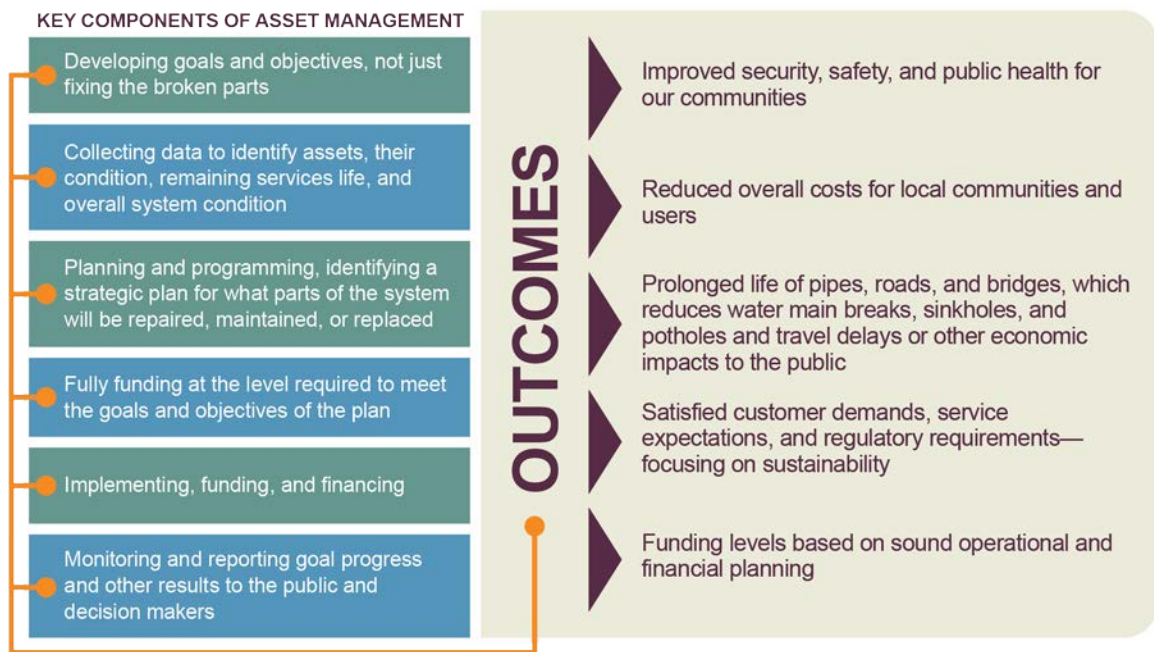


CHAPTER 3.
**Asset Management and Michigan
Infrastructure Council**

Throughout its work, the 21st Century Infrastructure Commission encountered a set of key issues that impact all areas of Michigan’s infrastructure system. This chapter highlights those issues, and two key recommendations to address them.

The first key issue Michigan faces in developing a 21st century infrastructure system is determining how to get more value out of our assets over their entire service life. The best way to accomplish this is through asset management—the practice of identifying and managing infrastructure in a cost-effective and efficient manner based on continuous collection of data (see Exhibit 5).

EXHIBIT 5. Asset Management Model



Asset management involves continually inventorying and assessing infrastructure condition so that planned maintenance can be done, which extends the service life of an asset before it has to be replaced. This makes it more economical to maintain performance. The result is cost savings for local communities and users, satisfaction for customers, and improved security, safety, and public health for our communities. Implemented in a standardized and systematic way across infrastructure types, asset management can improve coordination and increase cost savings even further.

Asset management is not a new concept for Michigan; we have been recognized by the Federal Highway Administration as a national leader in statewide transportation asset management data collection and planning, through the Michigan Transportation Asset Management Council (TAMC), but additional work is needed to make the state a leader in systematic, holistic infrastructure asset management and planning (U.S. DOT FHA 2014).

Communities that utilize effective asset management can attest that identifying strategic investments in preventive maintenance, repair, and rehabilitation of infrastructure assets is much more cost-effective than reconstructing the “worst first”.

The foundation of asset management, and a strong water infrastructure system, begins with inventorying your assets, says Bob Belair, manager of Canton Township’s Department of Public Works. “Data is key. Once you have data, then you can institute asset management.” For nearly 15 years, Canton Township has been collecting data on their water and sewer systems, including the size and material of pipes, valves, hydrants, manhole locations, pump stations, and lift stations. They’ve also scanned in about 70,000 as-built plans for their water and sewer systems, which include specific details of each section of pipe, including age. In addition, Canton Township collects data on when and where water main breaks happen. With all of this information, they were able to design an in-house risk assessment tool for their entire water system that helps with their budgeting and water main replacement program. This risk assessment tool identifies potential impacts to the community of water main breaks, helping to prevent water boil advisories, and maintain pipes to prevent them from breaking.

The second key issue is coordination in the way we plan for and manage infrastructure across and among levels of government, and with private sector entities that build and manage infrastructure. Traditionally, public infrastructure in Michigan has been managed individually by sector. Particularly in the case of water infrastructure, there is limited information regarding the location and condition of mains, lead service lines, and leaks, which complicates investment decisions. Planning and funding cycles for different types of infrastructure are often not coordinated, and public and private infrastructure owners may not be aware of each other’s planning and decision-making processes. This results in the inefficient use of public money. For example, when a road is reconstructed or resurfaced, there is not consistent coordination with water and sewer utilities, gas, electric and communications companies to plan underground projects. As a result, sometimes newly surfaced roads are ripped apart to enhance or repair underground utilities, increasing costs—potentially compromising the integrity of the new road surface and needlessly affecting public travel.

21st Century Vision for Michigan

The 21st Century Infrastructure Commission recommends a two-tiered approach to ensure Michigan is effectively implementing asset management and coordinated planning and investment across infrastructure types and at all levels of government:

First, early in 2017 the State should establish a **regional infrastructure pilot** to identify existing infrastructure data and gaps, determine an appropriate comprehensive database system to house this data, and begin to coordinate amongst asset management data and planning across infrastructure sectors. The regional infrastructure pilot would also operationalize a statewide asset management process and database system across infrastructure types. This pilot should be established through an Executive Order of the Governor. Key State departments, in conjunction with public agencies and private entities, will be responsible for leading and conducting this effort. The scope of this pilot program is to develop a comprehensive asset management database.

Second, by 2018 the Michigan Legislature should establish the **Michigan Infrastructure Council**, a body that coordinates infrastructure-related goals as described below (referred to as “the Council”). The Council, authorized by legislative statute, should have three main functions, with the overarching goal of improving the level of service to the public at the lowest annual cost:

- Leverage the development of the pilot for implementation and maintenance of a common statewide asset management process and database
- Develop a long-term, integrated infrastructure strategy for the state, and communicate relevant project information to decision-making bodies
- Design, oversee, and coordinate the distribution of incentives and funding and financing opportunities, with an eye toward ensuring that funding cycles and processes promote cooperation between asset owners and reward projects that address multiple infrastructure needs with a single project

These two approaches are described below in recommendations 3.1 and 3.2.

3.1 REGIONAL INFRASTRUCTURE PILOT








A regional infrastructure pilot should be immediately established to identify existing data and data needs within the region and an appropriate system to house and analyze this information. The regional infrastructure pilot should also immediately identify critical stakeholders to assist in this process and begin to coordinate asset management across infrastructure sectors. The regional infrastructure pilot should be established through an executive order of the Governor to test and operationalize a statewide asset management database system. Key departments within the executive branch should conduct this effort and serve as the pilot leaders, such as the Governor’s Office, the Michigan Department of Technology, Management and Budget (DTMB), the Michigan Department of Environment Quality (MDEQ), the Michigan Department of Natural Resources (MDNR), the Michigan Department of Transportation (MDOT), and the Michigan Public Service Commission (MPSC). Key stakeholders, including public agencies and private utilities, should also be included in the pilot. The process for establishing the pilot should include, at a minimum, the following steps:

- **Identify pilot region:** The pilot leaders should identify a pilot region (ideally a Michigan Prosperity Region) that is best positioned with a foundation of asset management practices, data collection, and the ability to coordinate amongst infrastructure stakeholders.
- **Leverage and expand the efforts of TAMC:** The initial focus should be on transportation, water, and sewer, and include other asset types as issues surrounding inventorying condition, prioritization, and improved decision making at both the project and system levels, and security are addressed and the best methods for coordinating with private asset owners are identified.
- **Develop database:** The pilot leaders should ensure the chosen software is compatible across asset types and aligns with current asset management efforts that may already be underway across the state. Existing data storage, asset tracking, and reporting tools should be leveraged, such as the TAMC’s Investment Reporting Tool, Michigan Technological University’s Roadsoft database, and the Michigan Geographic Framework repository.
- **Identify and define data elements:** The pilot leaders should identify, define, and inventory existing and needed infrastructure asset data and data elements (condition, material, age, remaining service life, ownership, planned investment, etc.). The database must use a core set of data elements that enable tracking and assessment of investments, management actions, asset status, and desired outcomes. Common data elements and performance measures will allow comparisons across communities and utilities. Pilot leaders should establish partnerships with federal, state, local, and private entities to help leverage geographic information systems (GIS) data and to develop processes to secure information as necessary to protect public health and safety. Database development must ensure balanced attention to the collection, management, integration, analysis of relevant data, and delivery of useful information to decision makers.
 - MDEQ should work with stakeholders to review and assess existing programs and identify best practices of their current sewer and stormwater asset management initiatives during the pilot phase. A summary of their macro data should be provided to the Michigan Infrastructure Council upon establishment to ensure ongoing efforts are compatible with various permits (i.e., Stormwater, Asset Management, and Wastewater [SAW] Program and National Pollutant Discharge Elimination System [NPDES] permits have embedded asset management requirements). New funding for drinking water, sewer, and stormwater asset management plans should integrate with the Michigan Infrastructure Council's goals, policies, and database.
- **Identify database system:** Pilot leaders should identify a database that uses a core set of data elements that enable tracking and assessment of investments, management actions, asset status, and desired outcomes. Database development must ensure balanced attention to the collection, management, integration, analysis of relevant data, and delivery of useful information to decision makers. The database system must allow for the following:
 - Infrastructure condition assessments, identification of investment needs and subsequent plans for the rehabilitation of old assets, and construction of new assets—with a measured goal of improved system ratings toward specific targets—and collaboration among participating entities on all of these activities (online and offline).

- Participation from public and private entities and facilitation among private and public asset holders, without requiring private sector partners to reveal confidential business information.
- A snapshot of the condition of assets and integrated infrastructure planning coordination and adaptive management of assets.

The pilot may also make recommendations as to additional functions a statewide system may benefit from, including analytic and decision-making tools as well as how to provide a user-friendly interface where a snapshot of state, regional, and local system performance can be viewed by the public (see Exhibit 6).

EXHIBIT 6. Example Snapshot of System Performance

Percent of water, sewer and stormwater utilities have asset management plans	
Percent of broadband accessibility	
Percent of roads in good/fair condition	
Number of structurally deficient bridges	
Number of regions achieving full implementation of participation among public entities in planning and coordination.	
Number of fatalities on Michigan roadways	
Average number of power outages per customer	

- **Engage stakeholders and partners:** The pilot should identify key public and private infrastructure stakeholders in the region across water, transportation, energy, and communications infrastructure to help with this pilot. Stakeholder engagement will be critical during development of the database to agree on standards and policies that will allow for effective interoperability across data sets, while maintaining integrity and security of the data. Stakeholders will also be important in coordinating asset management planning across infrastructure sectors.
- **Identify regional structure and incentives:** The pilot should identify an appropriate regional structure and/or authority to plan, analyze, and coordinate infrastructure across assets at the regional level. This information would then be reported up to the Michigan Infrastructure Council for statewide aggregation. The Council would also identify State of Michigan incentives for these regional entities that would lead infrastructure planning and delivery in the region across sectors. Specifically, the regions identified by the pilot should address water and transportation regional planning efforts through the following steps:
 - a. Water:
 - i. Encourage and/or incent regional solutions for water, sewer, and stormwater needs in order to gain economies of scale. As a first step, the MDEQ should engage in the regional water quality planning process outlined in Section 208 of the federal Clean Water Act.
 - ii. Convene discussions with local communities, utilities, State of Michigan agencies, and professional associations to review local infrastructure asset management plans, master land use plans, and capital improvement plans. Support consolidation and reuse of existing infrastructure, ensure that new infrastructure investments are strategic and optimized, and address issues arising from excess capacity or stranded investment.
 - iii. Identify opportunities in communities through local master planning in communities to optimize systems experiencing declines in water usage or sewage output associated with demographic shifts.



b. Transportation:

- i. Identify and work with stakeholders across all modes to complete a comprehensive assessment and determine what transportation infrastructure is needed and the appropriate location to support the industries and communities expected in the future.
- ii. Work with local agencies and transportation stakeholders to identify areas of the state where excess road infrastructure undermines the potential for community success, develop context sensitive solutions to transportation problems, and encourage the use of design solutions that make more effective and beneficial use of the excess road capacity, while respecting and serving the community.
- iii. Work with local agencies to encourage cross-collaboration, particularly smaller jurisdictions that may not have sufficient expertise with context-sensitive solutions for right-sizing, encourage greater coordination between agencies, and provide technical assistance to local agencies seeking solutions that help right-size their infrastructure.



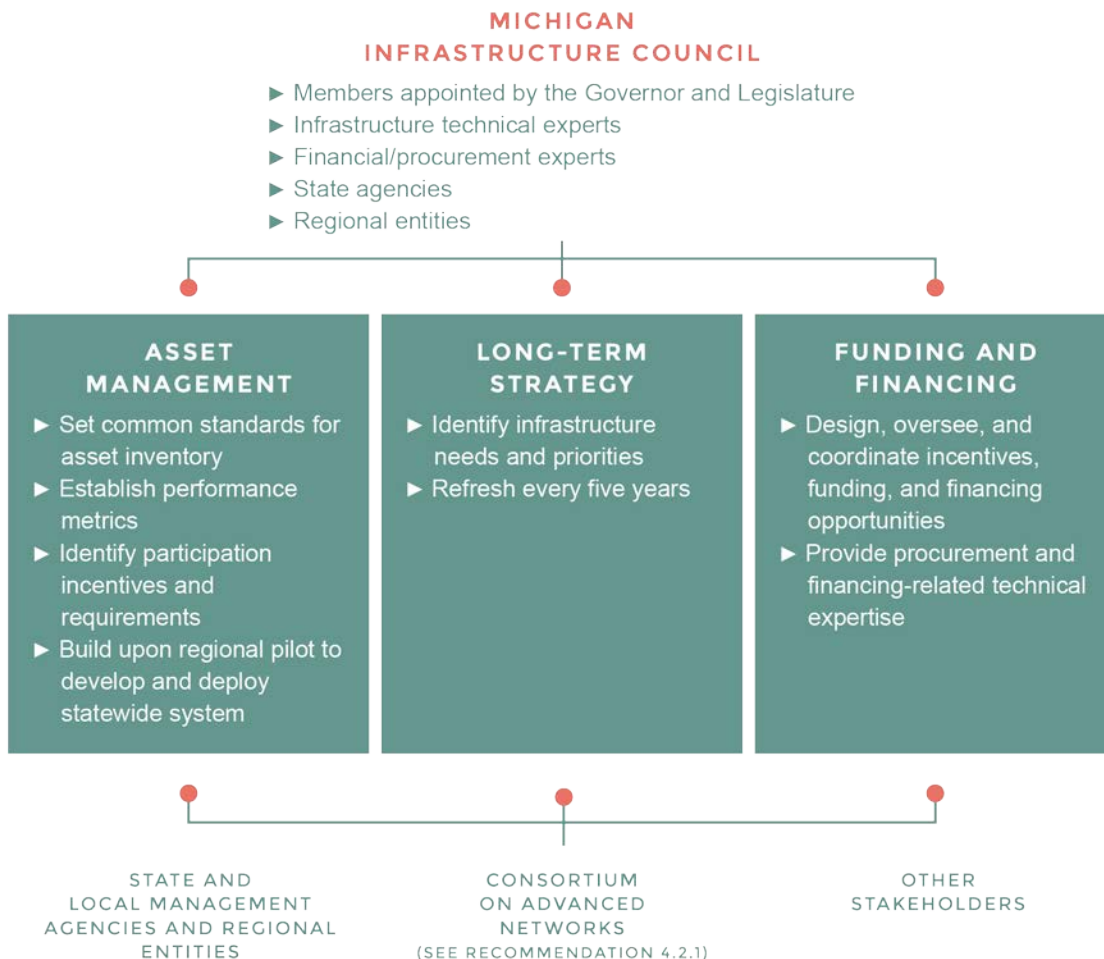
- **Asset management database statewide deployment:** Within one year of the establishment of the pilot, pilot leaders should provide a set of recommendations to the Michigan Legislature, Governor, and Michigan Infrastructure Council (contingent upon establishment by statute) for deployment of a statewide asset management database system and regional structure to plan asset management and direct information statewide. The statewide development and implementation of this database and regional structure should be recommended based upon the successes and lessons learned of the pilot.
- **Funding:** The estimated cost of the pilot program is \$2 million in state funding, which includes the development and completion of the pilot analytics database, initial data collection, and initial training.
- **Staffing:** Key state departments, regional, and local public and private stakeholders will provide staffing support to the pilot program.

3.2 MICHIGAN INFRASTRUCTURE COUNCIL

In order to coordinate and unify efforts to implement comprehensive asset management, the Michigan Legislature should create the Michigan Infrastructure Council. This Council should consist of members appointed by the Governor and the Legislature, including:

- Infrastructure technical experts from the public and private sectors representing transportation, water, energy, and communications
- Financial/procurement experts from public and private sectors
- Representatives of key state departments
- Representatives of regional entities

EXHIBIT 7. Michigan Infrastructure Council



At the Council's inception, terms of members should be staggered. At the end of initial appointments, terms should be three years in length. The chairperson of the Commission should be selected from among the voting members of the body. Key state departments, including a representative from the department or office selected to house the database, should provide qualified administrative staff, and regional entities should also provide qualified technical assistance to the Commission. The Council should have the following three main responsibilities, which are further detailed below:

- Expand the regional asset management infrastructure pilot to deploy the asset management database process and system
- Develop a long-term, integrated infrastructure strategy for publicly held assets in Michigan, as well as coordinate with private utilities
- Design, oversee, and coordinate incentives; funding; and financing opportunities for Michigan's various infrastructure asset types

Expand the Regional Asset Management Infrastructure Pilot to Deploy the Asset Management Database Process and System Statewide

The Council should lead deployment of the statewide asset management process and database system, and ensure inclusion of the following components:

- **Basic components:** Basic components of the system need to be determined, such as an inventory of assets; asset conditions; current and desired customer level of service; and operations, maintenance, capital, and replacement costs.
- **Consistent standards:** Consistent standards should be developed for collecting data on asset condition, risk-based asset planning, and making decisions regarding capital expenditure programs.
- **Key metrics:** Key metrics for the overall system rating at the state, regional, and agency level should be developed, along with the level of investment needed to hit targeted system ratings. Performance targets must be established and reported. An example dashboard that could be used to communicate
- **Public access to information:** Provide a user-friendly interface where a snapshot of state, regional, and local system performance can be viewed by the public (see example in Exhibit 6).
- **Security:** Protocols should be developed and implemented that ensure data security at the local, regional, and state levels.
- **Participation:** Participation benchmarks/minimum thresholds for state, regional, local, and private entities should be established. Entities that exceed those benchmarks will be provided incentives (see below).
- **Incentives and requirements:** To identify incentives that can be deployed through existing funding and regulatory authority, the Michigan Infrastructure Council will work with the MDEQ, DTMB, MPSC, MDNR, MDOT, and any other relevant agencies to conduct a review of all regulatory and financing programs for opportunities to require beneficial asset management.

- **Regions:** The Council should implement the recommendation from the pilot regarding the appropriate regional structure and/or authority to plan, analyze, and coordinate infrastructure across assets at the regional level.
- **Predictive analytics:** Tools are needed to identify repetitive patterns of failures, other trends, and areas of opportunity for preventative maintenance, demonstrate the savings of preventative investment, and compare annualized life-cycle costs for different options. Predictive analytics should be explored as part of the capabilities of the database.
- **Opportunities for coordinated project planning:** The database for public infrastructure planning would provide opportunities for coordination by allowing private-sector infrastructure owners (e.g., most communications and energy providers) to participate, in a way that maximizes the ability for coordinated project planning, without revealing confidential business information. The Council should develop an approach and system to enhancing communication at a stage early enough to permit coordination in planning (private asset owners receive notifications of potential public projects planned nearby and vice versa).
- **Funding:** The Michigan Legislature should appropriate adequate funds from the General Fund budget for the expansion of the statewide database. Funding should also be appropriated for the implementation of the statewide asset management system, including providing licenses to users at an affordable cost, training users on how to use the database, and providing ongoing staffing and user support.
- **Timeline:** After completion of the pilot, a rollout of the statewide system should be implemented within two years of the creation of the Michigan Infrastructure Council.
- **Additional considerations:**
 - Asset management responsibility, practices, data collection, and analysis will remain decentralized, as it is today, residing with the private, public, local, and state infrastructure asset owners.
 - The statewide framework and guidelines should be designed so that even though all asset owners (private, public, local, and state) will be encouraged to participate, there are different expectations for owners depending on capacity and how critical their assets are (e.g., local, rural asset owners with few infrastructure assets would not have the level of planning and reporting requirements as those in larger cities). A minimum value should be established for inclusion in the framework (e.g., assets valued under a certain monetary amount are not included in the asset management framework).

Develop a Long-term, Integrated Infrastructure Strategy for Publicly Held Assets in Michigan and Coordinate with Private Utilities

The Council should develop a long-term, integrated infrastructure strategy for publicly held assets in Michigan, as well as coordinate with private utilities. This strategy should include the following:

- **Comprehensive infrastructure plan:** Based on the information in the statewide infrastructure asset management database, the Council should develop and refresh an infrastructure plan at least every five years. The plan should include an articulation of infrastructure asset condition, needs, and priorities. The Council should also have the

ability to receive confidential information from private infrastructure owners and use that information in development of its infrastructure plan.

- **Investment needs:** Advise the Governor, the Michigan Legislature, local agencies, and private stakeholders of five-, ten- and 20-year investment needs to reach targeted overall system ratings, with a goal of leveling annual investments to long-term predictable amounts.
- **Accountability and transparency:** Make information readily available and accessible to the public through regularly published needs assessments/reports and dashboards that depict the condition and trends of infrastructure investments and operations at the local, regional, and state levels, including benchmarking against other states.
- **Communication regarding project decisions:** Recognizing that private and public decision-making timelines are difficult to align and that funding structures differ, the Council should play a vital advisory role to the various decision-making bodies. At the time funding or permitting decisions are made, the Council should advise decision makers whether projects are a) part of coordinated planning efforts, and thus especially cost-effective, or b) off-cycle when compared to planned investments by other infrastructure owners, and thus likely to needlessly increase costs.
- **Smarter state:** As mentioned in the communications infrastructure recommendations in Chapter 4 of this report, the Council should explore structural options including public-private partnerships (P3s) to ensure inclusion of network intelligence in infrastructure planning and monitoring. Retrofit technologies should be considered, pursued, and incorporated as they become available for upgrades and maintenance activities to existing and future infrastructure.

Design, Oversee, and Coordinate Incentives; Funding; and Financing Opportunities for Michigan's Various Infrastructure Asset Types

The Council should design, oversee, and coordinate incentives, funding, and financing opportunities for Michigan's various infrastructure asset types. The Council's work on funding and financing should include the following steps:

- **Incentives:** Identify and leverage incentives using existing funding and regulatory authority to ensure high participation among public entities in planning and coordination and private asset owners in participation in coordination opportunities.
- **Review of regulatory and financing programs:** Work with the Governor's office and all relevant state agencies on an ongoing basis to conduct a review of all regulatory and financing programs for opportunities to require asset management and use of the system.
- **Funding:** Research and provide advice to the Governor, state departments, and the Michigan Legislature on infrastructure funding capacity, level of effort and needs, innovative and new infrastructure funding sources and financing options, ways in which to leverage federal funds, and legislative and regulatory changes needed for improving infrastructure planning and management efficiencies.
- **Priorities:** Review regional planning efforts, identify funding needs, identify integrated planning opportunities, and determine a list of funding priorities by region for the State of Michigan, Governor's Office, and/or Legislature. Those priorities and opportunities should

be both made available to the public when determined and should provide the basis for recommendations to decision-making bodies regarding whether specific projects are in line with those priorities.

- **Procurement and financing expertise and coordination:** Provide procurement and finance-related technical expertise on projects determined to be high value and high risk for the State, including identifying opportunities for public and private infrastructure funding, financing, and procurement, as well as identifying, and potentially overseeing, alternative funding sources.