The City of SAN DIEGO

Infrastructure Asset Management (IAM) Program
Office of the DCOO for Infrastructure/Public Works

Strategic Asset Management Plan

JUNE 2018

Contents

Acronyms

AM	Asset Management
AMAC	Asset Management Advisory Committee
AMP	Asset Management Planning
AM Plan	Asset Management Plan
AMD	Asset Managing Department(s)
AR	Administrative Regulation
ASCE	American Society of Civil Engineers
BEA	Bureau of Economic Analysis
BCE	Business Case Evaluation
CAP	Climate Action Plan
CEO	Chief Executive Office
CIP	Capital Improvement Program
CIPRAC	CIP Review and Advisory Committee
CY	Calendar Year
DCOO	Deputy Chief Operating Officer
DIF	Development Impact Fees
DoIT	Department of Information Technology
DOT	U.S. Department of Transportation
E&CP	Engineering and Capital Projects Branch
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FBA	Facilities Benefit Assessments
FCI	Facility Condition Index
FY	Fiscal Year
GIS	Geographic Information System
HVAC	Heating, Ventilation, and Air Conditioning
IAM	Infrastructure Asset Management
ISO	International Standards Organization
IT	Information Technology
KPI	Key Performance Indicator
LOS	Level of Service
MDG	Master Data Governance
O&M	Operations and Maintenance
OCI	Overall Condition Index (Pavement)
PAS	Publicly Available Specification
PCC	Project Controls Committee
PFFP	Public Facilities Financing Plans
PUD	Public Utilities Department
PWD	Public Works Department
QA/QC	Quality Assurance/Quality Control
SAMP	Strategic Asset Management Plan
SEMMS	Smart Energy Management & Monitoring System
SOP	Standard Operating Procedures
TSWD	Transportation & Storm Water Department

Executive Summary

Infrastructure in the United States is a complex network of public works infrastructure, such as roads, bridges, airports, parks, facilities, and utilities. Much of the nation's infrastructure is owned and maintained by state and local governments, representing a significant investment vital to public health, quality of life, productivity, competitiveness, and the economy. State and local governments have faced tight financial constraints with competing priorities for limited resources, leading to underinvestment in infrastructure. As a result, governments are challenged with aging and deteriorating assets and a backlog of deferred projects.

BACKGROUND – Asset Management (AM) plays an important role in helping to effectively plan for investments in infrastructure. It is best business practice for managing infrastructure assets to achieve desired Levels of Service (LOS) in the most cost-effective manner. Analogous to vehicles, which have maintenance needs such as getting the oil changed every 3,000 to 5,000 miles, infrastructure assets have predictive and preventative maintenance strategies to support effective lifecycle management. International Standards Organization (ISO) 55000 series provides standards for AM business processes and systems to support effective and efficient management of assets. ISO consists of experts who share knowledge and develop voluntary, consensus-based, market-relevant international standards that support innovation and provide solutions to global challenges.

Countries such as Australia, New Zealand, United Kingdom, and Canada have been conducting AM for many years, and AM programs and plans are often required to receive infrastructure funding. In the United States, federal support for AM has increased over the past decade and the U.S. Environmental Protection Agency (EPA) and U.S. Department of Transportation (DOT) are strong advocates, particularly in the water and transportation sectors.

CASE STUDIES – As part of this effort, Strategic Asset Management Plans (SAMPs) from 11 different country, state, and local governments were assessed to provide insight for the City of San Diego. Three SAMPs have been included in Section 02; they were selected based on geographical, political, and asset-based similarities.

Downtown San Diego.

Key takeaways are as followed:

County of Los Angeles, California - The County's SAMP created a new AM branch in the Chief Executive Office to provide leadership and a holistic approach to these programs. It also provides clear objectives and goals, and specific initiatives are outlined to improve coordination and communication of departmental AM efforts.

City of Calgary, Canada – Calgary's SAMP focuses on continuous process improvement, creation of standardized AM tools and development of a sustainable funding strategy.

City of Windsor, Canada – Windsor's SAMP underscores creating measurable goals with explicit key performance indicators (KPIs) that support decision-making strategies for assets.

CITY OF SAN DIEGO – The City of San Diego has taken significant steps towards implementing AM to effectively address infrastructure challenges by putting in place a comprehensive Infrastructure Asset Management (IAM) System to support business practices, titled the 'I AM San Diego Project.' As part of Phase 1 in Fiscal Year (FY) 2018, the System was rolled out to five divisions/ departments: Department of Information Technology (DoIT)/Wireless Services Division, Public Utilities Department (PUD), Public Works Department (PWD)/ Engineering & Capital Projects Branch, PWD/Facilities Division, and Transportation & Storm Water Department (TSWD).

The creation of this SAMP is also an important step to establish AM objectives, strategy, and policy as well as provide a framework for departmental AM plans. The City of San Diego's SAMP was developed through input from representatives of the City's Asset Managing Departments (AMDs) and related support service departments. Even though the AMDs manage a wide range of asset types with diverse goals and priorities, the group was fully aligned on AM objectives and strategy.

AM OBJECTIVES AND STRATEGY – The SAMP aligns with the overall goals and objectives of the City's Strategic Plan, which establishes direction and priorities in support of the City's mission to effectively serve and support the communities and the City's vision of a world-class city for all. The AM objectives are intended to aid in the achievement of specific, measurable results and align with organizational priorities. The strategy describes the next level of detail, providing guidance for how the AM objectives can be achieved.

The City's four AM objectives and related strategic elements include:

Objective 1 - Holistic Inventory: Create and maintain an inventory of reliable, integrated information on all assets throughout their life-cycle.

- Build and Maintain a Centralized Asset Inventory
- Standardize AM Procedures
- Manage Data as an Asset
- Conduct Regular Condition Assessments and Inspections
- Establish and Implement Condition Assessment and Inspection Guidelines

Objective 2 - Resilient Service: Provide resilient service by preserving safety and value of assets through sustainable, cost-effective maintenance practices.

- Establish LOS for Assets
- Use the IAM System to Conduct Condition-based Lifecycle Planning for Assets
- Incorporate Planning for Future Assets into IAM
- Centralize Facilities Maintenance across AMDs

Objective 3 - Transparent + Translatable Prioritization: Prioritize capital investment in a manner that is transparent and translatable across departments.

- Uphold the Prioritization Process from Council Policy 800-14 and Implement Recommended Revisions
- Use the IAM System in Capital Planning and Prioritization
- Establish Capital Project Bundling Guidelines
- Optimize Capital and Operations and Maintenance (O&M) Expenditures
- Confirm Maintenance Funding in Capital Plans

Objective 4 - Supported Investment: Enhance and sustain stakeholder support of investment through ongoing communication and education.

- Review Current Funding Structures at Regular Intervals
- Develop a Financing Strategy
- Build Support through Public Outreach Initiatives
- Measure Satisfaction of Stakeholders

FRAMEWORK FOR AM PLANS – AM plans form the cornerstone of an effective AM System. ISO 55000 notes that AM plans provide the roadmap for achieving value from physical assets by optimizing cost, risk, and performance across the asset lifecycle. AM plans identify what assets are owned, their condition, and needed maintenance to keep the asset at a desired, pre-determined LOS as well as repair or replacement schedules and investment strategies. AMDs should develop AM plans based on the framework provided in the SAMP, while supplementing with detail related to specific asset-based considerations. It will be important to develop a timeline for completion of AM plans or updates of existing AM plans (e.g., for PUD and TSWD/Storm Water Division).

POLICY – With AM objectives and related strategies identified, a policy is necessary to explicitly define the course of action to be collectively adopted by AMDs. The two Council Policies that require revisions based on the new IAM System and SAMP are:

- Council Policy 800-14: Prioritizing Capital Improvement Program (CIP) Projects - Revisions to enhance the policy are being recommended to (1) enable prioritization across department/asset types; and (2) incorporate rankings specifically for capital needs, including how the AMP tool can be used to support it. By enhancing this policy, and in conjunction with the AMP tool, investment can be planned in more detail, and projects can be bundled for efficiency and cost savings.

- Council Policy 800-16: Asset Management Guidelines and Plan Steps - A new AM policy which clearly states the City's vision and principles for AM is being recommended to replace the existing policy. Integrated with the AM objectives and strategy, business processes and AM systems, the policy emphasizes San Diego's citywide, holistic approach to AM.

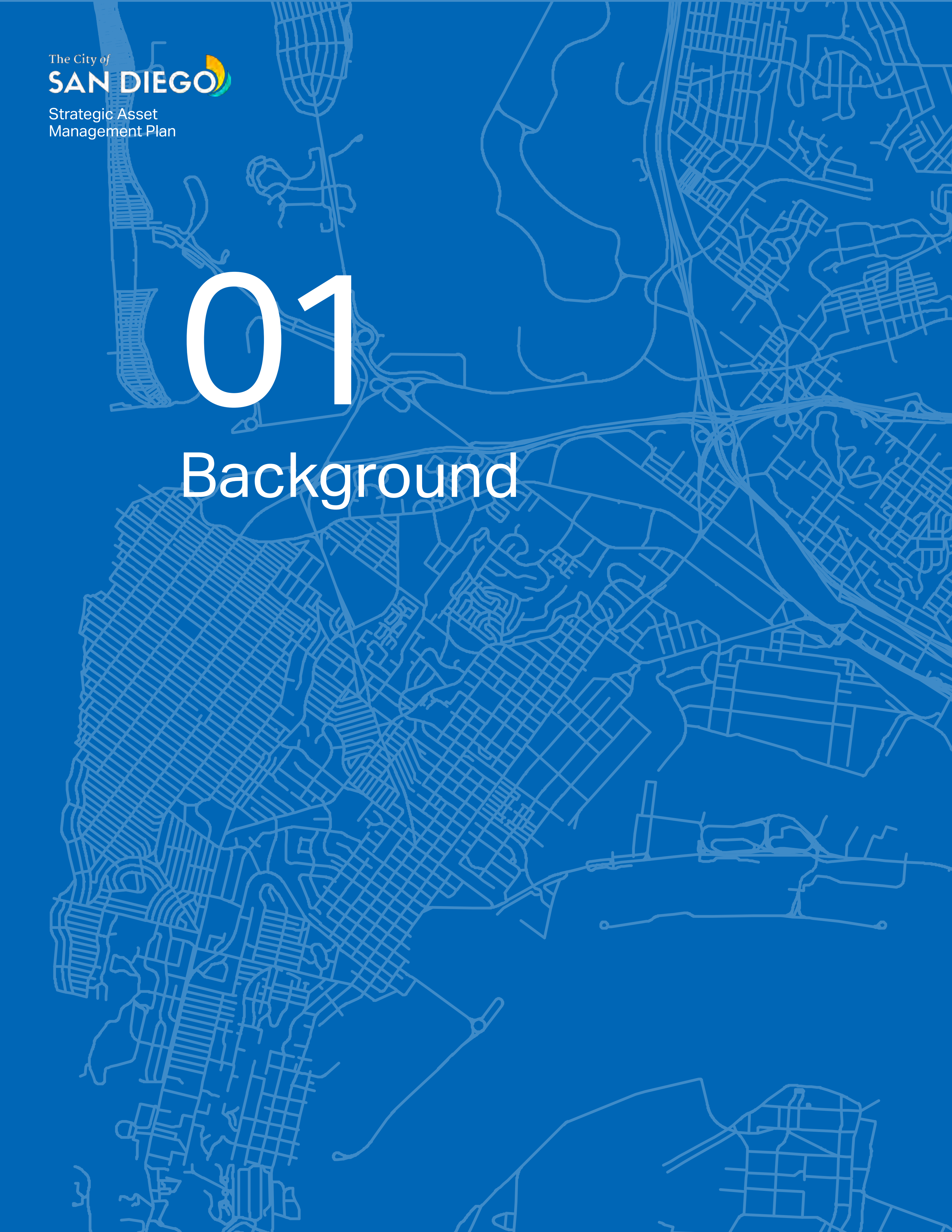
AM ROLES AND RESPONSIBILITIES – For AM to be effective across multiple departments with complex responsibilities and relationships, all stakeholders must be working towards the same objectives.

Existing Roles – Mayor, City Council, Infrastructure/Public Works, CIP Review and Advisory Committee (CIPRAC), PWD/Engineering & Capital Projects Branch, AMDs and related support service departments all play important roles in guiding infrastructure management.

New Roles Resulting from I AM San Diego – Master Data Governance (MDG) Committees for asset data and materials data will work to develop standards for data and the IAM System Post Go-Live Support Organization will work with departments to handle logistics and technical needs.

Recommended Roles – An Asset Management Advisory Committee (AMAC) is being recommended to coordinate AM activities, ensure that the AM objectives are being upheld, serve as the stewards of the SAMP, and drive action items to completion. The existing CIPRAC could potentially revise its role and membership to cover AM for infrastructure assets (which includes both maintenance and capital projects).

CONCLUSION AND RECOMMENDATIONS – The City has made significant progress implementing AM and deploying the IAM System for the Phase 1 departments. The City has a mature condition assessment program for several asset types and has developed comprehensive AM plans for some departments. Policies that emphasize San Diego's citywide focus and commitment to AM will ensure that AM activities are consistent and synergized across departments. Throughout the SAMP, there are 27 action items that have been identified and recommended. The complete outline of action items is listed in Section 07. Following this SAMP and using the IAM System, the City will be better positioned to holistically prioritize and plan infrastructure investments. New roles and responsibilities will be restructured in a way that encourages transparent, collaborative planning. It is critical for the City to continue this momentum and organize the AMAC to implement the SAMP and drive completion of the remaining action items to ensure sound investments by the City are being made and fully realized.



01 Background

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Infrastructure in the United States is a complex network of public works infrastructure, such as roads, bridges, airports, parks, public facilities, and utilities. Well-designed and well-maintained infrastructure is essential to public health and quality of life for citizens and visitors. It is also vital to productivity, competitiveness, and the economy. The federal government plays an important oversight role, but much of the nation's infrastructure is owned and maintained by state and local governments. According to the U.S. Bureau of Economic Analysis (BEA), of the net stock of publicly owned nondefense infrastructure, the federal government owns only 13 percent ($1.5 trillion), while state and local governments own 87 percent ($10.1 trillion).[1]

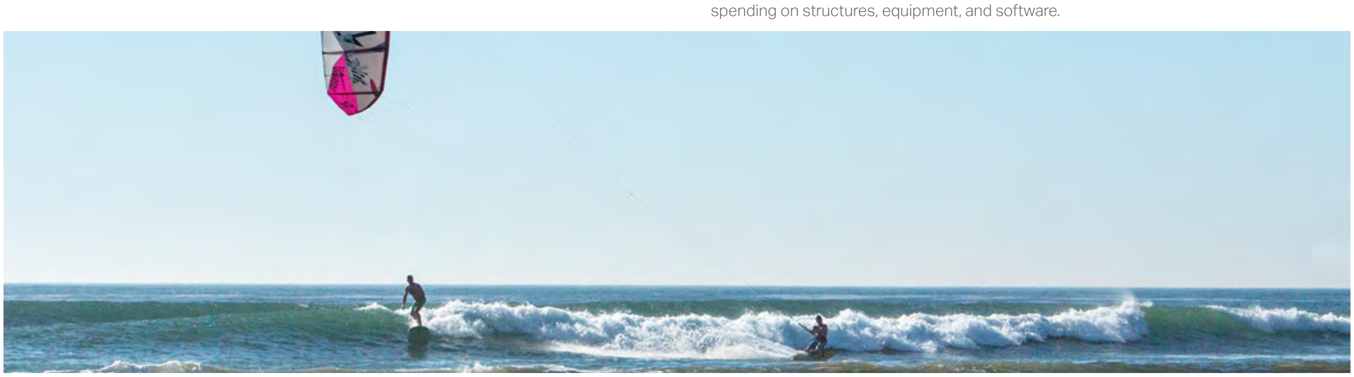
1 U.S. Bureau of Economic Analysis, "Table 1.1. Current-Cost Net Stock of Fixed Assets and Consumer Durable Goods," https://www.bea.gov/iTable/iTable.cfm?ReqID=10&step=1#reqid=10&step=3&isuri=1&1003=16 and "Table 7.1B. Current-Cost Net Stock of Government Fixed Assets," https://www.bea.gov/iTable/iTable.cfm?ReqID=10&step=1#reqid=10&step=3&isuri=1&1003=30 (accessed January 14, 2018).

State and local governments across the United States are dealing with aging and deteriorating infrastructure assets and a backlog of deferred maintenance projects. Several contributing factors have led to these circumstances:

Competing priorities for limited resources – Many cities, including San Diego, have faced tight financial constraints with competing priorities for limited resources, which have led to underinvestment in infrastructure.

Underinvestment in infrastructure – Investment in infrastructure is down in the United States, with state and local spending at a 30-year low.[2] The 2017 Infrastructure Report Card developed by the American Society of Civil Engineers (ASCE) rated national

2 U.S. Bureau of Economic (BEA) Analysis, based on BEA gross investment, which includes spending on structures, equipment, and software.



Windsurfers at Pacific Beach, San Diego.

infrastructure as a D+, with either poor or at risk conditions. This is the same grade the nation received the last time the assessment was given in 2013, revealing that no significant investments have been made. For infrastructure systems that include highways and bridges, there is a capital needs backlog nationwide of $836 billion, with the bulk of the backlog ($420 billion) for repairing existing highways. Note, while investment may be increasing for some state and local governments, funds are often being spent on new infrastructure rather than in support of existing assets.

Limited and restricted funding sources – Even with dedicated funding, there are often various restrictions placed on how the money can be spent. Enterprise funds must be expended on the asset for which they are earned. For example, water rates are specific for water projects, gas tax funds are specific for transportation and transit projects, and bond proceeds can only be used for capital projects - not for maintenance. As a result, some assets such as storm water infrastructure, parks or facilities may not receive sufficient funding because they are competing for general funds with services like police and fire. Therefore, regular maintenance is frequently not fully funded.

Lack of business processes and support – Many organizations lack the needed information, data, and system or tools to identify effective investment strategies for assets. This results in a reactive approach to managing assets, policies favoring new construction, and political drivers playing a competing role in sound capital decision-making.

Underinvestment in infrastructure results in increased deferred maintenance costs, continued deterioration, and decreased performance and reliability. Delaying these investments only escalates the costs and risks of an aging infrastructure system, including increased unpredicted emergency costs. In FY 2016, for example, record emergency repairs occurred in the City due to major rainstorms.

ASSET MANAGEMENT STANDARDS

AM is a best business practice for managing infrastructure assets to achieve desired service levels in the most cost-effective manner. Analogous to a vehicle, which has maintenance needs like getting the oil changed every 3,000 to 5,000 miles, infrastructure assets have predictive and preventative maintenance strategies to support effective lifecycle management through an asset's phases, from acquisition to disposition.

ISO 55000, 55001, and 55002

ISO provides international standards for AM business processes and systems, with the goal of enabling organizations to achieve objectives through effective and efficient management of assets.

Published in 2014, ISO 55000 is the central reference document for the SAMP, defined as a high-level strategic plan that documents the relationship between organizational and AM objectives. The SAMP is also intended to outline the approach for developing AM plans, as well as the role of the AM System, in achieving objectives.

ISO 55002 outlines important considerations for AM best business practices, including:

- Setting performance metrics and indicators
- Revisiting scope, especially if critical or poor conditions were identified
- Performing condition assessments
- Implementing recommendations for delivering budgeted capital improvements and routine maintenance
- Confirming compliance with requirements
- Examining historical data
- Using documented information to facilitate subsequent corrective actions and decision making across the departments

The City's SAMP has been developed to be in full alignment with these international standards[3].

Publicly Available Specification 55 (PAS 55)

PAS 55 was the predecessor to ISO 55000 and laid the foundation for how the later standard was developed. PAS 55 was created by British Standards Institute in 2004 in response to issues arising from the privatization of the utilities and transport sectors in the United Kingdom. The standard provides guidance on how to build an AM System that supports optimal management of physical assets. Key components include:

- 28-point checklist for good practices in lifecycle planning and cost/risk optimization
- Linkage to the accepted Plan-Do-Check-Act cycle to support successful implementation and alignment with other standards
- Integration of all aspects of the asset lifecycle

3 As of June 2018, there are no certified Conformity Assessment Bodies that have been certified for ISO 55001 yet.

Some regulators recommend accreditation to PAS 55 to provide evidence of appropriate AM practice. Formal certification may not be required in most instances though, as the benefits of the standard can be realized without it.

FEDERAL SUPPORT FOR AM

Countries such as Australia, New Zealand, United Kingdom, and Canada have been conducting AM for many years, and generally have more mature and robust programs than organizations in the United States. For these other countries, AM programs and plans are often required to receive infrastructure funding. In the United States, federal support for AM has increased over the past decade, particularly in the water and transportation sectors.

Executive Order 13327

Executive Order (EO) 13327, issued by George W. Bush in 2004, instituted Federal Real Property AM to "promote the efficient and economical use of federal real property resources in accordance with their value as national assets and in the best interests of the Nation."[4] This EO signified a national dedication to prioritizing the responsible management of assets, at all levels and across all sectors. It spurred federal agencies to emphasize strategic AM proficiency, particularly across the U.S. Army Corps of Engineers Civil Works Division, U.S. Environmental Protection Agency (EPA), and the U.S. Department of Transportation (DOT).

4 Hutchison, Michael. "Federal Asset Management: 10 Years of Progress." The Military Engineer, 2014, www.themilitaryengineer.com/index.php/tme-articles/tme-online-exclusive-articles/item/265-federal-asset-management-10-years-of-progress.

EPA

The EPA is a strong advocate for AM, particularly related to water and wastewater assets. In 2008, the Agency issued a "Best Practices Guide," targeted for use by owners, managers, and operators of water systems, local officials, technical assistance providers, and state personnel. EPA has developed several AM resources, including web-based training and software, that will help build an inventory, manage work orders, and track

> *"Renewing and replacing the nation's public water infrastructure is an ongoing task. Asset management can help a utility maximize the value of its capital as well as its operations and maintenance dollars. Asset management provides utility managers and decision-makers with critical information on capital assets and timing of investments. Some key steps for asset management are making an inventory of critical assets, evaluating their condition and performance, and developing plans to maintain, repair, and replace assets and to fund these activities."*
>
> **– EPA**

San Diego Central Library.

finances. The EPA also conducts research related to condition assessments, system rehabilitation, advanced concepts relating to the application or adoption of new infrastructure designs, management procedures, operational approaches, and innovative treatment technologies for wastewater and water reuse. The EPA's extensive dedication to knowledge sharing around AM emphasizes the value and support it has at the federal level.[5]

DOT/Federal Highway Administration

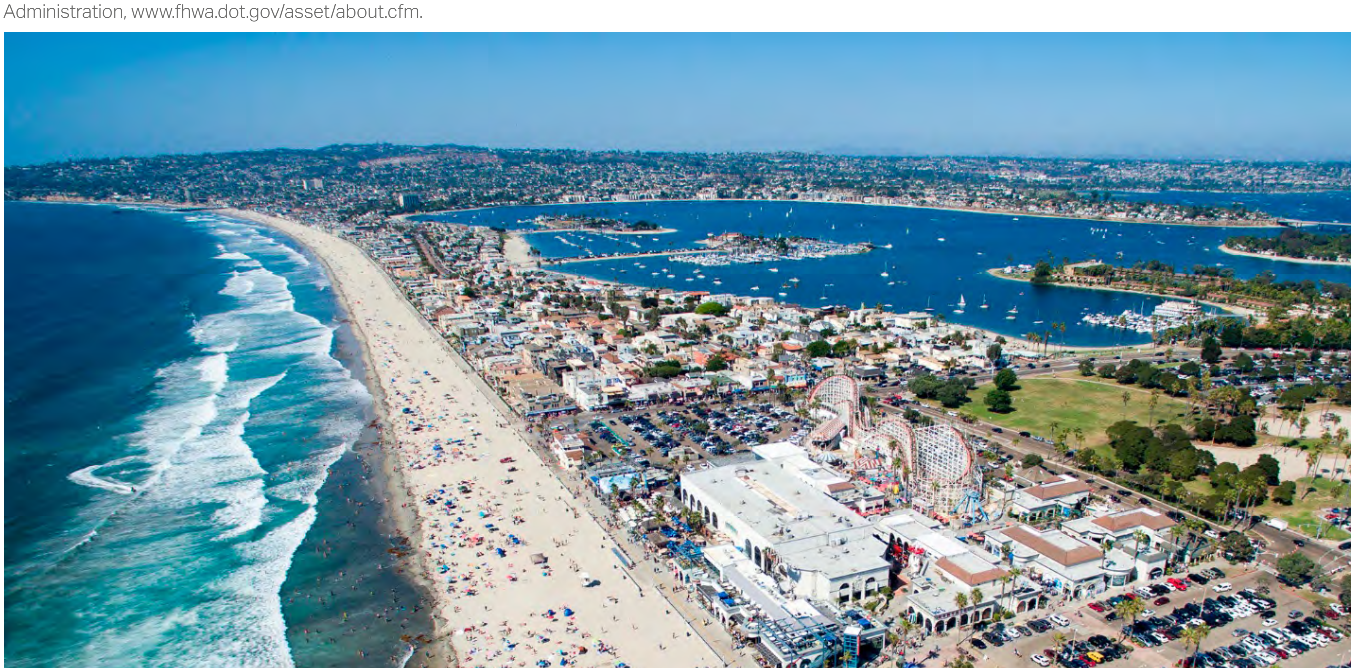
Within the DOT, a team provides national leadership in Transportation AM for highway program administration. The team also develops AM policies for management of physical assets and system preservation, and partners with numerous boards, agencies, and offices to conduct nationwide programs. It is the vision of the team that "all States effectively use AM principles to manage and allocate resources to improve our nation's transportation system performance."[6]

CITY OF SAN DIEGO AM INITIATIVES

The City has taken significant steps towards implementing AM to effectively address infrastructure challenges. In 2013, the City Council approved two AM-related policies and updates: 800-14 – Prioritizing Capital Improvement Program (CIP) Projects, and 800-16 – AM Guidelines and Plan Steps. In 2015, The Infrastructure Asset Management (IAM) Program was established by the Office of the Deputy Chief Operating Officer (DCOO), Infrastructure/Public Works, to:

- Implement a comprehensive IAM System to support business practices, titled the 'I AM San Diego Project.'
- Develop a SAMP to provide City policy, objectives, and strategy for AM. The SAMP will also provide direction and guidance for departmental AM plans and programs.
- Implement and coordinate Citywide AM best business practices to sustainably manage infrastructure assets at a desired LOS for the lowest lifecycle cost.

5 "Asset Management for Water and Wastewater Utilities." EPA, January 26, 2018, www.epa.gov/sustainable-water-infrastructure/asset-management-water-and-wastewater-utilities.
6 "Asset Management." U.S. Department of Transportation/Federal Highway Administration, www.fhwa.dot.gov/asset/about.cfm.



Mission Beach and Bay.

I AM San Diego Project
Given the significant amount of information and data required for management of municipal assets, a tool or system is required to effectively maximize investment strategies. The I AM San Diego Project developed a comprehensive IAM System to transform the way the City plans, prioritizes, and delivers maintenance and capital projects. I AM San Diego is an investment in technology and infrastructure, in alignment with the City's Strategic Plan. The IAM System replaced 28 outdated—in some cases paper-based systems—with one streamlined, integrated system. The system also provides state-of-the-art technology to support the work of staff, including mobile work management capabilities.

Key Features of the IAM System include:

1. Automated, real-time work management that brings all asset information into one online system, providing better information for planning and completing work.

2. Mobile, map-based capabilities that provide access to work orders with real-time data, online updates, and paperless reporting for workers in the field. This enables easier access to job parts with up-to-date store room and purchasing information.

3. Asset Management Planning (AMP), a tool that enables proactive, condition-based maintenance and capital planning. This supports long-term planning for capital needs, as well as the one-dig strategy to plan work on co-located assets in a bundled project, and reduce digging up multiple streets.

4. Accurate, detailed analytics and reporting, as well as provide a one-stop-shop for the state of assets. This supports long-term planning and annual budgets.

The IAM System successfully went live to Phase 1 departments in three releases:

- December 4, 2017 – to about 160 end-users in PWD/Facilities Division and DoIT/Wireless Services Division with a non-geographic information system (GIS) solution.

- March 12, 2018 – to over 1,600 end-users in PUD and TSWD with a GIS solution.

- April 16, 2018 – to 60 end-users in PWD/E&CP and AMDs with the component of the IAM System known as AMP and related tools.

I AM San Diego Phase 2 is planned as a rolling release over five fiscal years to six additional AMDs/Divisions (DoIT/Operations Division, Library, Police, Fire Rescue, Environmental Services, and Parks and Recreation). Phase 2 will be rolled out in future budgets when these departments are ready for integration into the IAM system.

SAMP
The City has developed the SAMP to define AM objectives, strategy, and policy, and provide guidance for departmental AM plans and programs. In addition to providing the overall direction for AM, the SAMP aligns with the business processes related to the IAM System, and addresses policy gaps relating to Council Policies 800-14 and 800-16.

As a guiding document and resource for the City's AMDs, the SAMP is not intended to provide asset specific protocols and procedures. The framework outlined here should be used as a tool for AMDs to guide management of their own unique assets.

AMDs and Clients
The SAMP covers all City assets, and was developed in collaboration with the City's AMDs and related support service departments to ensure that the policy, objectives, and strategy align with existing practices and plans, and are relevant to San Diego–specific infrastructure needs. The departments and clients involved in the development of the SAMP include:

- Economic Development
- Environmental Services
- Fire-Rescue
- DoIT
- Library
- Parks & Recreation
- Performance & Analytics
- Planning
- Police
- PUD
- PWD
- TSWD

Planning workshops were conducted from September 2017 through February 2018 to understand and synthesize the different AM objectives and needs of each department.

02

Case Studies - Learning from Other Local Governments

02 Case Studies

As part of this effort, SAMPs from 11 different countries, state, and local governments were assessed to provide insights for developing a SAMP for the City of San Diego. Most of the SAMPs developed to date are from the United Kingdom, Canada, Australia, and New Zealand. These countries have been conducting AM for many years, and generally have more mature and robust programs than municipalities in the United States. For these other countries, SAMPs are required as part of an overall AM program, and AM plans are often mandatory to receive infrastructure funding. Having a SAMP enables these countries to clearly define broader AM objectives across wider geographies, as well as strategies and methods to develop high-level initiatives that will deliver these objectives.

Three relevant SAMP examples are included here:

- County of Los Angeles, California was chosen as a case study because of geographical and political similarities to the City of San Diego.
- Cities of Calgary and Windsor, Canada were chosen because of similarities in the diverse range of assets covered in each SAMP to the City of San Diego's portfolio.

Key lessons from the case studies are outlined below, with more detailed information available in Appendix A.

San Diego waterfront walkway.

Los Angeles County,

COUNTY OF LOS ANGELES, CALIFORNIA

The County of Los Angeles Chief Executive Office (CEO) developed a SAMP in March 2016. The goals were to optimize the use of their assets, create an enterprise-wide understanding of asset needs and priorities, and develop long-term strategies to address unfunded future needs. This plan also aimed to alleviate discrepancies between planned capital budgets and actual operating budgets. To provide leadership and a holistic approach to AM, the County's SAMP created a new AM branch in the CEO.

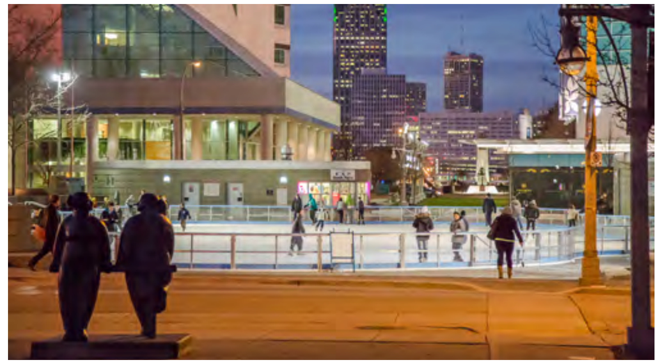
Los Angeles County Museum of Natural History.

Los Angeles Library at Flower Street.

Relevancy

- ✓ The County of Los Angeles and the City of San Diego have comparable aging building stock and funding challenges.
- ✓ Both entities' plans include smart lifecycle planning to maximize aging assets, while still providing a high LOS to residents.
- ✓ A key takeaway from County of Los Angeles' SAMP is incorporation of clearly defined objectives and goals, which serve to alleviate discrepancies between planned capital budgets and the actual operating budget.
- ✓ The listed objectives feed into strategies to address discrepancies. With a clearly defined direction, Los Angeles County was also able to establish initiatives to improve interdepartmental communication, and in turn, overall AM.
- ✓ The strategies around communication and departmental organization are set to be achieved by the City of San Diego via the AM process, but the focus on project prioritization and cross departmental asset planning to maximize capital expenditures especially resonates with the City's objectives.

Calgary's Peace Bridge. Source: City of Calgary



Charles J. Clark Square Skating. Source: City of Windsor

CITY OF CALGARY, CANADA

The City of Calgary developed their Corporate AM Plan to improve their existing infrastructure management plan. They intend to support AM practices at both executive and departmental levels. Calgary's senior management makes up their Administrative Leadership Team, which developed and approved their AM policy, strategy and governance.

Relevancy

- ✓ The cities of Calgary and San Diego have nearly identical metropolitan populations, and similar funding restrictions for capital expenditures.
- ✓ There are also similarities across asset portfolios, with the City of Calgary conducting planning for vertical and horizontal assets, including departments such as Roads, Transit, Waste and Recycling Services, and IT.
- ✓ Because of these comparable portfolios, strategies identified are highly applicable to San Diego, including continuous process improvement, strong integration between departments, creation of standardized AM tools, and development of a sustainable and standardized funding strategy.

CITY OF WINDSOR, CANADA

The City of Windsor Corporate AM Plan is a detailed document put in place to ensure Windsor's infrastructure upholds sound AM practices while maintaining a desired service quality. Their plan also includes details regarding the state of current infrastructure, service guidelines, prioritization, risk management, and financial strategies. Windsor's centralized Corporate Asset Management office is responsible for monitoring the progress of the plan annually.

Relevancy

- ✓ Like Calgary, the cities of Windsor and San Diego have similar portfolio complexities beyond the facility-based focus for the County of Los Angeles.
- ✓ Windsor's attention to frequency of review for the AM Policy, Corporate AM Plan, Service Area AM Plans, and Capital Budget is pertinent to the context of San Diego, because applicability of AM practices and strategies should be evolving and growing along with the rest of the City.
- ✓ Key takeaways in this plan include a clearly defined set of objectives and measurable goals, along with explicit KPIs that feed into decision-making strategies for Windsor's assets.
- ✓ Another important similarity to San Diego is Windsor's incorporation of IT as a major asset-managing group. Windsor developed a specific set of guidelines to provide an overall framework of IT AM, many of which could be directly applied to San Diego's IT asset needs.

03

Objectives and Strategy

03 Objectives & Strategy

The AM objectives are intended to aid the City of San Diego in achievement of specific, measurable results, and align with organizational priorities. These objectives are the basis of AM practices and plans across the City. From the objectives, strategies were developed to provide a long term, optimized approach to the management of the City's assets, and guidance on how the AM objectives could be achieved.

ALIGNMENT WITH STRATEGIC PLAN

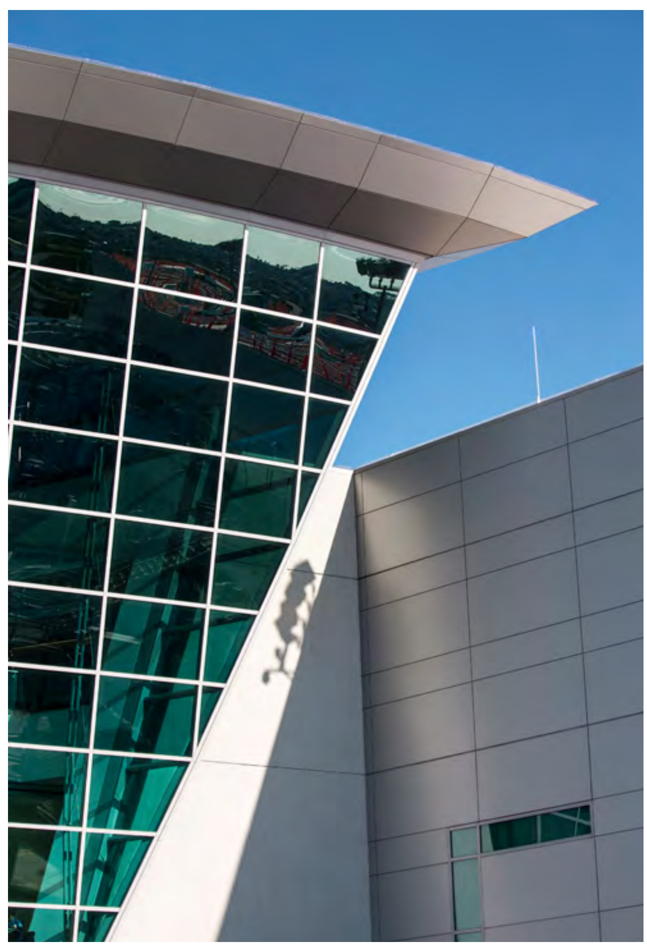
An effective SAMP aligns with the overall goals and objectives from an organization's Strategic Plan. The City of San Diego's Strategic Plan establishes direction and priorities, working toward the City's mission to effectively serve and support the communities and vision of a world-class city for all. Goals and objectives related to AM include:

Goal 1: Provide high quality public service

- Improve external and internal coordination and communication
- Ensure equipment and technologies are in place so that employees can achieve high quality public service

Goal 2: Work in partnership with all of our communities to achieve safe and livable neighborhoods

- Invest in infrastructure



San Diego International Airport.

Torrey Pines Golf Course.

AM OBJECTIVES

The AM objectives were developed through input from representatives of the City's AMDs. The departments manage a wide range of asset types, and have diverse goals and priorities based on their individual missions. Despite these differences, there are numerous common interests across departments. The department representatives fully agreed on these objectives, emphasizing that the City's assets need to be identified and accounted for throughout their lifecycle, as well as supported in a way that is safe and strategic.

- **Objective 1: Establish a Holistic Inventory –** Create and maintain an inventory of reliable, integrated information on all assets throughout their lifecycle.
- **Objective 2: Provide Resilient Service –** Provide resilient service by preserving safety and the value of assets through sustainable, cost-effective maintenance practices.
- **Objective 3: Provide Transparent + Translatable Prioritization –** Prioritize investment in assets, including maintenance and capital projects, in a transparent and translatable manner across departments.
- **Objective 4: Ensure Supported Investment –** Enhance and sustain support of investment through ongoing communication and education to stakeholders.

Gonzales Canyon Trail.

AM STRATEGY

The strategy describes the next level of detail, providing guidance for how the AM objectives can be achieved. The AM policy, discussed in Section 05 of the SAMP, is directly aligned with this strategy.

Objective 1: Establish a Holistic Inventory

Create and maintain an inventory of reliable, integrated information on all assets throughout their lifecycle. An accurate, comprehensive asset inventory will:

- Enable the City to conduct AM-related activities in an efficient, decisive, and accountable manner.
- Support in generating data for prioritization—and ultimately—investment decisions.
- Manage data like an asset (Master Data Governance).

The following proposed actions will help the City to create and maintain an inventory of reliable integrated information on all assets throughout their lifecycle.

Build and Maintain an Asset Inventory. An asset inventory, registry, and hierarchy have been developed and included in the IAM System for I AM San Diego Phase 1 departments/divisions, including DoIT/Wireless Services Division, PWD, PUD, and TSWD. The intent is for all City assets to be included and managed in the IAM System. Phase 2 of I AM San Diego is planned as a future phased rollout to six additional AMDs/divisions (DoIT/Operations Division, Library, Police, Fire-Rescue, Environmental Services and Parks & Recreation). To develop and maintain a complete inventory of reliable and integrated information on all City assets, the City should build on this foundation created by the IAM System and maintain it.

Standardize AM Procedures. AM procedures should be consistent across City departments. This will be achieved through development of departmental AM plans and implementation of the AM policy, which are discussed in Sections 04 and 05, respectively.

To ensure that standardized plans and procedures are being carried out and upheld, Section 06 recommends creation of the AMAC. The committee should include representatives from each AMD, and meet regularly to share AM updates, ensure AM objectives are being met, and drive completion of action items. In moving forward, the existing CIPRAC could potentially revise its role and membership to cover AM for infrastructure assets (which includes both maintenance and capital projects).

Manage Data as an Asset. Data Governance is the collection of decision rights, processes, standards, policies, technologies, and oversight required to manage, maintain, and benefit from information as an enterprise resource. An effective data governance program includes the process by which an organization manages the quality, consistency, usability, security, and availability of its data.

The IAM System includes a component called Master Data Governance (MDG) which is a tool for ensuring data

Doyle Community Center.

standards and consistency of data in the IAM System. MDG Committees are being established for both asset data and materials data. These committees will be responsible for developing standards and guidelines, and for approval of new data coming into the system.

Conduct Regular Condition Assessments and Inspections. Condition assessments provide information on the state of assets, such as age and usage, to provide a rating and determine remaining useful life. This information provides valuable insight into the nature and timing of possible failure.

Several AMDs are contracting with various expert consultants to conduct condition assessments and inspections for their assets. The status of the City's condition assessments is shown in the following table.

Mission Beach Lifeguard Station.

Status of Condition Assessments

Asset Type	Status
Facilities – General Fund	City-occupied facilities assessed between FY 2014 and FY 2016 were presented to Council in April 2016. Assessments are to be updated on a four-year rotating schedule. Leased assessments were presented winter 2016/2017.
Facilities – Public Utilities	The assessment was completed in Calendar Year (CY) 2016, and the final report was released in early CY 2017.
Facilities – Parks & Recreation	Parks & Recreation facilities were included in the General Fund FY 2016 Facility Condition Assessment update.
Developed Parks	Anticipated to be completed in 2020.
Sidewalks	Completed in 2015. Results report was released in September 2015.
Streets	Completed in 2016. Results report was released in September 2016.
Water and Wastewater	Dams & Outlet Works – FY 2017 to FY 2022 Potable Water Reservoirs – FY 2014 to FY 2017 (completed) Small-Diameter Potable AC pipe – FY 2014 to FY 2016 (completed) Large-Diameter Water Pipeline – FY 2015 to FY 2019 Large-Diameter Wastewater Pipeline – FY 2014 to FY 2018 (completed) Small-Diameter Municipal Collection System (continuous) Municipal Wastewater Pump Stations (continuous)

Condition assessment data are generally housed within the IAM System. As City staff use the IAM System, they will include accurate and up-to-date information on maintenance that is being conducted on assets. In the future, this information can be used to target and prioritize needed condition assessments so that the full network of assets does not need to be inspected. This in turn will free up funds and allow inspections to be expanded to additional assets types, as appropriate.

Implement Condition Assessments and Inspections Guidelines. Condition assessment procedures, frequency, and tools provide for consistency in how information is collected, and ensure data can be easily uploaded into the IAM System.

The City currently lacks guidelines for condition assessments, as well as uniformity of data collection and storage format across departments and contracts. A recommendation is to establish guidelines for consistent procedures across all contracts. This includes developing a template for the format of data so they can be easily downloaded into the IAM System. More information related to condition assessment guidelines is included in Appendix B.

ACTION ITEMS

- ✓ Create the AMAC to coordinate AM efforts, provide a holistic approach to AM, and lead work towards completing the remaining action items.
- ✓ Standardize AM procedures by development of AM Plans and Policies.
- ✓ Carry out the planned MDG committees for asset data and materials data.
- ✓ Use maintenance history in the IAM System to target needed condition assessments.
- ✓ Expand the condition assessment program to include additional assets, as appropriate.
- ✓ Implement guidelines for condition assessments and inspections.
- ✓ Assess how capitalization of newly built or improved infrastructure can be done in the system and develop a policy/process for how this data is tracked and logged.

Objective 2: Provide Resilient Service

Provide resilient service by preserving public safety and value of assets through sustainable, cost effective maintenance practices. This will:

- Enable the City to have a proactive, rather than reactive, approach to its AM activities.
- Preserve asset value through sustainable, cost-effective management practices.
- Provide an effective emergency response service.

The following proposed actions will help the City provide resilient service by preserving safety and value of assets through sustainable, cost-effective maintenance practices.

Establish LOS for Assets. LOS, also known as Service Level Standards, provides a defined level of quality and reliability for the delivery of an asset. A successful AM program achieves targeted service levels at the lowest cost and risk. LOS helps to focus efforts and resources, communicate service expectations and choices, and negotiate for needed budgets, etc. Service levels fall into four major categories:

1. Reliability – Continuous, uninterrupted service to customers. Examples include targets and limits for unplanned events, crew dispatching times, and outage duration.
2. Quality – Commitment to deliver high-caliber products/services. Examples include targets for water odor, taste, color, and pressure.
3. Customer Service – Commitment to respond to customer needs in a courteous and timely manner. Examples include standards for complaint handling, new service connections, and call center wait times.
4. Regulatory – Reliability and quality targets mandated by regulators and legislators. Examples include EPA standards and consent decree compliance.

Several AMDs have established LOS, primarily related to regulatory requirements. A summary of LOS is shown in the following table. Given the new IAM System and proposed development of departmental AM plans, it is recommended that staff assess appropriateness of current LOS and establish service levels for remaining assets. The recommended approach is shown in Appendix C.

Summary of City of San Diego Departmental LOS

Department	Current LOS	Details
DoIT	Yes	Public Safety Public Service Maintenance Plan Scheduling during non-events Fire/Police Department vs. Non-emergency services
Fire-Rescue	Yes	Public Safety and Service Maintain fire and lifeguard stations for operational readiness Facility Condition Index of 15
Library	No	
Parks & Recreation	Yes	Park acres per population Park Condition Index of 15
Police	Yes	Facility Condition Index of 15 (Future LOS in development)
PWD/Facilities Division	Yes	Facility Reliability Public City EE Employees Preventive Maintenance Activities Facilities Condition Index (FCI) for General Fund facilities: • Public - 15 • Semi- Public - 15 • Office-Work-Yard Operations - 20 • Commercial-Residental - 20
PWD/E&CP	Depends on client	E&CP is a consulting department, so the LOS they follow change, depending on what type of project they are working on
PUD	Yes	Number of water main breaks Miles of water mains awarded for replacement Average number of minutes for water main break response time
TSWD	Yes	Response time to requests for repair Zero Flooded Properties Pavement Overall Condition Index (OCI) of 70 Tree-trimming frequency (currently a budget discussion) Response time metrics Ten-year goal for repairing all sidewalk defects Miles of streets swept annually

Use the IAM System to Conduct Condition-based Lifecycle Planning for Assets. Infrastructure assets have predictive and preventive maintenance strategies to support effective lifecycle management. This includes planning for maintenance, repair, rehabilitation, and replacement throughout an asset's phases, from acquisition to disposition.

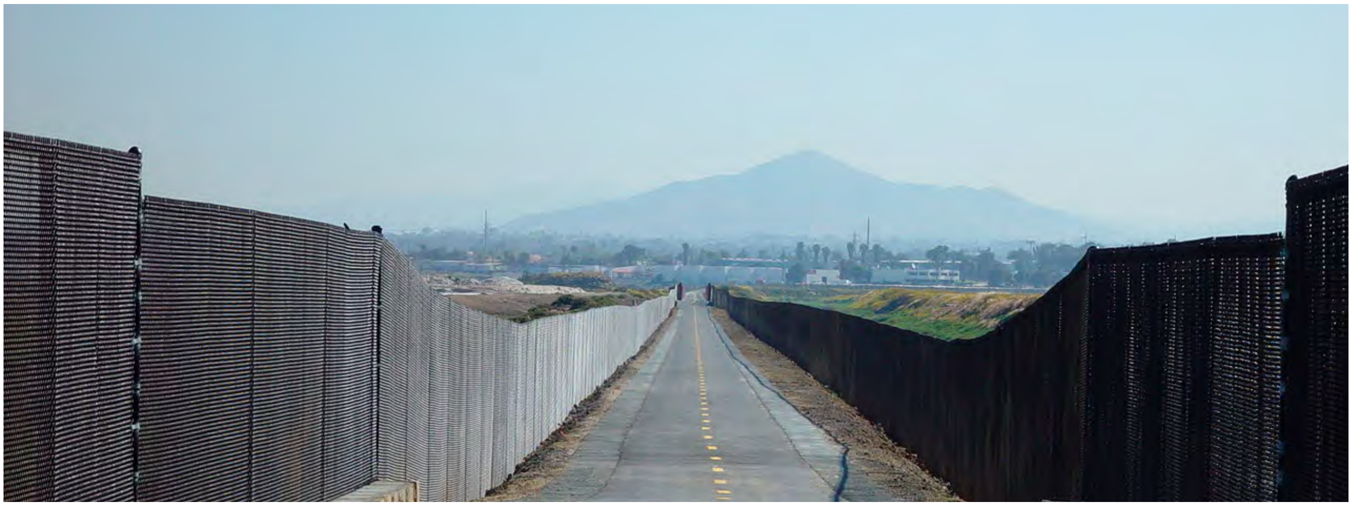
AMDs that participated in I AM San Diego Phase 1 are conducting lifecycle planning for assets using the IAM System. Within AM, this includes (1) maintenance plans in the maintenance management component (SAP Plant Maintenance); and (2) asset strategies in the capital needs planning tool known as AMP.

Maintenance Plans – AMD staff have developed maintenance plans that will automatically trigger inspections and predictive and preventive maintenance with the IAM System. For example, PUD has maintenance plans in the IAM System for about 25 percent of their assets. It will be important going forward to identify and develop maintenance for additional assets, as appropriate.

The California Tower in Balboa Park.

Maintenance Plans in IAM

Department	Description
DoIT	Location Specific
PUD	Water Main Cleaning (1 month to 5 years)
PUD	Manhole Inspection (36-month cycle)
PUD	Water Valve Inspections North & South (Four-year cycles)
PUD	Wastewater Pump Stations, Treatment Plants and Reservoirs
PUD	Plans for Commercial Meters & Backflow
PWD/Facilities Division	Building Inspections
PWD/Facilities Division	Electrical
PWD/Facilities Division	Heating, Ventilation, and Air Conditioning (HVAC)
TSWD	Traffic Signal Quarterly Inspections
TSWD	Street Sweeping
TSWD	Drain Cleaning and Storm Patrol



Bayshore Bikeway.

Asset Strategies – The AMP component of AM identifies long-term capital needs, called asset events, based on risk. This will support long-term capital needs planning. Currently, risk is based on the asset type's condition index and each AMD's approach to consequence of failure and likelihood of failure. Asset types with strategies currently in AMP are shown in the following table. These asset types were selected based on importance, as well as availability of strategies/ models and data for each asset. Note that the model for storm pumps and pump stations is being revised, and will be input into the AMP after completion, planned for the summer of 2018.

Asset Strategies in AMP

PUD	TSWD	PWD
• Transmission water mains • Distribution water mains • Sewer mains • Pressure regulating valves • Pressure regulating valve stations • Water pump stations • Wastewater pump stations	• Streets– pavement • Storm drains • Bridges • Proposed street lights	• Facilities

Since the go-live of AMP in April 2018, Phase 1 AMD staff are reviewing and revising the strategies and parameters included for each asset. Going forward, staff should determine what additional asset strategies should be included in AMP, and plan to obtain the needed data.

It will be important to support implementation to I AM San Diego Phase 2 departments so that they can also use the IAM System to conduct conditioned-based lifecycle planning for assets through both maintenance plans and asset strategies in AMP.

Incorporate Planning for Future Assets into IAM. The City's Planning Department is not considered to be an AMD, but plays an important role in planning for needed new assets. The Long-Range Planning Group is leading updates to Community Plans, which provide land use designations, as well as identify needed public infrastructure, based on the community's vision and policies in the City's General Plan. The Facilities Financing group develops and provides updates to Public Facilities Financing Plans (PFFPs), which establish priorities for infrastructure needs identified in community plans, and identify potential funding. Generally, the financing plans are funded through fees assessed on developers to mitigate the impact of new development, known as Development Impact Fees (DIFs) or Facilities Benefits Assessments (FBAs).

It is recommended that the Planning Department have a representative on the proposed AMAC (described in Section 06). Going forward, it will be important to assess options for including planned future assets into the IAM System, including those identified in PFFPs. This could be similar to the GIS layer for proposed new street lights.

Centralize Facilities Maintenance across Assets. The City has a Facilities Division within PWD that provides maintenance for many AMDs. However, in some cases, such as Police and Fire-Rescue, departments have maintenance staff of their own using various methods to track maintenance, and are currently not using the IAM System. The City has begun an effort to centralize the administration of facilities maintenance staff under the Facilities Division, as well as to provide gap analysis and training for staff so they can use the IAM System. This will ensure all information on maintenance of facilities will be included in IAM.

By centralizing these maintenance practices in one department, further efficiencies are achievable in scheduling, use of specialized staff across departments, reporting, and employee career development.

ACTION ITEMS

- ✓ Assess appropriateness of current service levels, revise as needed, and establish LOS for remaining assets.
- ✓ Assess and refine both maintenance plans and AMP asset models/strategies for Phase 1 AMDs.
- ✓ Support implementation for I AM San Diego Phase 2 departments so they can use the IAM System to conduct lifecycle planning for assets.
- ✓ Identify additional assets that would benefit from development of maintenance plans or strategies, and take steps or establish a plan to obtain the needed data.
- ✓ Assess options for including planned future assets into the IAM System, including those identified in Facilities Financing Plans.

Objective 3: Provide Transparent & Translatable Prioritization

Prioritize investment in assets, including maintenance and capital projects, in a transparent and translatable manner across departments. This includes assessing and budgeting for full lifecycle costs of assets. This will enable the City to:

- Make consistent and justifiable funding decisions and efficiently allocate resources across unique assets.
- Manage all assets on a lifecycle approach.
- Optimize capital and O&M expenditures.

The following proposed actions will help the City to prioritize capital investment in a manner that is transparent and translatable across departments.

Uphold the Prioritization Process from Council Policy 800-14 and Implement Recommended Revisions. To apply AM business practices across the City, the policies and procedures that promote transparency and outline prioritization criteria must be upheld consistently by each AMD. Council Policy 800-14 outlines prioritization for capital projects and transparency as part of the City's capital planning process. The goal of this policy is to institute a process that optimizes the City's limited resources for capital projects. The prioritization criteria includes factors for:

- Health and safety
- Asset condition
- Economic improvement
- LOS
- Sustainability
- Funding availability
- Project readiness
- Capital bundling opportunities

Revisions to enhance Council Policy 800-14 are being recommended to (1) enable prioritization across department/asset types; and (2) incorporate ranking specifically for capital needs, including how the AMP tool can be used to support them. By enhancing this policy, and in conjunction with the AMP tool, investment can be planned in more detail and projects can be bundled for efficiency and cost savings. Details related to recommended policy revisions are in Section 05.

Use the IAM System in Capital Planning and Prioritization. The IAM System provides the City with tools and consistent information to make informed decisions by identifying maintenance and capital expenditures for assets. In addition to providing tools and information, the AMP component of IAM will support development of the Five-Year Capital Planning Infrastructure Outlook.

As part of the I AM San Diego Project, staff from each AMD developed an approach to risk in AMP, which varies for each asset type currently in the system. Going forward, staff will need to work together to normalize risk[8], which will enable prioritization across asset types. Normalization of risk will also provide a basis for quantification of risks into dollars so the cost for deferring projects is understood.

Establish Capital Project Bundling Guidelines. PWD/E&CP is developing capital project bundling guidelines for proposed work packages of co-located needs in the public right-of-way, and within facilities. Guidelines will be based on geographical location, risk score, asset conditions, funding, and other constraints. These guidelines further transparency goals by outlining a standard process for how projects are shaped.

Optimize Capital and O&M Expenditures. With limited O&M and capital budgets, municipalities need to make hard decisions about where and when to spend their money to maximize returns on capital expenditures, while optimizing or deferring O&M. The IAM System is being used by Phase 1 departments for condition-based lifecycle maintenance and capital planning. This will support holistic asset investment plans based on actual and long-term predictive performance, and enable the City to effectively optimize costs, risks, opportunities, and performance.

8 Risk normalization means adjusting values measured on different scales to a common scale, in order to permit comparisons.

PUD is also using business case evaluations (BCEs) to assess different investment scenarios. This helps to ensure that all aspects of a proposed project are considered. Going forward, it will be important for other departments to use BCEs to support sound decision-making. A discussion of BCEs and PUD's template is included in Appendix D.

Confirm Maintenance Funding in Capital Plans. The City should confirm that maintenance is being accounted for in the lifecycle cost of assets when long-range capital planning is being conducted. Numerous cities, such as San Francisco, California and Denver, Colorado, include both maintenance and capital costs in long-term infrastructure plans. In San Francisco, routine maintenance is an explicit line item in the General Fund, planning for $153 million over the next 10 fiscal years, or approximately 8 percent of the total recommended funding amount. Denver spends most of its annual funding on a capital maintenance program (approximately 63 percent of available capital revenue), which is funded through property tax revenue. Detailed annual maintenance programs are developed by Denver city departments each year to prevent overall deterioration in asset condition, and improve service delivery. To supplement these efforts, a portion of annual maintenance funding is reserved in each department to allow immediate response to maintenance problems or other unanticipated needs. In addition to capital

Pacific Highlands Ranch - Fire Station 47.

maintenance funds, a portion of department operating budgets is dedicated to maintenance.

The City of San Diego should consider including maintenance in long-range capital planning to ensure it is being accounted for in the lifecycle costs of assets. This information will be developed as part of departmental AM plans.

ACTION ITEMS

- ✓ Revise Council Policy 800-14 to (1) enable prioritization across department/asset types; and (2) incorporate ranking specifically for capital needs.
- ✓ Normalize risk to enable prioritization across asset types, as well as to quantify into dollar amounts.
- ✓ Finalize guidelines for bundling projects into Standard Operating Procedures (SOPs).
- ✓ Use BCEs to fully assess projects and ensure sound investments are being made.
- ✓ Consider including maintenance in long-range capital planning to ensure it is being accounted for in lifecycle costs of assets.

Objective 4: Ensure Supported Investment

Enhance and sustain support of investment through ongoing communication and education to stakeholders. This will:

- Enable the City to realize the benefits of transparent and translatable capital project prioritization.
- Create an environment of engagement and ownership beyond those who are directly managing assets.
- Reduce uncertainty surrounding funding sources and help to build support for development of future financing strategies.

The following proposed actions will help the City to enhance and sustain stakeholder support of investment through ongoing communication and education.

Review Current Funding Structures at Regular Intervals. The City has various funding sources for maintenance and capital projects; for example, water and sewer enterprise funds, the Infrastructure Fund, and TransNet. Staff review existing funding sources regularly and provide O&M and capital projections and planning in the Five-Year Financial Outlook and the Five Year Capital Planning Infrastructure Outlook, respectively.

La Jolla Shores Lifeguard Tower.

The Five-Year CIP Outlook provides fiscal and capital asset planning. It details the basis for revenue projections, and criteria to determine capital infrastructure needs, presenting a broad overview of capital infrastructure needs and funding over the next five fiscal years. The CIP Outlook is developed to closely follow the annual release of the City's Five-Year Financial Outlook to more accurately forecast future available funding for capital projects, and drive long-term infrastructure planning.

Actual expenditures are then included in the City's annual operations and CIP budgets. PWD/E&CP also provides the State of the CIP twice annually. It is important that staff continue to regularly assess existing funding sources and pursue ongoing funding opportunities, such as grants.

Rebuild San Diego Infrastructure Fund

Passed by the voters on June 7, 2016, this ballot initiative requires the City to dedicate a percentage of the City's existing revenue streams (sales tax, General Fund growth, and pension payment savings) to be used for new infrastructure costs. The dedicated Infrastructure Fund included about $17 million in FY 2018.

Develop a Financing Strategy. Given existing funding sources, the CIP Outlook (for FY 2019-2023) shows an estimated additional $1.27 billion would be required to meet all the capital needs outlined. The IAM System will enhance the City's ability to develop sound long-term plans for capital investment, so that the City departments (specifically Finance, Debt Management, and AMDs) can more effectively pursue funding through commercial paper, bonds, etc. Developing a financing strategy for infrastructure will be an important next step so that additional, more-significant funding sources can be pursued, such as General Obligation Bond Programs and Public Private Partnerships, to help address the funding gap.

Build Support through Public Outreach Initiatives. To realize benefits from the City's other objectives, investment strategies need support from key stakeholders. Building initial support of projects will help to reduce uncertainty surrounding future funding sources.

Outreach can be fulfilled through various avenues. Developing a public campaign tailored to address residents' specific concerns about various assets, such as water, infrastructure, can be an effective route. Using asset data the City can move from a traditionally reactive approach to a campaign that proactively invites residents to ask tough questions of staff who are leading AM. Transparency and accountability go hand-in-hand with public outreach. Direct access to program leaders and straightforward answers to issues goes a long way in achieving citizen support.

Another avenue for outreach is to institute publishing of an annual report card that rates the City's success or failure in meeting established asset-related commitment. Coupled with these efforts, providing AM training for Council Members and staff, community groups, etc., can help support general understanding of AM as well as how it connects to key issues or concerns.

Through public outreach, this widespread support will engage and promote ownership beyond those directly managing assets.

The following documents provide related guidance for public outreach:

- Council Policy 600-24, Standard Operating Procedures and Responsibilities of Recognized Community Planning Groups, created Community Planning Groups that make recommendations to the Council and City staff.
- Council Policy 000-32, Neighborhood Input on Infrastructure Needs and Priorities, acknowledges the need for public participation and the process for neighborhood input on infrastructure priorities impacting the CIP plan
- Council Policy 000-31, Capital Improvement Program Transparency, formalizes the need for transparency with all stakeholders and members of the public with regard to CIP.
- Administrative Regulation 1.60, Capital Improvements Programming.

Measure Satisfaction of Stakeholders. The City conducts a biennial survey to determine the residents' level of satisfaction with major services, perceptions of safety, and attitudes about the quality of life in San Diego. The results from the 2015 survey indicated that 47 percent of the residents surveyed were "very satisfied" or "satisfied" with the overall quality of services provided by the City of San Diego.

It is recommended that future surveys incorporate infrastructure-specific questions to receive targeted feedback on projects and initiatives. Future survey results will be valuable in gauging how well these developments are delivered over time. To reinforce the survey findings, public outreach initiatives should be established or revised by each department that defines who the relevant stakeholders are, their decision making role, and the long-term value of AM to them.

ACTION ITEMS

- ✓ Continue to regularly assess existing funding sources and pursue funding opportunities, such as grants.
- ✓ Develop a financing strategy to identify new sources of funds to address the existing and future funding gap.
- ✓ Build support and educate stakeholders through public outreach initiatives.
- ✓ Work with the Performance & Analytics Department to include questions related to infrastructure in future residents' surveys to gauge satisfaction of stakeholders.

People at a Parkwide Event in Balboa Park.

04

Framework for Departmental Asset Management Plans

04 Framework for Departmental Asset Management Plans

THE IMPORTANCE OF ASSET MANAGEMENT PLANS

AM plans form the cornerstone of an effective AM System. ISO 55000 underscores the importance of AM plans, because they provide the roadmap for achieving value from physical assets by optimizing cost, risk, and performance across the asset lifecycle. AM plans identify what assets are owned, their condition, and needed maintenance to keep the asset to a desired, pre-determined LOS. AM plans also identify repair or replacement schedules and investment strategies.

Distinct from a master plan, which generally is a long-term planning document focused on providing a conceptual layout to guide future development, AM plans place emphasis on what is already owned, and how these assets can be optimized to meet appropriate service levels for customers. AM plans are increasingly being required to receive infrastructure-related funding, such as grants.

STATUS OF AM PLANNING IN THE CITY

AM Plans Are Not Widely Implemented. The maturity of AM varies across departments based on several factors, mostly notably:

- The level of federal and state regulation.
- Available resources and funding within the department.
- Differing priorities and goals for specific asset types.

As shown in the following table, two departments, TSWD and PUD, have existing AM plans. The remaining departments have various types of plans, but do not currently have AM plans.

Scripps Pier and the San Diego shoreline.

Infrastructure-Related Plans

Department	Plan and Date
Airports Division (Real Estate Assets)	Airports Division Business Plan, FY 2018
Fire-Rescue	Fire-Rescue Standards of Response Cover Reviews, 2010 and 2017
DoIT	None
Library	Branch Library Facilities Report, November 1998 Library Facility Improvement Plan, November 2002
Parks & Recreation	Parks Master Plan currently in development, in concert with Planning Note: Park Planning has several park-specific master plans, updates, and amendments, such as the Mission Trails Regional Park Master Plan Update
Planning	Planning Department has 52 community plans. The needed infrastructure is included in the community's PFFPs along with associated financing strategies.
Police	None
Public Utilities	Asbestos Cement Water Main Replacement Program Master Plan, January 2016 Citywide Water Facilities Master Plan Update, December 2015 City of San Diego Public Utilities Department Metropolitan Wastewater Plan, October 2012 Municipal Wastewater Collection System Master Plan, June 2012
Public Works/Facilities Division	Draft Interim Facilities Asset Management Plan (In Progress)
Transportation & Storm Water	Watershed Asset Management Plan, July 2013 Bicycle Master Plan, December 2013 Pedestrian Master Plan, December 2006 Urban Forestry Program Five-Year Plan, January 2017 Utilities Undergrounding Master Plan, 2009

TSWD/Storm Water Division has an extensive Watershed Asset Management Plan, which documents the state of assets and projects long-range asset renewal requirements for the City to comply with stringent water quality regulations. PUD has a mature AM program, including 20 dedicated staff, condition assessment programs for several assets, and AM plans, which are included in master plans for water and wastewater assets, and may add AM plans for additional assets in the future. It is important to note that PUD is not reliant on the City's General Fund; its operations are funded through water and sewer rates.

Departments that are reliant on the City's General Fund face more hurdles, with limited resources and priorities that compete with a number of other departments. For example, Parks & Recreation Department currently has two staff working part-time on AM activities. Although Parks & Recreation Department is working on development of a master plan, they do not have resources to develop an AM plan. Parks & Recreation is very interested in, and will greatly benefit from implementation of AM business processes and the IAM System; however, the department will need resources and staff to develop asset data and prepare for deployment.

RECOMMENDED APPROACH AND FRAMEWORK FOR AM PLANS

An AM plan identifies needed day-to-day asset operations, maintenance, and larger, less-frequent capital investments. The plan determines the procedures, priorities, and costs of this work, as well as how those costs fit into an overall departmental budget. Also assessed is how these costs impact asset performance and minimize risk while delivering a high LOS to citizens, visitors, and other stakeholders. Financial, social, and environmental costs should be balanced in a triple-bottom-line approach.

An AM plan includes a comprehensive report on the state of the infrastructure, as well as AM and financial strategies. It should also provide guidance on extending asset lifecycles by right-sizing maintenance regimes. Understanding the ideal level of maintenance to perform on different asset types maximizes operational efficiencies while minimizing costs. Initiating this strategy across a department or city allows for more assets to be properly maintained, instead of some being under-maintained and others over-maintained.

The framework recommended for each department's AM plan is provided below.

- Executive Summary – A high-level summary of the document and its overall recommendations.
- Introduction – An introduction to the department, the type of infrastructure it manages, and its role in the City's operations.
- Inventory Management – A summary of the current asset inventory system for the department, asset classes, and current state of the infrastructure in the department.
- Lifecycle Optimization – A program for performing condition assessments, predictive maintenance, and preventive maintenance, including an explanation of prioritization.
- Renewal and Replacement Management – A definition of the required service levels, a five-year cost projection, and a strategic plan for AM activities.
- Future Objectives for AM – Specific AM objectives for the department.
- Implementation Recommendations – Guidance for implementing the AM Plan, achieving the department's objectives, and communicating with and building support among stakeholders. Also included should be a definition of who is responsible for which activity.
- Citywide AM Initiatives – A discussion of Citywide AM initiatives and how the AM Plan achieves them.
- Funding Strategies – An outline of the current funding levels and a discussion of future funding strategies for the department's AM activities.
- Resilience Plan – A plan to sustain the right level of maintenance for infrastructure assets into the future.

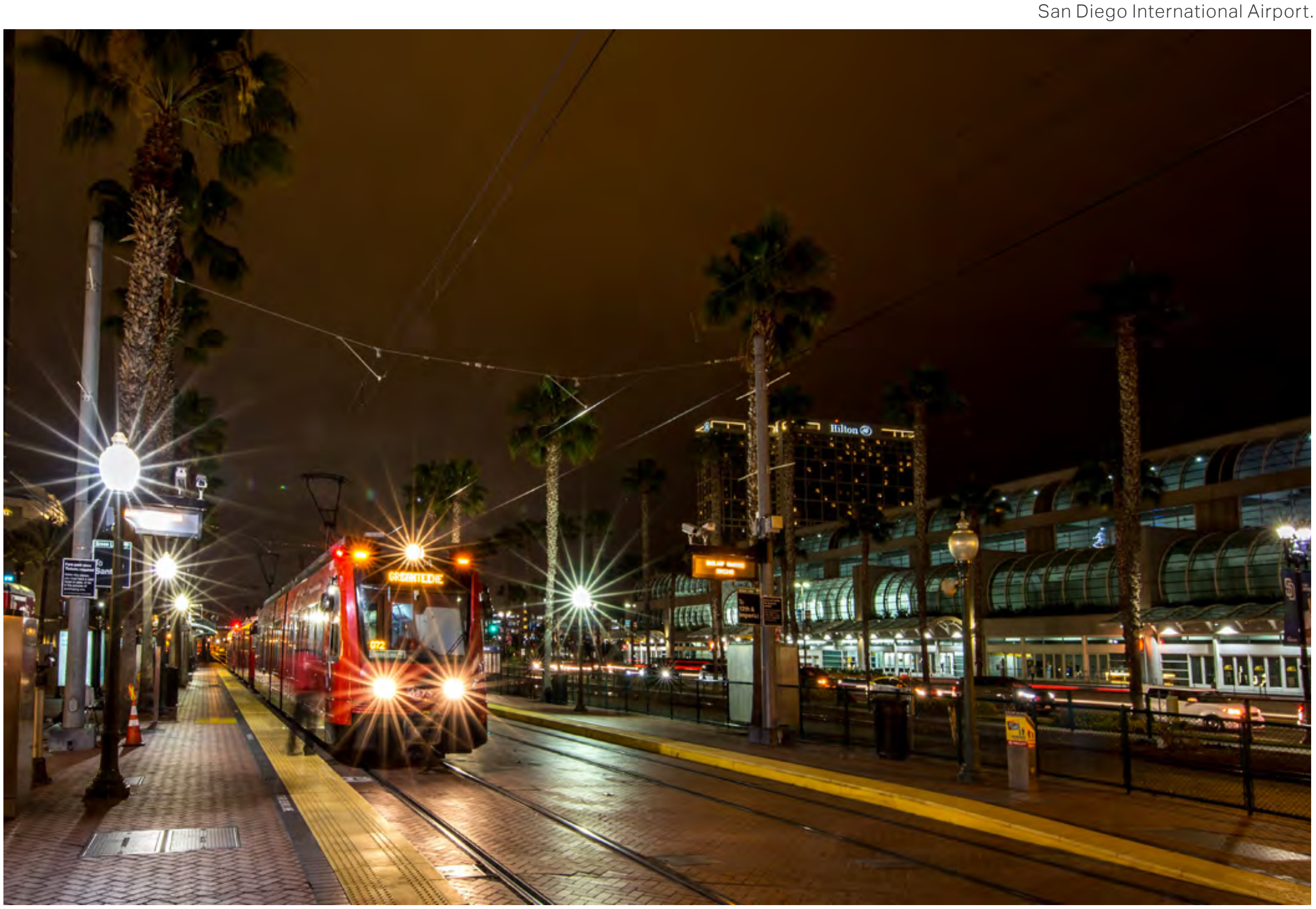
Although these guidelines serve as the foundation for departmental AM plan, each department's unique assets will require flexible approaches. Specific needs should supplement the guidelines where appropriate. In the case of departments with extensive regulatory or other requirements, such as PUD, the AM plan is to be used in conjunction with more detailed plans for handling specific asset types.

To continue the momentum of AM and ensure AM plans are developed, departments will need to start the planning process. The recommended AMAC, which is discussed in more detail in Section 06, should drive this effort and establish a timeline for completion of AM plans.

ACTION ITEMS

- ✓ Ensure I AM San Diego Phase 2 departments have needed resources to implement AM business practices and plans, as well as the IAM System.
- ✓ Drive the AM Planning effort and establish a timeline for completion of departmental AM Plans.

San Diego International Airport.



Trolley at the Convention Center.

05

Policy

05 Policy

The City's vision is to plan for and maintain assets in an efficient manner to support the City's strategic goals of providing high-quality public services, livable neighborhoods, and economic prosperity. Citywide coordination of AM will facilitate a holistic approach to infrastructure investments for maintenance and capital projects. With AM objectives and related strategies identified, a policy is necessary to explicitly define the course of action to be collectively adopted by AMDs.

EXISTING AM-RELATED POLICIES AND ADMINISTRATIVE REGULATIONS

The City currently has several AM-related policies and Administrative Regulations (ARs) in place, as shown in the following table. The two primary Council Policies that require revisions based on the new IAM System and SAMP are:

- Council Policy 800-14, Prioritizing Capital Improvement Program (CIP) Projects
- Council Policy 800-16, Asset Management Guidelines and Plan Steps

Both Council Policies were adopted in 2013, with minimal revisions since that time. A new AM policy is being recommended to replace the current Council Policy 800-16 and is provided as a separate document. Minor revisions recommended for Council Policy 800-14 are also discussed below.

Balboa Park Golf Course - Irritation System.

Policy or Regulation	Description
Council Policy 800-16: Asset Management Guidelines and Plan Steps	Establishes the overall guidelines and plan steps for Infrastructure Asset Management in the City of San Diego.
Council Policy 800-14: Prioritizing Capital Improvement Program (CIP) Projects	Guides CIPRAC in its CIP deliberations. The goal of this policy is to establish a capital-planning process that ultimately leads to policy decisions that optimize the use of available resources for projects competing from the same fund source or multiple fund sources.
Council Policy 000-31: Capital Improvement Program Transparency	Establishes the standard requirements for enhancing CIP transparency and improving access to publicly available information related to the CIP. It also establishes the framework for making the information readily available to stakeholders by using a combination of presentations to the City Council, stakeholder meetings, and media, including the City's website.
Council Policy 000-32: Neighborhood Input on Infrastructure Needs and Priorities	Formalizes a role and process for neighborhood input on infrastructure needs and priorities for consideration in the City's multi-year infrastructure plan, which is the blueprint for the annual CIP budget. This policy also intends to underscore the importance of Citywide public understanding and outreach for the CIP, as well as the need to communicate in various formats to reach all San Diegans.
Council Policy 600-24: Standard Operating Procedures and Responsibilities of Recognized Community Planning Groups	Identifies responsibilities and establishes minimum operating procedures governing the conduct of community planning groups.
General Plan Policy CE-A.5	Employs sustainable or "green" building techniques for the construction and operation of buildings.
AR 1.60: Capital Improvement Program (CIP) Project Initiation and Implementation (revised version currently in draft form)	Ensures that CIP funding and other resources are used for capital infrastructure planning and delivery purposes in compliance with applicable government accounting and funding requirements. It also ensures that available CIP funding and resources are used to deliver infrastructure projects in the most effective manner, and provide the greatest overall benefit/value to residents, businesses, and visitors of the City of San Diego.

PROPOSED NEW AM POLICY TO REPLACE COUNCIL POLICY 800-16

The current Council Policy 800-16 provides an introductory overview of AM guidelines and plans steps, rather than a broader overall policy for AM. Although the current policy sets important baseline information, some information is outdated and key sections are missing, such as review periods and consequences of non-compliance.

To develop the new policy, the guideline framework of Council Policy 800-16 was used as a starting point, and supplemented with additional principles based on the requirements of the current state of AM and input from departmental stakeholders.

The proposed new policy, summarized below, clearly states the City's mission, aspirations, and principles for Asset Management. The full proposed policy is available as a separate document.

Mission – The overarching mission for AM in the City is to deliver a targeted LOS for an asset in the most cost-effective manner.

Aspiration – The AM Program should be customer-focused, considering stakeholders throughout business decisions and promoting ease of use and access.

Principles – The City should become a leader in AM. Shifting focus from asset acquisition to optimizing the balance of preserving, upgrading, and replacing assets through cost-effective management, programming, and informed decision-making will uphold a consistent AM framework through integrated business practices and plans.

Key revisions include the following:

- Guidelines and steps for AM plans have been removed because a framework is provided in Section 04 of the SAMP.
- Updates were made to reflect the IAM System and AMP tool.
- The resource requirements section was revised to replace roles that no longer exist, such as the former Enterprise Asset Management Steering Committee, and include new roles, like the MDG Committees.
- The current policy states the need for periodic review of the policy. Revisions have been made establishing a specific review schedule to ensure the policy stays relevant and applicable.
- Additional definitions were added, including AM plan, condition assessment, and forecasting.

REVISIONS TO COUNCIL POLICY 800-14

Council Policy 800-14 outlines prioritization for capital projects and transparency as part of San Diego's capital planning process. The goal of this policy is to institute a process that optimizes limited resources for capital projects.

Revisions to enhance Council Policy 800-14 are being recommended to (1) enable prioritization across department/asset types; and (2) create detailed ranking specifically for capital needs, including how the AMP tool can be used to support it. By enhancing this policy, and in conjunction with the AMP tool, investment can be planned in more detail, and projects can be bundled for efficiency and cost savings.

Council Policy 800-14, Prioritization criteria includes factors for:

- Health and safety
- Asset condition
- Economic improvement
- Level of Service
- Sustainability
- Funding availability
- Project readiness
- Capital bundling opportunities

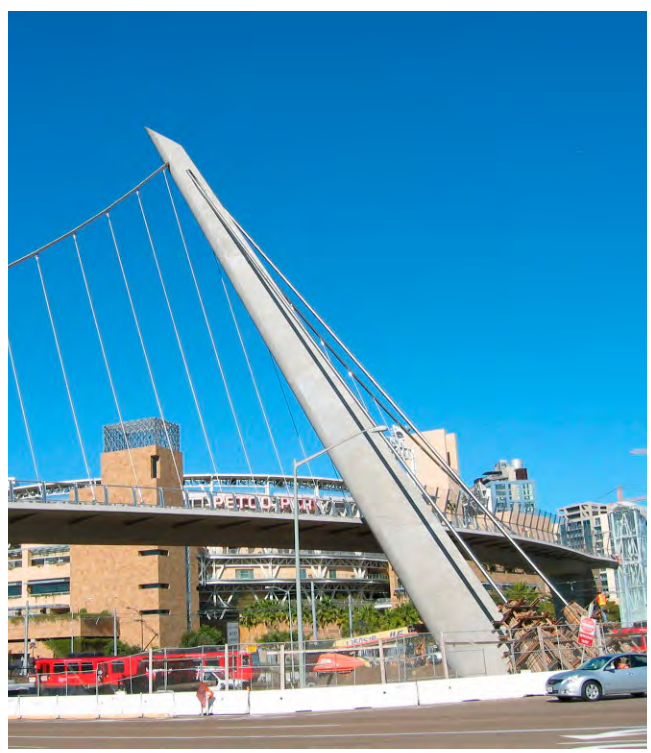
Prioritization across Asset Types

Council Policy 800-14 currently has four sets of scoring weights, as follows:

1. Enterprise-Funded Assets and Mandated Programs (services provided by PUD, Environmental Services, Airports, and Golf Courses)
2. Mobility Assets (bicycle facilities, bridges, roads, pedestrian facilities, etc.)
3. Public Safety Assets (lifeguard, fire and police facilities)
4. Neighborhood Assets (libraries, parks & recreation facilities, etc.)

It is proposed that these weights be reevaluated by the AMAC to reflect current priority concerns. For example, the potential points that can be earned for project bundling are low across all four groups in the current policy, but this should be a higher-priority consideration for the future, given:

- The new AMP GIS tool that will make bundling Phase 1 asset projects for co-located assets easier for E&CP staff is now live.
- Potential benefits associated with grouping projects for co-located assets in the right-of-way will help to avoid rework, reduce soft costs, and achieve economies in hard costs.



Harbor Drive Pedestrian Bridge.

The numbers behind scores should then be translated to priority urgency groupings of high, medium, and low. For instance, a priority score of 84 for a park restroom and a score of 78 for a storm water pump could both be given a high-priority grouping, and then could be more readily compared across asset types. This translation from a number to a priority level should be done by department asset managers who are highly familiar with the risks the asset poses to health and safety, as well as the level and quality of service targets.

Incorporate Ranking Specifically for Capital Needs

It is also recommended that further details related to prioritizing capital needs be included more specifically in this policy. The policy states that CIP needs lists are developed by City departments, based on input from elected officials, community-based organizations, private residents, O&M staff, and other stakeholders. The policy states that AMDs will establish a high-level project score for the needs when appropriate.

The policy does not, however, provide clear guidance for how AMD staff should identify which needs are the most critical. This has been raised as a challenge by AMD staff that has the responsibility for prioritizing capital needs for their departments. In developing this SAMP, the cross-departmental working group agreed that such guidance is needed, and could be addressed in the AM Policy, or in a revision to the Council Policy 800-14 as recommended here.

ACTION ITEMS

- ✓ Work with appropriate staff and the Infrastructure Committee to finalize the proposed new Council Policy 800-16 (provided as a separate document).
- ✓ At the discretion of the AMAC, a corresponding administrative regulation could be developed to reflect the revised Council Policy 800-16.
- ✓ Assess and finalize as appropriate recommended revisions to Council Policy 800-14.

East Village - Fire Station 4.

06

AM Roles and Responsibilities

06 AM Roles and Responsibilities

For AM to be effective across multiple departments with complex responsibilities and relationships, all stakeholders must be working towards the same objectives. Within the City, there are numerous key roles involved in implementing the SAMP. Those identified below are categorized as existing, new, and recommended responsible parties, and associated roles related to AM.

EXISTING ROLES

Mayor: Provides overall policy direction to departmental staff related to infrastructure, and presents the proposed Operating and CIP budgets.

City Council: Provides overall policy direction related to infrastructure, and approves the final Operating and CIP budgets.

DCOO, Infrastructure/Public Works, and IAM Program: Provides guidance and leadership for Citywide AM and coordinates efforts within departments. Led implementation of I AM San Diego Phase 1. The DCOO chairs the CIPRAC.

AMDs - Asset Managers: Responsible for having a strategic overview of their respective department's AM activities, from maintaining records to planning for maintenance, repair, and replacement.

PWD/E&CP Branch: Implements and manages approved projects in the CIP budget, including project initiation, planning, design, construction bid and award, construction, and post-construction. Going forward, will provide proposed bundled work packages for co-located assets.

CIPRAC: Includes senior-level officials from AMDs and supporting departments who review proposed projects and project prioritization from a Citywide perspective, and forward budget recommendations for the Mayor's approval. A new Project Controls Committee (PCC) is being initiated to review and approve bundled work packages.

Community Planning Committee/Groups: Serves in an advisory capacity to the City regarding matters related to the General Plan, various community plans, and PFFPs.

IAM Governance Committee: Senior-level officials providing overall direction and guidance on the IAM System.

NEW ROLES RESULTING FROM INFRASTRUCTURE ASSET MANAGEMENT SAN DIEGO

MDG Committees: Will work to develop standards for data, as well as procedures for new data coming into the system. There are two separate committees within MDG: one focused on asset data and one focused on materials data.

IAM System – Post-Go Live Support Committee: Works with departments to handle logistics and technical needs that arise in support of the IAM System.

RECOMMENDED ROLES

AMAC: The City needs a new committee to coordinate AM activities, ensure that AM objectives are being upheld, serve as stewards of the SAMP, and drive and support completion of action items. Every AMD should have at least one representative on the committee who is a decision-maker and knowledgeable of their department's AM operations and structure. Related support service departments should also have a representative on this committee, including the Planning and Finance Departments.

Committee activities should include:

- Setting performance metrics and evaluating compliance with regulatory requirements.
- Identifying clear procedures for accessing data and ensuring data are substantial enough to use for planning activities.
- Overseeing the development, implementation, and continual improvement of departments' AM programs.
- Determining the appropriate timeline for updates to departmental AM plans.
- Reporting on the current state of departmental AM on an annual basis.
- Addressing common issues across departments and sharing resources related to AM best practices.

Meetings should be conducted on a regular basis to ensure that AM maintains a top priority for the City throughout the future. The existing CIPRAC could potentially revise its role and membership to cover AM for infrastructure assets (which includes both maintenance and capital projects).

ORGANIZATIONAL STRATEGY: RESOURCES, SKILLS, AND TRAINING

AM strategies would not be effective without also considering soft assets like human resources, knowledge and skills, and training. With City implementation of the IAM System, and Citywide dedication to AM, specialized roles and new job classifications may be needed to effectively support these changes. Members of the cross-departmental working group, as well as the I AM San Diego business leads, identified some key roles:

Asset Analyst – Provides support to AMDs, ensures information and data are accurate in reporting and database systems, and performs analysis of property financials, budgets, and portfolio reporting.

Asset Manager – Analyzes asset classes, recommends optimal maintenance and replacement schedules, determines business risks, groups projects, and implements an asset-related feedback mechanism.

Pacific Beach Surf Rescue.

(Master) Data Analyst – Conducts quantitative analyses and provides analytical support to inform the major departmental asset data decisions.

Information Systems Analyst – Analyzes procedures, methods, and operations of computer-based information systems; and designs, implements, and recommends information systems to improve the efficiency and economy of City operations.

Financial Analyst – Performs financial forecasting, reporting, and operational metrics tracking; analyzes financial data and creates financial models for decision support; reports on financial performance and preparation for regular leadership reviews; and identifies trends and makes recommendations for improvements.

Risk Manager – Implements policies and conduct training to minimize human, property, and financial risk; investigates and assesses potential risks for assigned projects and accounts; and proposes possible solutions/programs/protocols for minimizing risk and liability.

Processes should be put in place to ensure that adequate training for AM teams continue to be upheld throughout the future. These teams include anyone who is involved in dealing with their department's assets, from maintenance workers to division deputy directors. Training on technology applications, including the IAM System, should be conducted at regular intervals, to keep up to date with industry expertise.

ACTION ITEMS

- ✓ Review job classifications to determine what additional classifications are needed or should be revised to effectively support AM business practices and the IAM System.

Imperial Beach, San Diego.

07

Conclusion and Recommendations

07 Conclusions and Recommendations

The City of San Diego owns and maintains billions of dollars of infrastructure assets, such as streets, storm drains, facilities, and water and sewer mains. Effectively managing infrastructure is critical for continuing to keep the City safe and beautiful. Infrastructure represents a significant investment for the City, and impacts the quality of life for residents, visitors and businesses. At the same time, the City is facing competing priorities for limited resources. AM plays an important role in helping the City effectively plan for investments in infrastructure. It is a best business practice for managing infrastructure assets in the most cost-effective manner while achieving desired LOS.

The City has made significant progress towards implementing citywide AM by developing and deploying the IAM System to five primary Departments/Divisions. With the IAM System, the City has taken a unique, Citywide approach for ultimately including all asset types to provide an overall, transparent view of the state of the City's infrastructure. Many local governments and utilities include one or a few assets in an IAM System, but have not taken the Citywide approach. Also unique is the City's end-to-end approach to including the AMP tool to support proactive, condition-based maintenance and long-term capital needs planning.

Additional progress the City has made with AM includes:

- A mature condition assessment program for several asset types such as water and sewer mains.
- Comprehensive AM plans developed by PUD and TSWD/Storm Water Division.

Creation of this SAMP is also a significant step to establish AM objectives, strategy, and policy, and provide a framework for departmental AM plans. By following this SAMP and using the IAM System, the City will be better positioned to holistically prioritize and plan infrastructure investments. New roles and responsibilities will be restructured in a way that encourages transparent, collaborative planning. Policies that emphasize San Diego's Citywide focus and commitment to AM will ensure that AM activities are consistent and transparent across departments.

It is critical for the City to continue this momentum and move forward with the recommended action items to ensure the investments the City has made will be fully realized. To support achievement of the AM objectives, strategy, and policy, the following commitments are needed:

All departments should be accountable. The objectives have been developed to further enable achievement of the City's strategic goals. For these objectives to carry meaningful weight across the City, they must be understood, supported, and promoted across the entire AM network. Departments are accountable for this support of the objectives, along with the tasks associated with the recommended action items. Accountability and ownership of the commitment to AM is crucial to sustaining an effective system.

Leadership should guide support. All City departments that have the responsibility for planning, acquisition, operation, maintenance, reporting, and/or disposition of assets have a joint responsibility to support AM. Departmental leaders should maintain involvement in the implementation of these objectives, and general accountability for the IAM System. Furthermore, a diversity of perspectives should be included among those who are supporting the AM activities to invoke new ideas related to maintaining and creating value. The new AMAC could be a resource to go to with these new ideas.

Activities should be revisited to see if practices are adhering to objectives. After AM activities have been conducted, they should be evaluated against the objectives to measure performance. Whether or not an objective has been achieved, it is important to understand why this outcome occurred, to either support or modify future practices. More details on this are found under Section 03.

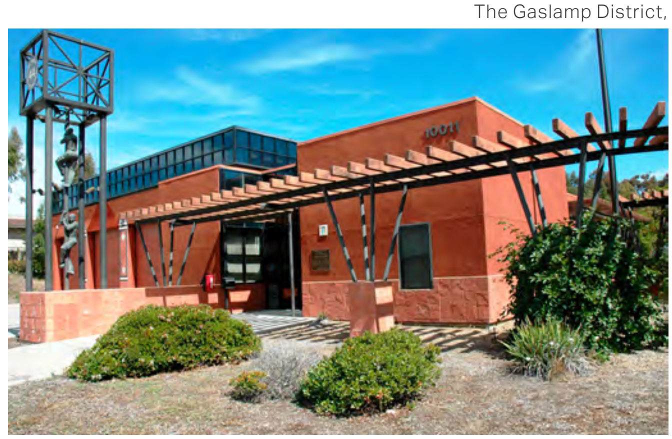
RECOMMENDED ACTION ITEMS

The following action items need to be completed to ensure investments the City has made will be fully realized. Note that these items are listed in the order they are introduced in the document. Prioritization of these action items should be done before their undertaking.

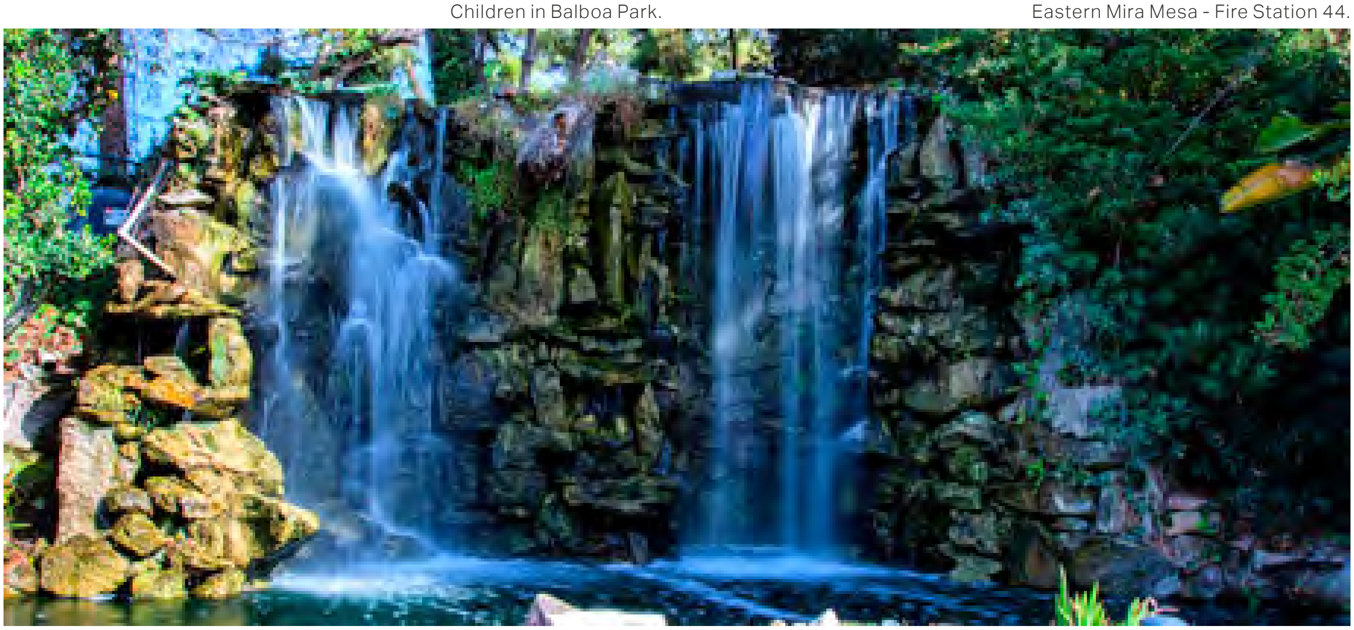
	Action Item
1	Create the AMAC to coordinate AM efforts, provide a holistic approach to AM, and lead work towards completing the remaining action items.
2	Standardize AM Procedures by development of AM Plans and Policies.
3	Carry out the planned MDG committees for asset data and materials data.
4	Use maintenance history in the IAM System to target needed condition assessments.
5	Expand the condition assessment program to include additional assets, as appropriate.
6	Implement guidelines for condition assessments and inspections.
7	Assess how capitalization of newly built or improved infrastructure can be done in the system and develop a policy/process for how this data is tracked and logged established.
8	Assess appropriateness of current service levels, revise as needed, and establish LOS for remaining assets.
9	Assess and refine both maintenance plans and AMP asset models/strategies for Phase 1 AMDs.
10	Support implementation for I AM San Diego Phase 2 departments so they can use the IAM System to conduct lifecycle planning for assets.
11	Identify additional assets that would benefit from development of maintenance plans or strategies, and take steps or establish a plan to obtain the needed data.
12	Assess options for including planned future assets into the IAM System, including those identified in PFFPs.
13	Revise Council Policy 800-14 to (1) enable prioritization across department/asset types; and (2) incorporate ranking specifically for capital needs.
14	Normalize risk to enable prioritization across asset types, as well as to quantify into dollar amounts.
15	Finalize guidelines for bundling projects into Standard Operating Procedures (SOPs).
16	Use BCEs to fully assess projects and ensure sound investments are being made.
17	Consider including maintenance in long-range capital planning to ensure it is being accounted for in lifecycle costs of assets.
18	Continue to regularly assess existing funding sources and pursue funding opportunities, such as grants.
19	Develop a financing strategy to identify new sources of funds to address the existing and future funding gap.
20	Build support and educate stakeholders through public outreach initiatives.
21	Work with the Performance & Analytics Department to include questions related to infrastructure in future residents' surveys to gauge satisfaction of stakeholders.
22	Ensure I AM San Diego Phase 2 departments have needed resources to implement AM business practices and plans, as well as the IAM System.
23	Drive the AM Planning effort and establish a timeline for completion of departmental AM Plans.
24	Work with appropriate staff and the Infrastructure Committee to finalize the proposed new Council Policy 800-16 (provided as a separate document).
25	At the discretion of the AMAC, a corresponding administrative regulation could be developed to reflect the revised Council Policy 800-16.
26	Assess and finalize as appropriate recommended revisions to Council Policy 800-14.
27	Review job classifications to determine what additional classifications are needed or should be revised to effectively support AM business practices and the IAM System.

The Gaslamp District,

Children in Balboa Park.



Eastern Mira Mesa - Fire Station 44.



Mission Bay Golf Course.

The City of SAN DIEGO

Strategic Asset Management Plan

Appendix

A

Appendix A: Strategic Asset Management Case Studies

As part of this effort, SAMPs from 11 different country, state, and local governments were assessed to provide insights into developing a SAMP for the City of San Diego. Most of the SAMPs that have been developed to date are from the United Kingdom, Canada, Australia, and New Zealand. These countries have been involved with AM for many years, and generally have more mature and robust programs than organizations in the United States. For these countries, SAMPs are required as part of an overall AM program, and AM plans are often required to receive infrastructure funding. Having a SAMP enables them to clearly define broader AM objectives across wider geographies and provide strategies and methods to develop high-level initiatives that will deliver these objectives.

Three relevant SAMP examples are included here:

County of Los Angeles, California – The County's SAMP created a new AM branch in the Office of the Chief Executive Office to provide leadership and a holistic approach to these programs. It also provides clear objectives and goals, and specific initiatives are outlined to improve coordination and communication of departmental AM efforts.

City of Calgary, Canada – Calgary's SAMP focuses on continuous process improvement, creation of standardized AM tools and development of a sustainable funding strategy.

City of Windsor, Canada – Windsor's SAMP underscored creating measurable goals with explicit KPIs that support decision-making strategies for assets.

COUNTY OF LOS ANGELES, CALIFORNIA

The County of Los Angeles' CEO developed a SAMP in March 2016. The goals were to optimize the use of assets, create an enterprise-wide understanding of asset needs and priorities, and develop long-term strategies to address unfunded future needs. This plan also aimed to alleviate discrepancies between planned capital budgets and actual operating budgets.

A key initiative outlined in the plan includes a new AM branch in the Office of the CEO to provide leadership to these programs. This branch will serve as the central hub, which works with the Board, other critical areas of CEO, and all other departments, to implement a vision for managing the County's assets. Within this branch, three divisions—Capital Programs, Real Estate and Leasing, and Master Planning and Sustainability—will help improve efficiency through reduced bureaucracy and operational cost savings.

Plan Objectives:

Maintain Accurate Asset Inventory – The County intends to conduct current condition assessment studies to identify and estimate costs of deferred maintenance projects. They will also conduct needs assessments to identify undersized, underused, or outdated facilities.

Maximize Existing Assets – Reducing costs, maximizing return on investment, and extending the useful life of assets are key components of asset maximization. Eliminating deferred maintenance backlog, investing in major rehabilitation projects, and addressing depreciation are a few of the County's underlying goals in this area.

Guide Strategic Investment – The County aims for a more holistic approach to planning and prioritization of collecting asset data. Interdepartmental planning, sustainability, analysis of opportunities for re-use and re-investment, and County service objectives (like homelessness and child welfare) are important factors that are considered when addressing investment directions.

Enhance Economic Development – The County targets to leverage existing assets and investment to opportunities that can benefit the surrounding community.

Develop Strategy to Fund Highest Priority Needs – The County has made a critical long-term financial commitment to develop a program for addressing existing deferred maintenance backlog, roughly estimated to be $1 billion.

Strategies for Maintaining Assets:

Work to Meet Sustainability Measures – This includes optimizing water and energy use, reducing waste generation, and working with the Internal Services, Public Works, Tenant Departments, and Sustainability Council to create healthier environments.

Maintenance Strategy – The Plan updates the performance requirements for maintaining County facilities.

Facility Managers Network – The County will convene regular meetings with staff from each department to increase efficiency and effectiveness through collaboration.

Asset Planning/Master Planning – County assets will be planned from an enterprise perspective; one that maximizes opportunities across the boundaries of individual departments. The CEO will work with the County departments to review capacity, operational efficiency, and programmatic sustainability of facilities to provide for current and future services.

Prioritizing Projects – Apply objective criteria to potential projects and aid in developing short- and long-term implementation plans.

Rolling Five-Year Plans – Every five years, the CEO will establish capital and deferred maintenance projects. Facilitation efforts by the Internal Services Department and Department of Public Works will plan and manage these projects.

Preparing Annual Budgets – Annual budgets will be shaped by indicated priorities and decisions regarding use of facilities that reflect the Board's operational priorities.

Project Review Committee – A committee of department heads will review the annual budget. This will increase transparency and build support for a consistent County-wide vision.

CITY OF CALGARY, CANADA

The City of Calgary developed their Corporate AM Plan to improve their existing infrastructure management plan. They intend to support AM practices at both executive and departmental levels. Calgary also instituted an Administrative Leadership Team—a group made up of the City's senior management responsible for developing and approving their AM policy, strategy and governance.

Key Strategies for Maintaining Assets:

Update the Corporate AM Strategy & Policy – Given the evolving practices and performance expectations in the City, Calgary is expanding on their previous AM strategy document, written in 2005, based on newly agreed key principles and objectives.

Continually Improve Management System for the AM Practice – The management system should evolve and update as needed. The City intends to conduct performance tracking and institute corrective action mechanisms. To aid in this, the City will have AM practice performance metrics that will be internally reviewed and checked.

Enable an Integrated Approach to Infrastructure Decision-Making – This action will be to collaborate and integrate with other departments, ensuring a coordinated approach to sustainable urban development.

Improve Tackling of Infrastructure Investment – The City plans to review and revise the current maintenance, upgrade, growth, and service strategies, as well as any other existing infrastructure management strategies in place across its districts, because these strategies currently do not capture the drivers behind investment from an AM perspective.

Implement Continuous Improvement of AM Practices – The City aims to continuously update AM guidelines as they evolve over time to better understand how to sustainably plan for long-term strategic direction, and to optimize these asset systems at the portfolio level.

Develop an AM-Enabling Service – An ongoing effort is development of standardized tools that support these AM processes.

Establishing a Funding Strategy for Infrastructure – The City plans on standardizing the way infrastructure investment plans are collected and possessed to implement an infrastructure funding strategy.

Regular checks will be implemented to monitor AM both at the departmental and executive level. The newly improved Infrastructure Status Report will detail current and anticipated statuses of the City's infrastructure.

CITY OF WINDSOR, CANADA

The City of Windsor Corporate AM Plan is a detailed document put in place to ensure the City's infrastructure upholds sound AM practices while maintaining a desired service quality. Their plan also includes details regarding the state of current infrastructure, service guidelines, prioritization, risk management, and financial strategies. Windsor also created an Asset Planning Division in 2013, which works with various operational areas to assist them in producing AM plans.

The plan reflects numerous City-implemented guidelines and goals, including:

Infrastructure Strategic Plans – Following the City's Strategic Plan Goals, including required Assets, Asset Performance and Community Expectations, incorporating the appropriate legislation.

State of Current Infrastructure Reports – Maintaining Asset inventory and valuation, tracking current condition and performance, and analyzing sustainable funding.

Expected LOS – Setting performance measurements about whether an asset or infrastructure is delivering at an appropriate level, and gauging current required KPIs, performance measures, and public engagement levels.

AM Strategy – Developing current assets' lifecycle analysis, growth requirements, risk management, and project prioritization methodologies.

AM Performance Reporting – Tracking key performance measures and reporting progress to senior management and the Council.

The City of Windsor relies on LOS to clearly indicate and track AM progress. These measurements help departments deliver consistent service while simultaneously aligning themselves to City objectives. Windsor also cross-references benchmarking levels with comparable municipalities, making sure they are in line with regional standards.

After all the set LOS were evaluated, every asset group/department was given a rating on its predicted performance. These included:

- Negative upward trend: Higher risk to service delivery.
- Positive upward trend: Represents positive outcome, improving LOS.
- Negative downward trend: Declining LOS.
- Positive downward trend: Lower risk to service delivery.
- Consistent/stable trend: No anticipated changes.

Ultimately, determining service quality feeds Windsor's strategies for managing assets, which include:

- Operation: Mitigating risks, deferring needs for upgrades/renewals, asset utilization and demand management, and emergency response planning.
- Maintenance: Finding an approach to determine optimal mix of planned/unplanned maintenance.
- Optimized decision-making: Using risk-based, investment optimizing approaches across service areas.
- Investment: Identifying and scoping projects to address capital maintenance, enhanced levels of service, growth, and efficiency needs.

Appendix B

Appendix B: Condition Assessments and Inspections Guidelines

Condition assessments and other inspection programs are a key component of AM. Assessments should be designed to provide the most useful analysis at the lowest cost to the department. Any opportunity to use industry standards to provide reporting without exhaustive data collection and maintenance are preferred. Once basic assets are documented, the emphasis should be on targeted data collection and analysis of condition to ensure that departments are not expending time and resources maintaining large databases of condition data that will be quickly outdated.

Assessors – Condition assessments are generally performed by architectural and engineering professionals, while inspection programs can also rely on City maintenance staff, and/or industry personnel for specific equipment.

Asset Types – The City has a large variety of assets that need to be assessed on a cyclical schedule. For each asset type, the City should ensure that the records for asset location and type are correct, right size the assessment scope (for initial and follow-up assessments), identify staff, and schedule the assessments to ensure that data does not age beyond usefulness.

Data Collection – The example below discusses the process for assessing buildings, but other asset types, such as roads or water infrastructure, may need a different assessment regime. Common information collected during a building assessment includes:

- Front elevation photographs.
- Overall condition of each asset or building system on an ordinal or nominal scale (such as good, fair, poor); examples of building systems include exterior vertical enclosures (exterior walls), roof construction, and heating, ventilation, and air conditioning (HVAC) systems.
- Deficiencies in the asset rated on a nominal scale, with photographs.
- Condition of equipment in facilities, with photographs.
- Summaries of asset conditions by discipline.

It is also important to create a data collection regime that minimizes inconsistent data collection. Establishing what reports are desired at the outset and working backwards to design standardized data collection drop-downs increases quality and ensures that the information collected will support the reporting and budgeting goals of the department.

Quality Assurance and Quality Control – Once this standardized data collection is achieved, the quality assurance/quality control (QA/QC) process is far simpler. After collected data are checked for completion and consistency, the data should be grouped into logical implementation projects with rough-order-of-magnitude costs assigned. These projects can then be costed and prioritized based on departmental factors. Some factors used for buildings include:

- Building use and mission
- Safety and security
- Available budget
- Potential return on investment.

The City's current process is to contract this work out to various consultants. These guidelines should ensure that data collected from this work are collected and stored in a manner that is consistent across all contracts.

Collecting curated, accurate deficiency data that support departmental reporting objectives, bundling these data into smart implementation projects with rough-order-of-magnitude level costing, and developing prioritization factors targeted to each asset type will allow insight into both short- and long-term budgeting needs. Understanding the immediate and future financial and asset condition liabilities will greatly reduce risk, allowing the City to tackle the most pressing regulatory, health, and safety needs across all asset types first.

The City of
SAN DIEGO

Strategic Asset
Management Plan

Appendix

C

Appendix C: Levels of Service

LOS determines a specified level of quality and reliability for the delivery of an asset. A successful AM program achieves targeted service levels at the lowest cost and risk. Service levels fall into four major categories:

- **Reliability –** Continuous, uninterrupted service to customers. Examples include targets and limits for unplanned events, crew dispatching times, and outage duration.
- **Quality –** Commitment to deliver high-caliber products/services. Examples include targets for water odor, taste, color, and pressure.
- **Customer –** Commitment to respond to customer needs in a courteous and timely manner. Examples include standards for complaint handling, new service connections, and call center wait times.
- **Regulatory –** Reliability and quality targets mandated by regulators and legislators. Examples include U.S. EPA clean water standards and consent decree compliance.

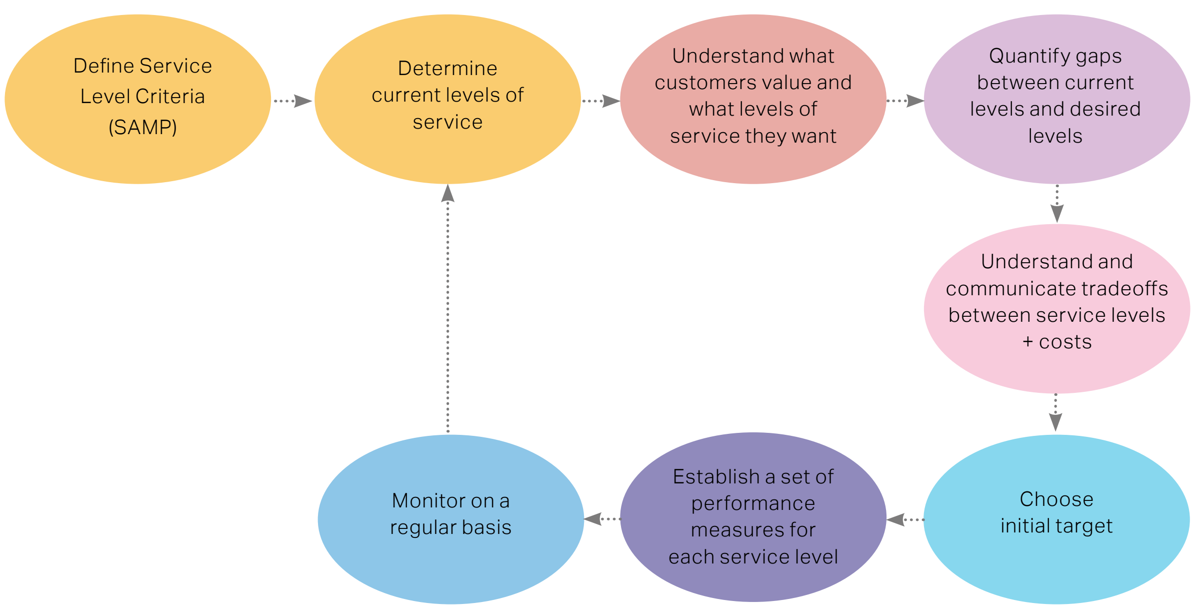
Before establishing target service levels, current levels should be assessed to see how far away from ideal levels an asset is. The four measurable categories above can then be used to figure out where the asset is performing well, and where it needs to improve. The following figure shows a typical process for determining LOS.

Recommended Approach to Establish LOS

It is critical to involve customers in the process early. If their values are reflected in the process of setting service levels, they will often be more supportive of the potential trade-offs necessitated by limited budgets and the need for achievable LOS. Customer involvement can be achieved through methods such as surveys, focus groups, community forums, advertisements, or public meetings. After an outreach approach has been determined, key questions to ask include:

1. What is important to them?
2. What do they value?
3. How much are they willing to pay for a given LOS?

Once negotiated and established, the service levels can be assigned performance measures that can be monitored and analyzed. These performance measures should tie into the departments' KPIs. Monitoring progress is crucial, because service levels need to be a living benchmark.



Process for Establishing Service Levels.

Summary of City of San Diego Departmental LOS

Department	Current LOS	Details
DoIT	Yes	Public Safety Public Service Maintenance Plan Scheduling during non-events Fire/Police Department vs Non-emergency services
Fire-Rescue	Yes	Public Safety and Service Maintain fire and lifeguard station for operational readiness Facility Condition Index of 15
Library	No	
Parks & Recreation	Yes	Park acres per population Park Condition Index of 15
Police	Yes	Facility Condition Index of 15 (Future LOS in development)
PWD/Facilities Division	Yes	Facility Reliability Public City Employees Preventive Maintenance Activities Facilities Condition Index (FCI) for General Fund facilities: • Public – 15 • Semi-public – 15 • Office-Work-yard Operations – 20 • Commercial-residential - 20
PWD/E&CP	Depends on client	E&CP is a consulting branch so the LOS depends on type of project.
PUD	Yes	Number of water main breaks Miles of water mains awarded for replacement Average number of minutes for water main break response time
TSWD	Yes	Response time to requests for repair Zero Flooded Properties Pavement Overall Condition Index (OCI) of 70 Tree-trimming frequency (currently a budget discussion) Response time metrics Ten-year goal for repairing all sidewalk defects Miles of streets swept annually

The City of SAN DIEGO

Strategic Asset Management Plan

Appendix D

Appendix D: Business Case Evaluation (BCE)

The BCE is a process to evaluate a perceived need and determine how best to address this need considering financial, environmental, and social impacts. Its ultimate purpose is to support a business judgment decision on a proposed project. Preparing a BCE helps decision makers answer the following questions:

- Do the customers need this project?
- Is this project the best approach to solving a real problem?
- How does it best balance project costs compared to expected benefits?
- What risks are involved?
- What are the risks' real magnitudes and gravity?

A BCE will usually require input from staff in planning, design, finance, operations, and/or maintenance to provide comprehensive information. In some cases, such as large-scale projects, the BCE will be done by a cross-functional team providing expertise in all or most of these areas. This cross-functional team is usually referred to as an "Expert Panel," or simply a "BCE Team." The team may need to meet several times to completely consider and finalize a BCE.

The staff responsible for the BCE will usually need a lot of information, some of which will be easy to obtain, and some more difficult. Sources to consider, in order of likely ease of access, include:

- The BCE Manual
- The department's AM Coordinator and BCE Coordinator
- Previous BCEs, cost dictionary, standards, etc., available in the department's BCE Library
- In-house "experts" throughout the department
- Library materials and the Internet
- Outside subject-matter experts

With regards to the mechanics of a BCE, there is no single "formula" that fits every case. Every project is in some way unique and has its own reasons for existence. However, most BCEs proceed in these general steps:

1. Define the drivers
2. State the problem
3. Formulate alternatives
4. Analyze alternatives
5. Recommend and report

Two key points of the BCE are:

1. "Lifecycle" means that benefits and costs are considered over a long period of time, typically 20 years or more. To the extent possible, these benefits and costs are expressed in dollar terms. Risks, if present or if reduced by an alternative, are likewise expressed in dollar terms.

2. "Present value" means that the analysis takes the time value of money into account. Present-value analysis is universally used by private companies to make investment decisions.

Public Utilities Department
BCE Project Abstract

Title	
Proponent	
Division	
Sponsor/Deputy Director	
Submission Date	

Issue/Problem to be Addressed

Known Alternatives

Key Factors to Consider
(Note: Reference Business Case Evaluation Process Narrative)

Other Considerations

Comments

Cost Estimates	Attachments: Y/N

Accounting (For Administrative Use)

Funding: O&M_____ or CIP_____ CIP# ____________________ Funding Year: __________

Financing Plan Review: 10YR/RC Version Date: _____/_____/_______

Fund No.	Cost Center No.	G/L Acct. No.	WBS No.	Internal Order No.

Analyst Review:_______________________________ Date:_____/_____/_____

Approval/Signatures

Role	Name	Signature	Date
Deputy Director			
Assistant Director			
Director			

Tracking (For Administrative use)

BCE No.	Asset No. (Auditor's Use)	Completion Date	Final Cost	Asset Manager Review

The City of SAN DIEGO

Strategic Asset Management Plan

Appendix

E

Appendix E: Definitions

ASSET
Item, thing, or entity that has potential or actual value to an organization.

ASSET LIFE
Period from asset creation to asset end-of-life.

ASSET MANAGEMENT (AM)
A best business practice for achieving desired service levels in the most cost-effective manner. This includes condition-based lifecycle management of physical infrastructure assets with consideration of design, construction, commissioning, operations, maintenance, and decommissioning; and usually involves a software system for the holistic management of assets.

ASSET MANAGEMENT (AM) PLAN
Documented information that specifies the activities, resources and timescales required for an individual asset, or a grouping of assets, to achieve the organization's Asset Management objectives.

ASSET MANAGEMENT (AM) STRATEGY
Long-term optimized approach to management of assets, derived from, and consistent with, the organizational strategic plan and AM policy.

CAPITAL PROJECT
Project that helps maintain or improve a City asset. Usually a lengthy investment used to build or improve on a project, and requires the use of significant capital—both financial and labor—from start to finish.

CONDITION ASSESSMENT
An analysis of the condition of an asset such as infrastructure, facility or group of facilities typically conducted by an architect and/or engineer. The analysis includes inspecting and documenting characteristics such as age, design, construction methods, and materials.

DEVELOPMENT IMPACT FEES
Fees that are collected within urbanized communities which are near build-out to mitigate the impact of new development.

FACILITIES BENEFITS ASSESSMENT
Assessment that generally provides 100% of funds for public facilities projects that service a designated area of benefit and are identified in the PFFP.

FORECASTING
Making conjectures about future asset performance and capital projects.

INFRASTRUCTURE ASSET MANAGEMENT (IAM) SYSTEM
Computerized maintenance management system for infrastructure assets.

INFRASTRUCTURE ASSET MANAGEMENT (I AM) SAN DIEGO PROJECT
A project to develop a comprehensive system to transform the way the City plans, prioritizes, and delivers maintenance and capital projects level of service. It replaces 28 applications with one SAP based solution that is integrated with the City's current enterprise system, including financials, procurement, and human resources.

KEY PERFORMANCE INDICATOR (KPI)
A metric related to departmental performance that shows evidence of results achieved. KPIs provide context for City services and enable the City to quantify service levels for each department.

LEVELS OF SERVICE (LOS)
Defined and measurable indicators that relate to quality, quantity, reliability, responsiveness, environmental consciousness, and cost.

LIFECYCLE
The phases of an asset, from the time it is constructed or acquired, through its operation and maintenance while in service, and to its eventual disposal.

PERFORMANCE METRICS
A method for evaluating how well specified targets are being met, which should give hard data and yield results that measure clearly defined quantities.

RESILIENCY
Management of risk to protect quality of life.

STRATEGIC ASSET MANAGEMENT PLAN (SAMP)
Document that specifies how organizational objectives are to be converted into AM objectives, the approach for developing AM plans, and the role of the IAM system in supporting achievement of the AM objectives.

The City of SAN DIEGO

Strategic Asset Management Plan

Appendix F

Appendix F: Alignment with Strategic Initiatives

An effective SAMP aligns with the overall goals and objectives from an organization's Strategic Plan, as well as related initiatives. The SAMP provides the high-level framework to assist AMDs in keeping aligned with the larger goals across the City. The SAMP framework is intentionally broad, to serve as an umbrella under which related practices, plans, and programs are integrated. Below is a discussion of the most pertinent of these strategic initiatives, and their relationship with AM.

CLIMATE ACTION PLAN

The goal of the City's Climate Action Plan (CAP) is to create a cleaner San Diego for future generations. Like the SAMP, the CAP will help to support many vital benefits to San Diego, including improving public health and air quality, providing energy independence and spurring economic development. With the identified SAMP-related initiatives, the CAP points to how reinvestment in existing local buildings and infrastructure will provide new opportunities for skilled trades and a variety of professional services, with methods including furthering public/private partnerships and hands-on training.

The CAP calls for two explicit targets: (1) eliminate half of all greenhouse gas emissions; and (2) see that all electricity in the City comes from renewable sources by 2035. To achieve these targets, the City has identified five key strategies, which are outlined below with specific measures related to the SAMP.

1. **Energy & Water Efficient Buildings**
    - Implement amendments to the City's Building Code that require installation of cool roof materials, significant repairs to existing roofs, and re-roofing.
    - Implement a Smart Energy Management & Monitoring System (SEMMS) for municipal facilities to monitor and track energy consumption.
    - Zero Net Energy Policy for new municipal-owned buildings.
    - Pursue Leadership in Energy and Environmental Design (LEED) for Existing Buildings: O&M Certification for municipal facilities.
    - Record the annual volume percentage of recycled water used and planned to be introduced through 2035.
2. **Clean & Renewable Energy**
    - Implement General Plan Policy CE-A.5 to achieve net zero energy consumption by employing sustainable or "green" building techniques for the construction and operation of buildings.
    - Establish policies, programs, and ordinances that facilitate and promote siting of new onsite photovoltaic energy generation and energy storage systems.
    - Encourage solar photovoltaic installations through implementation of a professional-certification permitting program.
    - Consider an integrated transportation strategy that combines zero-emissions vehicle deployment and infrastructure.
3. **Bicycling, Walking, Transit & Land Use**
    - Implement bicycle improvements concurrent with street re-surfacing projects, including lane diets, green bike lanes, sharrows, and buffered bike lanes.
    - Identify and address gaps in the City's pedestrian network and opportunities for improved pedestrian crossings.
    - Develop a new priority ranking for CIPs in Transit Priority Areas.
    - Implement infrastructure improvements, including "complete streets," to facilitate alternative transportation modes for all travel trips.
    - Use the CalEnviroScreen tool to identify and prioritize underserved communities ranking in the top 30 percent of scores for transit-related infrastructure improvements and capital improvements.

4. **Zero Waste (Gas & Waste Management)**
    - Implement operational procedures to capture methane gas from wastewater treatment.

5. **Climate Resiliency**
    - Develop a regional (Western San Diego County) Urban Tree Canopy Assessment in collaboration with other regional jurisdictions and the regional transportation planning agency, San Diego Association of Governments.
    - Plan for the long-term maintenance of additional trees, and ensure sufficient staff and funding are available.
    - Complete the Urban Forest Management Plan and present to City Council for adoption.

ECONOMIC DEVELOPMENT STRATEGY

The City's Economic Development Strategy is intended to guide the City's economic development efforts and lay out an action plan to promote the City's fiscal and economic prosperity. Although the Economic Development group is mainly a contract managing group and usually does not directly oversee asset maintenance activities, many of their initiatives and projects are dependent on the success of the City's infrastructure and assets. As a result, the SAMP and every department's AM plan must align with the Economic Development Strategy, and further the economic resilience of the City.

Current economic development agenda items for the City include reducing violent crime by increasing the number of and replacing old streetlights; placemaking initiatives; Smart Cities initiatives; investment in homeless shelters; and electric vehicle-charging stations. These initiatives rely on assets such as buildings, utilities, and equipment.

Finally, the Economic Development Strategy's emphasis on tourism and trade makes it essential that the City's roads, highways, and port are well-maintained, dependable, and have adequate capacity for the City's population and its visitors.

PERFORMSD PLATFORM

The PerformSD Platform is an initiative created by the Performance & Analytics Department, and is intended to display the City's KPIs in a visually accessible and digestible way for its residents. The platform works as a way for the City to closely monitor City services so that they can be improved through ongoing efforts. As the SAMP aims to provide resilient service and supported investment, AM activities should take full advantage of the platform to gauge how asset performance is perceived by the public, and where to focus future resources. The PerformSD Platform can be a valuable tool for AMDs to make timely, data-driven investment decisions.