementation Plan, along with revisions to the associated cost estimates, are also presented in this addendum.

The governor’s executive order requires the Montana Department of Administration (DOA) State Information Technology Services Division (SITSD) implement an information technology convergence plan designed to serve two (2) primary purposes:

- Migrate information technology assets into a consolidated enterprise infrastructure;
and
- Utilize enterprise systems, including but not limited to enterprise content management, directory services, email, telecommunications, and state data centers.

This project is referred to as the “Convergence Project” by MDT staff and the phrase will be used throughout this addendum. In early June of 2016, MDT staff from the Information Services Division (ISD) began planning the actions required of MDT resources and the assignment of project management staff to begin these project efforts. In support of the Convergence Project, MDT is required to migrate its information technology assets to the state enterprise infrastructure no later than December 31, 2017. These information technology assets are defined by DOA/SITSD as “the hardware and software associated with enterprise servers and storage”. Implementation of the Convergence Project will result in migration of the Montana Department of Transportation (MDT) information technology assets to the state’s enterprise infrastructure and may additionally result in different directions being taken regarding enterprise system business decisions.

B. IT CONVERGENCE PROJECT IMPACT ON THE STRATEGIC EA IMPLEMENTATION PLAN

The Convergence Project scope includes the following three (3) main activities, which extend over all of 2017 and into the 2018 calendar year:

- Transfer MDT Information Technology assets to DOA/SITSD:
 - MDT will transfer servers and storage to DOA/SITSD, including more than 500 virtual and physical servers and more than 850 TB of storage media; the transfer of servers and storage is targeted to begin June 2017.

- Collapse MDTHQ into the State AD domain:
 - MDT will collapse the existing MDTHQ Active Directory domain into the state’s Active Directory domain; planning for this is targeted to begin in December 2017.

- Establish Email Archive:

- MDT will add the archive service to Exchange email for all MDT staff and provide MDT staff with training to ensure an effective use of the Archive Inbox; implementation of the archive service is targeted for July 2017.

While it may appear that the tasks needed to be accomplished are largely infrastructure related, numerous applications programs, databases, webpages, and other similar items will require modifications as well. Unfortunately, many of these changes are required because the current MDTHQ domain names and accompanying structure were hardcoded into these programs. Further complicating the necessary revisions is the fact that the state’s target environment will be using a different structure, as DOA/SITSD does not intend to replicate the current MDT directory structures. DOA/SITSD plans to redesign them, thus requiring more communication and potentially more extensive coding revisions. As a result, not only will MDT IT infrastructure resources be tasked with Convergence Project activities, this means applications development staff will also be involved. Data migration challenges may also occur that will necessitate resources from both infrastructure and applications to resolve, as well as the need for MDT resources to work closely with DOA/SITSD resources.

Table 1 provides an overview of the current status of each recommendation found in the EA Final Report. For ease of reference, the prefix found on each entry (e.g., “E.1”) refers to the section in the EA Final Report where the original recommendation details can be found.

C. MDT CIVIL INTEGRATED MANAGEMENT IMPLEMENTATION PLAN

During the fact gathering and validation phases of the EA Project (July 2015 through June 2016), an eConstruction vision was being formed by MDT. As this area was understood by MDT at the time, the state of that vision was captured in the EA Final Report. These were primarily reflected in the EA Recommendations “Reengineer As-Built Process (AA-6)” and “Establish and Implement Design Model Strategy (AA-7)”. In the time since the EA Final Report was completed, MDT completed development of this vision and termed it MDT “Civil Integrated Management” (CIM).

Civil Integrated Management (CIM) encompasses the technologies and processes that facilitate the transition from traditional construction project delivery and facility management (that is, 2-dimensional paper plans and specifications) to digital project delivery and asset management. Transitioning to CIM requires highly accurate advanced survey methods, intelligent model-based design, digital project delivery, and a digital database for asset management.

C.1 INTELLIGENT MODELS

Intelligent Models require high accuracy surveys, allowing design to develop 3-D models that not only allow stakeholders to more clearly visualize these projects, they also allow the design team to more easily identify potential design issues and conflicts earlier in the design process. Ultimately, it is intended that these Intelligent Models will become a key part of the binding contract for project construction, and the constructed 3-D model will be included in the MDT asset management system.

C.2 3-DIMENSIONAL MODELS

Construction Engineering will incorporate these 3-D models into their staking, quality assurance, and measurements, with the constructed 3-D model becoming the “Model of Record” for future projects and the asset inventory. Maintenance will also have access to this “Model of Record” for use during incident management, system impact reviews, and for inclusion in their asset management system.

C.3 ROADWAY PLANNING

Planning will have detailed information on roadway geometrics, plant mix, and surfacing depths; signing; culvert and guardrail lengths; detailed drainage information; etc., for inclusion in corridor studies, system impact reviews, environmental assessments, and P3 funding allocation decision making.

C.4 CIM IMPLEMENTATION PLANS

The Civil Integrated Management target implementation date is January 2022. Pilot 3-D design projects were initiated in 2016, and the target January 2022 target provides the DOT with five (5) years to fully integrate CIM into its daily business processes. The implementation requires significant technology advances to be implemented over these five (5) years, with phased implementations of these technology advances to be rolled out over this period.

The introduction of increasingly modern survey technologies (such as the expanded use of LIDAR), will impose higher demands on data storage requirements, network bandwidth, and require the introduction of standardized data formats. The ability to use Intelligent Models as a binding contract will require research to support, in addition to the ability to utilize digital signatures. Last, but not least, the implementation of CIM will be dependent on the successful implementation of the MDT CADD Data Management System (CDMS), noted in EA Recommendation AA-2.

TABLE 1: CURRENT STATUS ON RECOMMENDED PROJECT IN THE STRATEGIC EA IMPLEMENTATION PLAN

Recommendation	Current Status	Assumed Impact to Original Implementation Plan
E.1 APPLICATIONS ARCHITECTURE		
E.1.1 Applications Architecture — Transportation Project Delivery		
E.1.1.1 Implement Next Generation PPMS (AA-1)	<ul style="list-style-type: none"> Requirements for PPMS being developed by MDT staff (after original contractor for effort was released) Actual implementation date unknown pending completion of RFP and vendor selection 	<ul style="list-style-type: none"> Durations for Requirements Definition and RFP creation and vendor selection extended Implementation moved 6 months into future
E.1.1.2 Implement Next Generation TIS/LRS & Roadway Inventory (AA-3)	<ul style="list-style-type: none"> RFP for TIS/LRS replacement product (TRIS) in development Presently targeting vendor award for RFP in mid-2017 with implementation based on implementer's project plan 	<ul style="list-style-type: none"> Durations for Requirements Definition and RFP creation and vendor selection extended due to current status
E.1.1.3 Implement ROW, Utilities Relocation, and Outdoor Advertising system (AA-4, AA-15)	<ul style="list-style-type: none"> Received grant for Utilities resulting in reprioritization of project phases Phase reordering is now Utilities, Outdoor Advertising, and Right-of-Way Outdoor Advertising – Waiting on AASHTOWare™ release expected in 6-12 month timeframe; MDT considering utilizing as a SaaS solution 	<ul style="list-style-type: none"> Utilities project initiated earlier than original EA Implementation Plan based on priority change and grant funding
E.1.1.4 Extend Planisware® to support resource management (AA-5)	<ul style="list-style-type: none"> No change from original EA Implementation Plan STIC Grant funding obtained allowing project to proceed according to original EA plan 	<ul style="list-style-type: none"> Assumed no impact to original EA Implementation Plan
E.1.1.5 Reengineer As-Built Process (AA-6)	<ul style="list-style-type: none"> Civil Integrated Management (CIM) vision developed No change from original EA Implementation Plan 	<ul style="list-style-type: none"> Assumed no impact to original EA Implementation Plan
E.1.1.6 Establish and Implement Design Model Strategy (AA-7)	<ul style="list-style-type: none"> Civil Integrated Management (CIM) vision developed Bentley Open Roads expected to be in full use by April 2017 for new projects 	<ul style="list-style-type: none"> Project extended additional 18 months to reflect current Civil Integrated Management (CIM) Vision described on page 5
E.1.1.7 Implement AASHTOWare™ Project Construction & Materials (AA-8, AA-9)	<ul style="list-style-type: none"> Project Planning underway MDT considering SaaS deployment 	<ul style="list-style-type: none"> Assumed no impact to original EA Implementation Plan
E.1.2 Applications Architecture — Maintenance and Asset Management		
E.1.2.1 Define Enterprise Asset Management Strategy (AA-10)	<ul style="list-style-type: none"> Project needs Project Manager to be assigned (resource constrained due to Convergence Project initiative) and sponsorship Asset Management strategy, governance, data warehouse not initiated MMS maintenance centric ancillary assets implemented as part of MMS (AA-13) 	<ul style="list-style-type: none"> Project moved 12 months into future

Recommendation	Current Status	Assumed Impact to Original Implementation Plan
E.1.2.2 Extend SIMS functionality (AA-11)	<ul style="list-style-type: none"> Not planned for initiation until FY2019 (per original EA Implementation Plan) 	<ul style="list-style-type: none"> Assumed no impact to original EA Implementation Plan
E.1.2.3 Implement Modeling and Analytics for Structures (AA-12)	<ul style="list-style-type: none"> Not planned for initiation until mid-FY2018 (per original EA Implementation Plan) RFI released January 2017 	<ul style="list-style-type: none"> Assumed no impact to original EA Implementation Plan
E.1.2.4 Extend MMS to handle ancillary assets (AA-13)	<ul style="list-style-type: none"> Agile Assets MMS project nearing completion and deployment date UAT started with an anticipated go live on or before mid-2017 Extending MMS to handle ancillary assets will be accomplished when MMS goes live, thus fulfilling AA-13 requirement 	<ul style="list-style-type: none"> No longer required as completion of MMS Implementation fulfills requirement
E.1.3 Applications Architecture — Transportation Operations Management		
E.1.3.1 Implement new COTS Traveler Information System (AA-14)	<ul style="list-style-type: none"> Original project initiation scheduled for beginning of FY2018 (per original EA Implementation Plan) 	<ul style="list-style-type: none"> Project moved 6 months into future based on other impacts
E.1.3.2 Continue SmartCOP enhancements (AA-16)	<ul style="list-style-type: none"> Priority of project lowered 	<ul style="list-style-type: none"> Project moved 12 months into future
E.1.3.3 Implement ePart Enhancements (AA-24)	<ul style="list-style-type: none"> ePart implementation completed in 2016 Recommended enhancements not yet started 	<ul style="list-style-type: none"> Assume enhancements phase delayed ~9 months
Multi-Modal and Grants Management		
E.1.3.4 Implement Enterprise Grants Management Solution (AA-18)	<ul style="list-style-type: none"> Future project: no action recommended in original EA Implementation Plan until FY2021 	<ul style="list-style-type: none"> Assumed no impact to original EA Implementation Plan
E.1.4 Applications Architecture — Business Support Services		
E.1.4.1 Implement Financial Suite (AA-19)	<ul style="list-style-type: none"> No direct action taken (see E.1.4.2 in this table (below)) 	<ul style="list-style-type: none"> Project moved 6 months into future; scope reduced with intent to redirect resources/focus on E.1.4.2 Implement State's ERP solution as financial system or record (AA-20, AA-21) See E.1.4.2 in this table (below)

Recommendation	Current Status	Assumed Impact to Original Implementation Plan
E.1.4.2 Implement State's ERP solution as financial system of record (AA-20, AA-21)	<ul style="list-style-type: none"> • Impacted by requirement to address federal financial system audit findings to Billing Voucher (BV) application • Billing Voucher (BV) application changes required to address FHWA concerns currently underway and targeted for completion June 2017 • Documenting and identifying business requirements for Billing Voucher, Cost Accounting Record Entry System (CARES), Project Accounting, and ERP implementation • Some early investigatory work has been completed: <ul style="list-style-type: none"> ○ Research conducted on PeopleSoft implementations in Wisconsin and Wyoming to obtain understanding of existing gaps in the Montana DOA PeopleSoft implementation, specifically with respect to MDT or typical DOT requirements ○ This research supplements information and insights provided by eVision Partners and provides MDT with information for future budgetary discussions during legislative session, as might be appropriate to garner support for initiating this project 	<ul style="list-style-type: none"> • Intend to leverage requirements gathered earlier in Billing Voucher (BV) and Financial Suite effort • Project advanced 12 months to leverage the requirements gathered in Billing Voucher (BV) changes to expedite start-up of ERP requirement; initial focus on implementation of PeopleSoft Projects
E.1.4.3 Implement State's ERP for Talent Management and Additional HCM Capabilities (AA-22, AA-23)	<ul style="list-style-type: none"> • Plan to implement Taleo Talent Management solution • Additional HCM Capabilities Future project: no action recommended in original EA Implementation Plan until FY2021 	<ul style="list-style-type: none"> • Talent Management solution implementation anticipated to begin earlier (mid-2018) • Assumed no impact to Additional HCM Capabilities implementation
E.1.4.4 Case Management System (AA-26)	<ul style="list-style-type: none"> • In original EA Implementation schedule this was a FY2019 project, however, it has been prioritized to begin 12 months earlier (in FY2018) 	<ul style="list-style-type: none"> • Moved 12 months earlier
E.1.5 Applications Architecture — Cross-Functional		
E.1.5.1 Implement Enterprise Content Management (ECM) (AA-2)	<ul style="list-style-type: none"> • CDMS (CAD Document Management System) requirements completed and ISD/Engineering has reviewed state's enterprise solution (Lexmark Perceptive ECM) <ul style="list-style-type: none"> ○ Issued memo highlighting significant gaps between Perceptive and CDMS requirements ○ MDT requested and obtained approval from DOA/SITSD to procure product to address CDMS requirements ○ Implementation expected to take at least one (1) year • Project is on critical path of MDT Domain collapse to state solution 	<ul style="list-style-type: none"> • Project schedule for CDMS extended to obtain DOA/SITSD approval for exception and for MDT to complete solution procurement, extending original project timeline an estimated 12 months (beginning March 2017) • MDT enterprise content management (ECM) requirements will be met by solution already procured thus eliminating need for RFP and subsequent procurement; therefore, original EA Implementation Schedule and costs reduced accordingly

Recommendation	Current Status	Assumed Impact to Original Implementation Plan
E.1.5.2 Implement Mobile Technology Strategy and Support (AA-17, TA-4)	<ul style="list-style-type: none"> Budget, other business requirements, and Convergence Project initiative have all contributed to delay No action started or anticipated on Mobile Technology, with these noted exceptions: <ul style="list-style-type: none"> MDT continues to deploy new mobile products, such as the Maintenance RAP (Report a Problem) app in the absence of an overall strategy Mobile Device Management (MDM) via enterprise solution poses challenges that will have to be addressed 	<ul style="list-style-type: none"> Development of governance and potential RFP(s) creation extended (assumes additional time needed for collaboration and approvals from DOA/SITSD) Project duration extended 12 months due to delay and to provide necessary time to develop solution(s) within enterprise solution
E.1.5.3 Retire all Oracle Forms Applications (AA-25)	<ul style="list-style-type: none"> Oracle Forms 12c upgrade (from 11g) completed Fall 2016 to support legacy applications while Convergence Project is underway Impact from Convergence Project initiative: Converting Oracle servers from virtual to physical due to licensing restrictions at DOA/SITSD (current EULA (End User License Agreement) does not support use of virtual) Oracle Forms not expected to be fully retired until after Convergence Project is completed (scheduled to begin FY2019 in original EA Implementation Plan) 	<ul style="list-style-type: none"> Assumes no impact to original timeline for retiring all Oracle Forms (originally scheduled to commence FY2019 and end in FY2022) Initial focus on Reports to be followed by Oracle Forms (note that Oracle Reports will no longer be supported after October 2020)
E.2 DATA ARCHITECTURE		
E.2.1 Establish a Data Governance Program (DA-1)	<ul style="list-style-type: none"> Budget, other business requirements, and Convergence Project initiative have all contributed to delay Data Governance not yet initiated MDT recognizes need for Data Governance as prerequisite for a successful Data Warehouse initiative 	<ul style="list-style-type: none"> Project initiation moved 12 months into future
E.2.2 Implement Data Warehouse, BI, and Analytics (DA-2)	<ul style="list-style-type: none"> Budget, other business requirements, and Convergence Project initiative have all contributed to delay Oracle BI (OBIEE) retired January 2017 Tibco's JasperSoft product replaced all OBIEE artifacts at end of December 2016 (i.e., Jasper Reports and Analytics are replacing Oracle BI reports and analytics) Talend ETL product (part of JasperSoft Suite purchase) planned for installation in early 2017 and the existing Data Store being used to support analytic products will be converted from Oracle Recommended Data Warehouse initiative not initiated, impacted by Convergence Project initiative, recognizing the need for Data Governance initiative for success 	<ul style="list-style-type: none"> Project initiation moved 12 months into future Coincides with initiation of Data Governance initiative The use of available tools against existing data stores will continue

Recommendation	Current Status	Assumed Impact to Original Implementation Plan
E.2.3 Define and implement Data Services Strategy (DA-3)	<ul style="list-style-type: none"> Budget, other business requirements, and Convergence Project initiative have all contributed to delay Not initiated 	<ul style="list-style-type: none"> Project initiation moved 12 months into future
E.3 TECHNOLOGY ARCHITECTURE		
E.3.1 Implement Single Sign-on (TA-1)	<ul style="list-style-type: none"> Budget, other business requirements, and Convergence Project initiative have all contributed to delay Not initiated 	<ul style="list-style-type: none"> As originally noted in the EA Final Report, this project would require collaboration with DOA/SITSD; therefore, it would be logical to pick up once the DOA/SITSD Convergence Project initiative has been completed Project initiation moved 12 months into future
E.3.2 Define and implement Disaster Recovery Planning (DRP) and Strategy (TA-2)	<ul style="list-style-type: none"> Budget, other business requirements, and Convergence Project initiative have all contributed to delay Not initiated 	<ul style="list-style-type: none"> DRP responsibilities change with completion of the Convergence Project initiative, however, MDT will still need to collaborate with DOA/SITSD to develop a viable DRP Project initiation moved 12 months into future
E.3.3 Develop Cloud Strategy (TA-3)	<ul style="list-style-type: none"> Budget, other business requirements, and Convergence Project initiative have all contributed to delay Not initiated 	<ul style="list-style-type: none"> Project initiation moved 12 months into future ISD will continue to assess with business units on a case-by-case basis

Recommendation	Current Status	Assumed Impact to Original Implementation Plan
E.4 TECHNOLOGY GOVERNANCE		
E.4.1 Establish Technology Governance (IT-1)	<ul style="list-style-type: none"> • Budget, other business requirements, and Convergence Project initiative have all contributed to delay • Not initiated 	<ul style="list-style-type: none"> • Project initiation moved 12 months into future
E.4.2 Establish Agency Technology Procurement Policy (IT-2)	<ul style="list-style-type: none"> • Budget, other business requirements, and Convergence Project initiative have all contributed to delay • Not initiated 	<ul style="list-style-type: none"> • Project initiation moved 12 months into future
E.4.3 Establish Strategy and Framework for Effective Use of IT Resources (IT-3)	<ul style="list-style-type: none"> • Budget, other business requirements, and Convergence Project initiative have all contributed to delay • Not initiated 	<ul style="list-style-type: none"> • Project initiation moved 12 months into future
E.4.4 Establish Consistent Use of IT standards and Polices (IT-4)	<ul style="list-style-type: none"> • Budget, other business requirements, and Convergence Project initiative have all contributed to delay • Not initiated 	<ul style="list-style-type: none"> • Project initiation moved 12 months into future
E.4.5 Establish Effective IT Contract Services Capabilities (IT-5)	<ul style="list-style-type: none"> • Budget, other business requirements, and Convergence Project initiative have all contributed to delay • Not initiated 	<ul style="list-style-type: none"> • Project initiation moved 12 months into future

D. REVISED STRATEGIC EA IMPLEMENTATION PLAN FOR RECOMMENDATIONS

This section of the addendum provides an overview of the revised plan for implementing the MDT Enterprise Architecture program recommendations and prioritization and order of magnitude cost estimates for each recommendation.

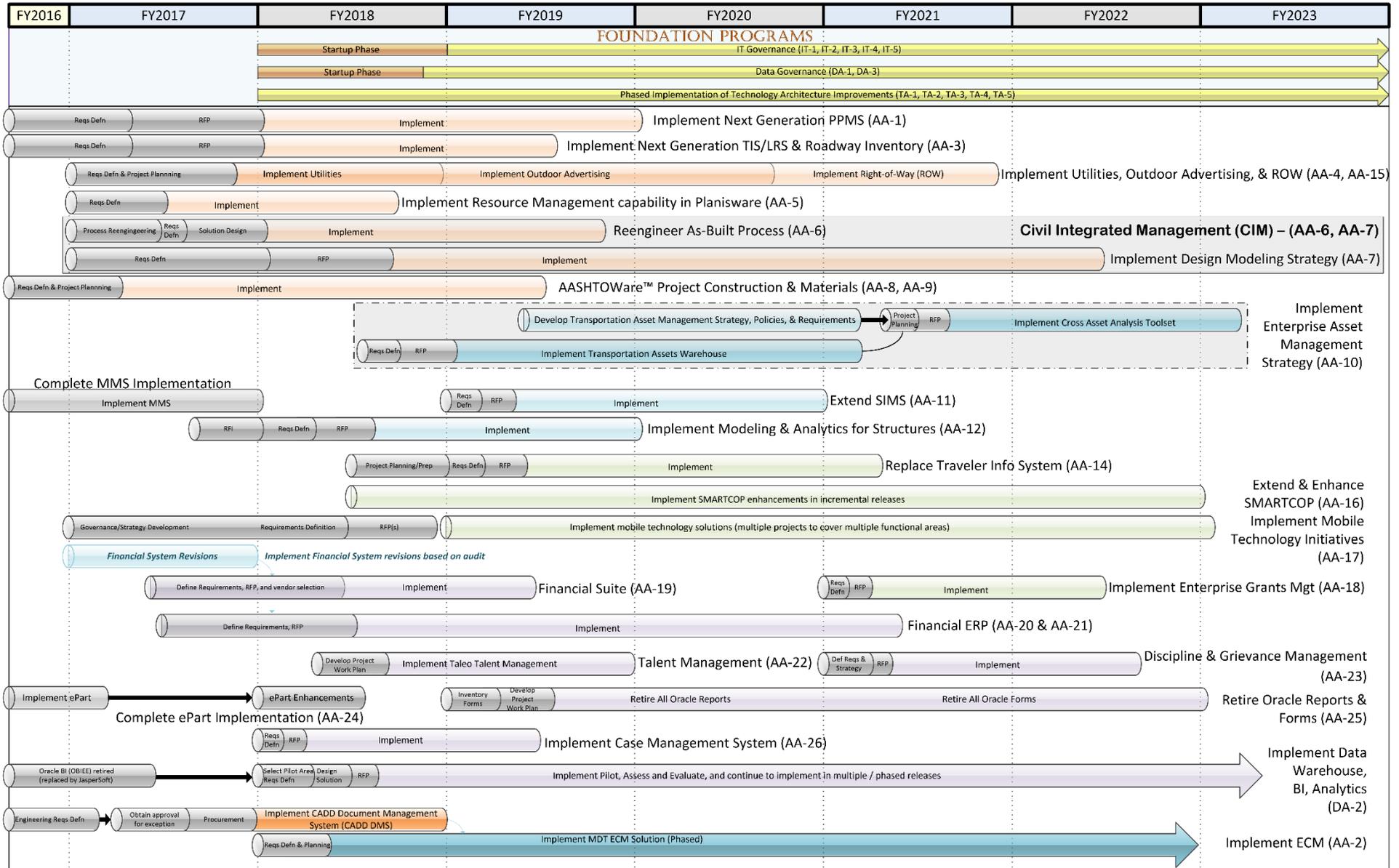
Please refer to the EA Final Report for the original complementary material:

- Proposed work plans for implementation of recommendations;
- Anticipated benefits from the implementation of the Enterprise Architecture program recommendations;
- Risk Management Plan; and an
- Organizational Change Management Strategy to guide implementation activities.

D.1 HIGH-LEVEL OVERVIEW OF IMPLEMENTATION SCHEDULE AND WORK PLANS

Based on the relative prioritization of each recommendation, as well as complexity, associated costs and implementation risks, the eVision Partners team developed a multi-year implementation plan for the MDT Enterprise Architecture program. This multi-year implementation plan is shown in Figure 1 on the following page.

MDT HIGH-LEVEL EA STRATEGIC PLAN IMPLEMENTATION



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FIGURE 1: MDT HIGH-LEVEL ENTERPRISE ARCHITECTURE IMPLEMENTATION PLAN (REVISED)

D.2 PRIORITIZATION AND COST ESTIMATES FOR RECOMMENDATIONS

Figure 2 provides the revised priority and order of magnitude cost estimates for each proposed recommendation in the Enterprise Architecture (EA) program:

- These cost estimates were prepared based on eVision’s experience with similar projects in other states and/or based on the cost of recent initiatives similar in size and scope from other states. These costs shown demonstrate projected annual spend patterns for each recommendation. These cost estimates are intended only for high-level program level planning and preliminary budgeting purposes only. Each recommendation (or project) should go through appropriate project sizing, scoping, and screening during which more detailed cost estimates would be developed.
- The priorities are based both on the anticipated business value to MDT of the recommendation and the relative priority of the recommendation in terms of their respective role as a building block in the execution of the Enterprise Architecture program. As an example, IT Governance is a key foundational element that needs to be in place to successfully execute many of the other recommendations, and therefore has a very high priority for implementation.

ID	Desc	Estimated Costs	FY2017		FY2018		FY2019		FY2020		FY2021		FY2022		FY2023		Sub-Totals		Total	Internal Labor	
			Fed/Other	MDT	Fed/Other	MDT	Fed/Other	MDT	Fed/Other	MDT	Fed/Other	MDT	Fed/Other	MDT	Fed/Other	MDT	Fed/Other	MDT			
Transportation Project Delivery																					
AA-1	PPMS		\$450,000	\$50,000	\$3,600,000	\$400,000	\$450,000	\$50,000									\$4,500,000	\$500,000	\$5,000,000	\$712,500	
AA-3	TIS/LRS	\$1m - \$2m	\$180,000	\$20,000	\$1,260,000	\$140,000	\$360,000	\$40,000									\$1,800,000	\$200,000	\$2,000,000	\$190,000	
AA-4	ROW	\$1.5m	\$80,000	\$20,000	\$240,000	\$60,000			\$240,000	\$600,000	\$208,000	\$52,000					\$768,000	\$732,000	\$1,500,000	\$285,000	
AA-5	Planisware®	\$1m	\$320,000	\$80,000	\$480,000	\$120,000											\$800,000	\$200,000	\$1,000,000	\$47,500	
AA-6	As-Built	\$2m	\$180,000	\$40,000	\$920,000	\$230,000	\$520,000	\$130,000									\$1,600,000	\$400,000	\$2,000,000	\$142,500	
AA-7	Design Modeling	\$3m	\$100,000	\$25,000	\$400,000	\$100,000	\$800,000	\$200,000	\$600,000	\$150,000	\$320,000	\$80,000	\$180,000	\$45,000			\$2,400,000	\$600,000	\$3,000,000	\$190,000	
AA-8, AA-9	AASHTOWare™	\$1m	\$400,000	\$100,000	\$320,000	\$80,000	\$80,000	\$20,000									\$800,000	\$200,000	\$1,000,000	\$1,000,000	
Maintenance and Asset Management																					
AA-10	EAM	\$2.5m Transportation Asset Whse plus \$.25 Asset Analysis Toolset			\$180,000	\$20,000	\$990,000	\$110,000	\$1,170,000	\$130,000	\$1,125,000	\$125,000	\$1,035,000	\$115,000				\$4,500,000	\$500,000	\$5,000,000	\$500,000
AA-11	SIMS	\$1.5m				\$800,000	\$150,000	\$600,000	\$150,000								\$1,200,000	\$300,000	\$1,500,000	\$190,000	
AA-12	Structures	\$2m		\$100,000		\$600,000		\$1,300,000									\$0	\$2,000,000	\$2,000,000	\$200,000	
Transportation Operations Management																					
AA-14	Traveler System	\$1.2m			\$400,000		\$400,000		\$400,000								\$0	\$1,200,000	\$1,200,000	\$570,000	
AA-15	Outdoor Adv	\$500K (over 2 years)			\$250,000		\$250,000										\$0	\$500,000	\$500,000	\$95,000	
AA-16	SMARTCOP	\$2m		\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000				\$1,000,000	\$1,000,000	\$2,000,000	\$475,000	
AA-24	ePart	\$710K			\$710,000												\$0	\$710,000	\$710,000	\$30,000	
Multi-modal and Grants Management																					
AA-18	Grants Mgt	\$1m - \$1.5m									\$675,000		\$825,000				\$0	\$1,500,000	\$1,500,000	\$150,000	
Business Support Services																					
AA-19, AA-20, AA-21	ERP - CARES and AP Replacement	\$6.6m			\$400,000		\$700,000		\$3,000,000		\$2,500,000						\$0	\$6,600,000	\$6,600,000	\$990,000	
AA-19, AA-22, AA-23	ERP: Talent, Disc & Grievance Mgt	\$6m - \$8m			\$1,250,000		\$1,250,000				\$1,750,000		\$2,000,000		\$1,750,000		\$0	\$8,000,000	\$8,000,000	\$1,200,000	
AA-26	Case Mgt	\$150K			\$125,000		\$25,000										\$0	\$150,000	\$150,000	\$95,000	
Cross-Functional																					
AA-2	CDMS	\$1m	\$800,000	\$200,000													\$800,000	\$200,000	\$1,000,000	\$500,000	
	ECM	\$1.9m			\$400,000		\$300,000		\$300,000		\$300,000		\$300,000		\$300,000		\$0	\$1,900,000	\$1,900,000	\$950,000	
TA-4, AA-17, TA-5	Mobile	\$1.8m - \$2m	\$50,000	\$50,000	\$175,000	\$175,000	\$175,000	\$175,000	\$175,000	\$175,000	\$275,000	\$275,000	\$150,000	\$150,000			\$1,000,000	\$1,000,000	\$2,000,000	\$600,000	
Information Technology																					
AA-25	Oracle Forms	\$1m		\$0		\$0	\$300,000		\$300,000		\$200,000		\$200,000				\$0	\$1,000,000	\$1,000,000	\$800,000	
DA-1	Data Governance	Startup Consulting Services \$200K 1 FTE Ongoing				\$195,000	\$95,000	\$95,000	\$95,000	\$95,000	\$95,000	\$95,000	\$95,000				\$0	\$670,000	\$670,000	\$470,000	
DA-2	DW	\$3m - \$5m			\$460,000	\$460,000	\$435,000	\$435,000	\$435,000	\$435,000	\$435,000	\$435,000	\$435,000	\$435,000	\$300,000	\$300,000	\$2,500,000	\$2,500,000	\$5,000,000	\$2,550,000	
DA-3	Data Svcs	\$500K (over 2 years)			\$500,000		\$500,000										\$0	\$1,000,000	\$1,000,000	\$1,000,000	
TA-1	Single Sign-on	\$3m			\$400,000		\$400,000		\$400,000		\$800,000		\$800,000		\$600,000		\$0	\$3,000,000	\$3,000,000	\$2,850,000	
TA-2	DRP	1/4 FTE Ongoing plus \$200K support and testing			\$23,750		\$23,750		\$23,750		\$23,750		\$23,750		\$23,750		\$0	\$142,500	\$142,500	\$142,500	
TA-3	Cloud	\$200K Start up Costs 1/4 FTE Ongoing			\$23,750		\$23,750		\$23,750		\$23,750		\$23,750		\$23,750		\$0	\$142,500	\$142,500	\$142,500	
TA-4	Mobile	1/4 FTE Ongoing for Tech Arch aspects			\$23,750		\$23,750		\$23,750		\$23,750		\$23,750		\$23,750		\$0	\$142,500	\$142,500	\$142,500	
TA-5	Collaboration	Included in ECM (AA-24)		\$0		\$0		\$0		\$0		\$0		\$0		\$0	\$0	\$0	\$0	\$0	
IT-1	IT Gov	Startup Consulting Services \$100K 1/2 FTE Ongoing		\$0	\$47,500	\$47,500	\$47,500	\$47,500	\$47,500	\$47,500	\$47,500	\$47,500	\$47,500				\$0	\$285,000	\$285,000	\$185,000	
IT-2	Procurement	Included in IT-1		\$0		\$0		\$0		\$0		\$0		\$0		\$0	\$0	\$0	\$0	\$0	
IT-3	EAM	Included in IT-1		\$0		\$0		\$0		\$0		\$0		\$0		\$0	\$0	\$0	\$0	\$0	
IT-4	Consistency	Included in IT-1		\$0		\$0		\$0		\$0		\$0		\$0		\$0	\$0	\$0	\$0	\$0	
IT-5	Contract Svcs	Contract Services \$175K Annually		\$0	\$175,000		\$175,000		\$175,000		\$175,000		\$175,000		\$175,000		\$0	\$1,050,000	\$1,050,000	\$1,050,000	
TOTALS			\$2,540,000	\$685,000	\$8,235,000	\$7,108,750	\$4,610,000	\$7,323,750	\$3,420,000	\$6,628,750	\$2,563,000	\$7,780,750	\$2,000,000	\$5,458,750	\$300,000	\$3,338,750	\$23,668,000	\$38,324,500	\$38,324,500	\$17,395,000	
			\$3,225,000		\$15,343,750		\$11,933,750		\$10,048,750		\$10,343,750		\$7,458,750		\$3,638,750		\$61,992,500		\$61,992,500		

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FIGURE 2: HIGH-LEVEL COST ESTIMATES FOR RECOMMENDATIONS (REVISED)

E. CLOSING COMMENTS

The same eVision team that prepared the EA Final Report prepared this addendum. The basic recommendations and findings found in the EA Final Report (July 2016) have been updated and revised where appropriate.

All Enterprise Architecture (EA) strategic plans undergo or require constant monitoring, refinement, and tuning as internal and external conditions change. The Convergence Project and the recently defined vision around the Civil Integrated Management (CIM) Project both represent examples of external and internal changing conditions requiring the refinements found in this addendum. That is, CIM introduced subtle refinements to the EA Implementation Plan and the Convergence Project noticeably impacted MDT's ability and capacity to undertake some of the projects shown on the EA Final Report's overall implementation plan in the recommended timeframes. As a result, this addendum presents a revised or updated version of the overall EA implementation plan's timelines, along with revisions to the estimated costs by fiscal year to support development and implementation of each proposed project.

As with the EA Final Report, this addendum presents an Enterprise Architecture implementation plan aligned to MDT's business drivers and strategic initiatives, providing an EA Implementation Plan, supporting the EA Final Report's recommendations by EA layer, benefits, risks, and risk mitigation strategies for the EA.