Traffic Control System Management
L01 e-Tool Demo

U.S. Department of Transportation
Federal Highway Administration

AMERICAN ASSOCIATION
OF STATE HIGHWAY AND
TRANSPORTATION OFFICIALS
AASHTO

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

Introduction

- **This e-tool is based on research conducted in SHRP2*: Integrating Business Processes to Improve Travel Time Reliability (L01)*

- **The e-tool is designed to assist agencies in identifying their business processes that effect travel time reliability**

- **Reliability is dependent on many agencies and processes**

- **Opportunities exist to reduce the impact of congestion triggers**
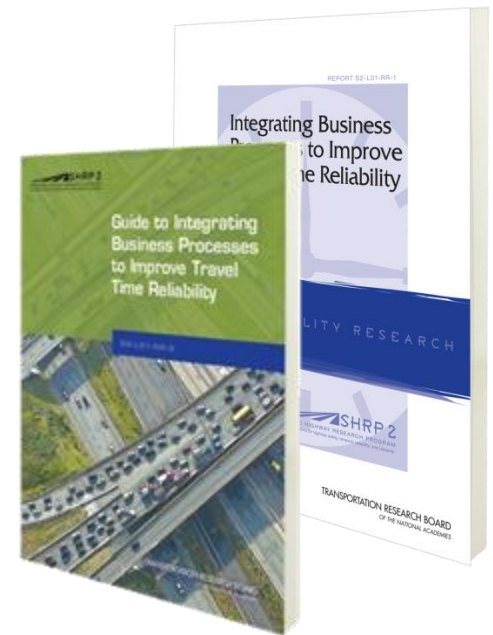
Introduction

- **Process – A series of actions or activities that result in a specific or desired outcome to accomplish a specific goal**
  - The method by which an incident is detected (911 call, service patrol call, etc.)
- **Business Process Mapping**
  - Provides a visual representation of steps and connections
  - Identifies areas for improvement
  - Highlights resource needs
  - Identifies additional support needs

Application of e-tool

The e-tool can be used to assess business processes for the following operational areas:

- Incident management
- Work zones
- Planned special events
- Weather/road weather management
- Traffic control/traffic operations
- Capacity/recurring congestion
- Fluctuations in demand

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Intended Use of e-tool

Includes an orientation and an application module

- **Orientation module:**
  - Provides background
  - Introduces case studies
- **Application module:**
  - Intended for use in a group setting
  - Ideally, the orientation module has already been completed
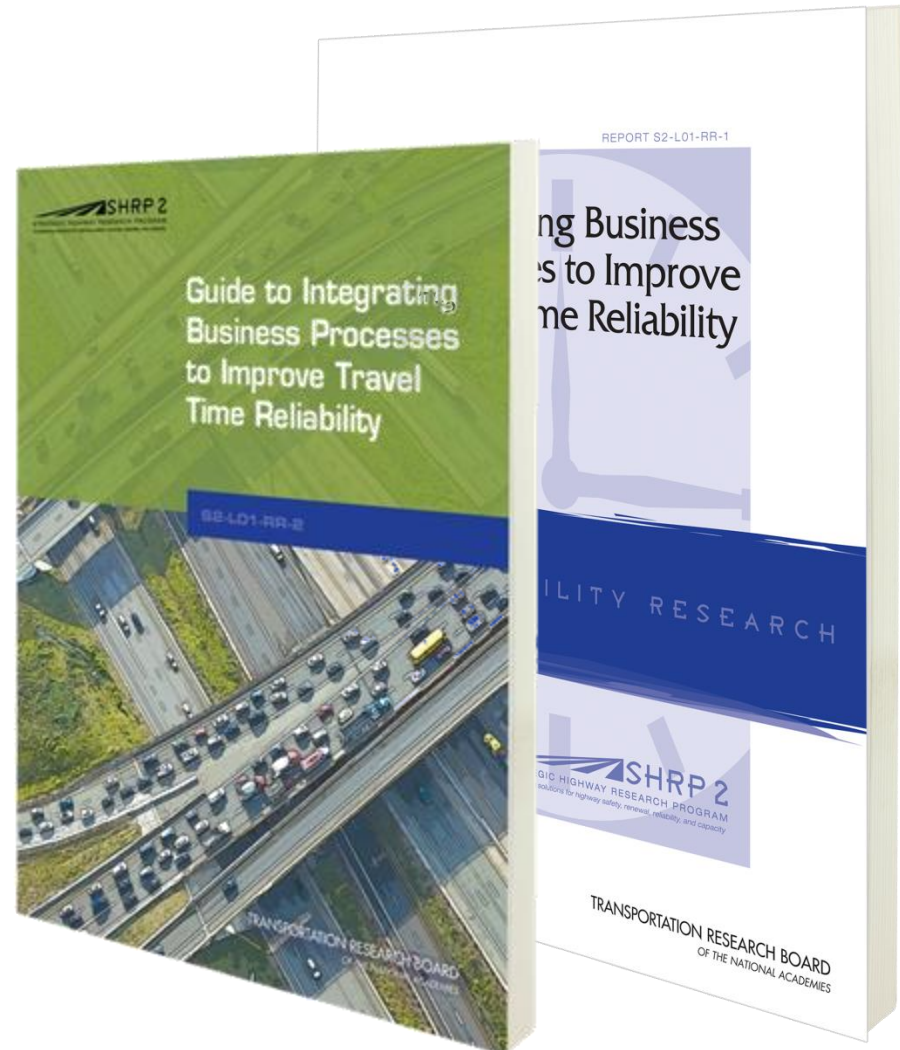
STEP
1

IDENTIFYING INFLUENCES

Identifying Influences

What made it apparent that there is a need to improve a business process in order to improve travel time reliability?

TOP DOWN

EVENT DRIVEN

NEEDS BASED

Top Down

- **Also known as "big directive"**
- **Legislative requirement or management –level directive**
- **Washington State DOT (WSDOT) Joint Operations Policy Statement and Instant Tow Program**
  - Directive came from the governor's office
  - Work closely with the Washington State Patrol
- **San Pablo Avenue Signal Retiming**
  - Identified as key by the SMART Corridor Program
  - Funded through the Metropolitan Transportation Commission (MTC) Regional Signal Timing Program (RSTP)

Event Driven

- **Caused by a specific event or hazard, like an accident**

- **Nevada DOT I-80 Winter Closure Program**
  – Significant crash due to weather
  – Major delays
  – There was a need to prevent further instances

Needs Based

- **Also known as "opportunity based"**
- **Evolves over time according to recurring needs**
- **Influences day-to-day operations**
- **Florida DOT Road Ranger Program**
  - Need to assist distressed vehicles
  - Initially implemented to assist with work zones, later expanded to assist stranded motorists

STEP 2

DEFINING THE SPECIFIC RELIABILITY GOAL

Defining the Specific Reliability Goal

- **Used to measure success**
- **Focuses your efforts**
- **Assists in the development of benchmarks**
  - Reducing incident clearance time
  - Providing 24/7 operations
  - Improving resource efficiency
  - Reducing congestion
  - Reducing delays

San Pablo Example

- **Identified a need for a revised signal timing plan**

- **Goal of addressing recurring congestion and improving travel time reliability**

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STEP 3

IDENTIFYING AND DOCUMENTING CURRENT BUSINESS PROCESSES

Identifying and Documenting Business Processes

- **A business process:**
  - Defines a series of actions or activities that result in a specific or desired outcome to accomplish a specific organizational goal
  - Is most likely something your agency does on a daily basis
- **The purpose is to formally document the business process associated with one of the operational areas**
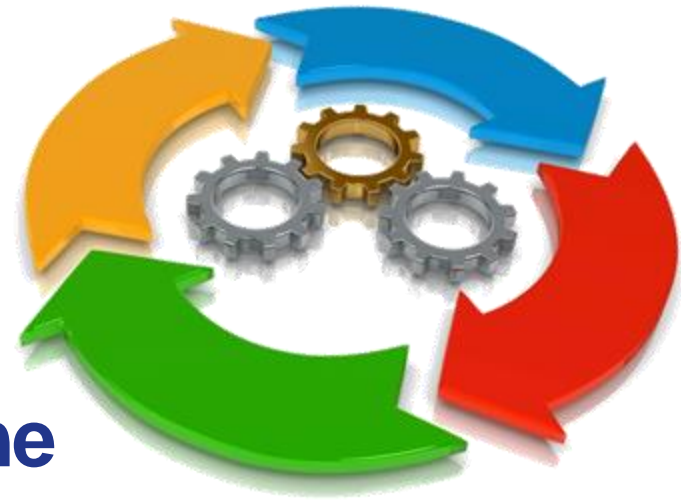
Identifying and Documenting Business Processes

- **Benefits**
  - Better understanding of the business process
  - Identifying gaps in communications or data flows

  - Identifying missing stakeholders

  - Formalizing roles and responsibilities to ensure continuity and retaining institutional knowledge

Identifying and Documenting Business Processes

- Demonstrate multiple methods by which a visual representation of an agency's business process can be developed

- No method is better than another

- Users are referred to the final reports of SHRP2 *Integrating Business Processes to Improve Travel Time Reliability (L01)* for additional information

Identifying and Documenting Business Processes

- **Start with the basics:**
  - Which agencies or organizations are key to a successful implementation?
  - The San Pablo Corridor Project has the following stakeholders:
    - Metropolitan Transportation Commission (MTC)
    - Alameda County Congestion Management Association (ACCMA)
    - SMART Corridor Program
    - Alameda County Costa Transit District
    - The motorists

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Identifying and Documenting Business Processes

- **Gather all documentation for your management program:**
  - Standard Operating Procedures
  - Formal Memorandums of Understanding
  - Informal exchanges of information and data
  - Current management methods
  - Others
- **Next, document the process or reverse engineer the current management process**
  - Data flows
  - Decision points
  - Process integration points
  - Critical input and output
  - Responsible entities
  - Integration of processes
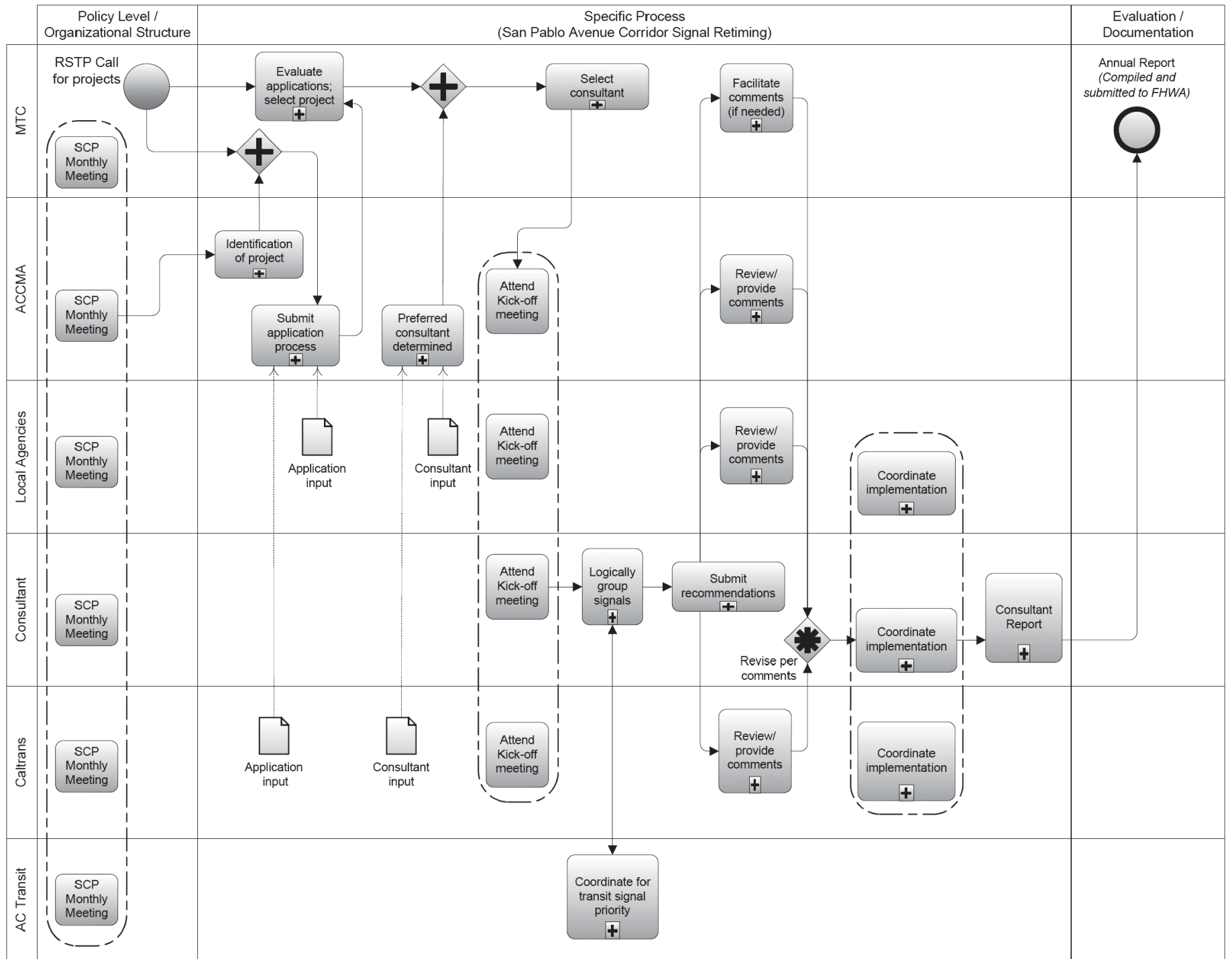
Identifying and Documenting Business Processes

- Next, create a visual representation of the operations process

- There are several approaches to mapping business processes

- In some cases, a sketch may be sufficient

- In other cases, a more comprehensive and complex drawing may be required

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San Pablo BPMN Example

- **Business process modeling is more formal than the previous flow chart**

- **Makes connection between:**
  - Those who create the process
  - Those who implement the process
  - Those who perform the process

- **Business Process Modeling Notation (BPMN) is detailed in L01 Report**

Policy Level / Organizational Structure

Specific Process (San Pablo Avenue Corridor Signal Retiming)

Evaluation / Documentation

MTC

RSTP Call for projects

SCP Monthly Meeting

Evaluate applications; select project ⊞

Select consultant ⊞

Facilitate comments (if needed) ⊞

Annual Report *(Compiled and submitted to FHWA)*

ACCMA

SCP Monthly Meeting

Identification of project ⊞

Submit application process ⊞

Preferred consultant determined ⊞

Attend Kick-off meeting

Review/ provide comments ⊞

Local Agencies

SCP Monthly Meeting

Application input

Consultant input

Attend Kick-off meeting

Review/ provide comments ⊞

Coordinate implementation ⊞

Consultant

SCP Monthly Meeting

Attend Kick-off meeting

Logically group signals ⊞

Submit recommendations ⊞

Revise per comments

Coordinate implementation ⊞

Consultant Report ⊞

Caltrans

SCP Monthly Meeting

Application input

Consultant input

Attend Kick-off meeting

Review/ provide comments ⊞

Coordinate implementation ⊞

AC Transit

SCP Monthly Meeting

Coordinate for transit signal priority ⊞

STEP 4

DEVELOPING/CHANGING AND IMPLEMENTING PROCESS

Developing/Changing and Implementing Process

STEP 4: IMPLEMENT PROCESS

STEP 5: ASSESS PROCESS

STEP 4: DEVELOP/CHANGE PROCESS
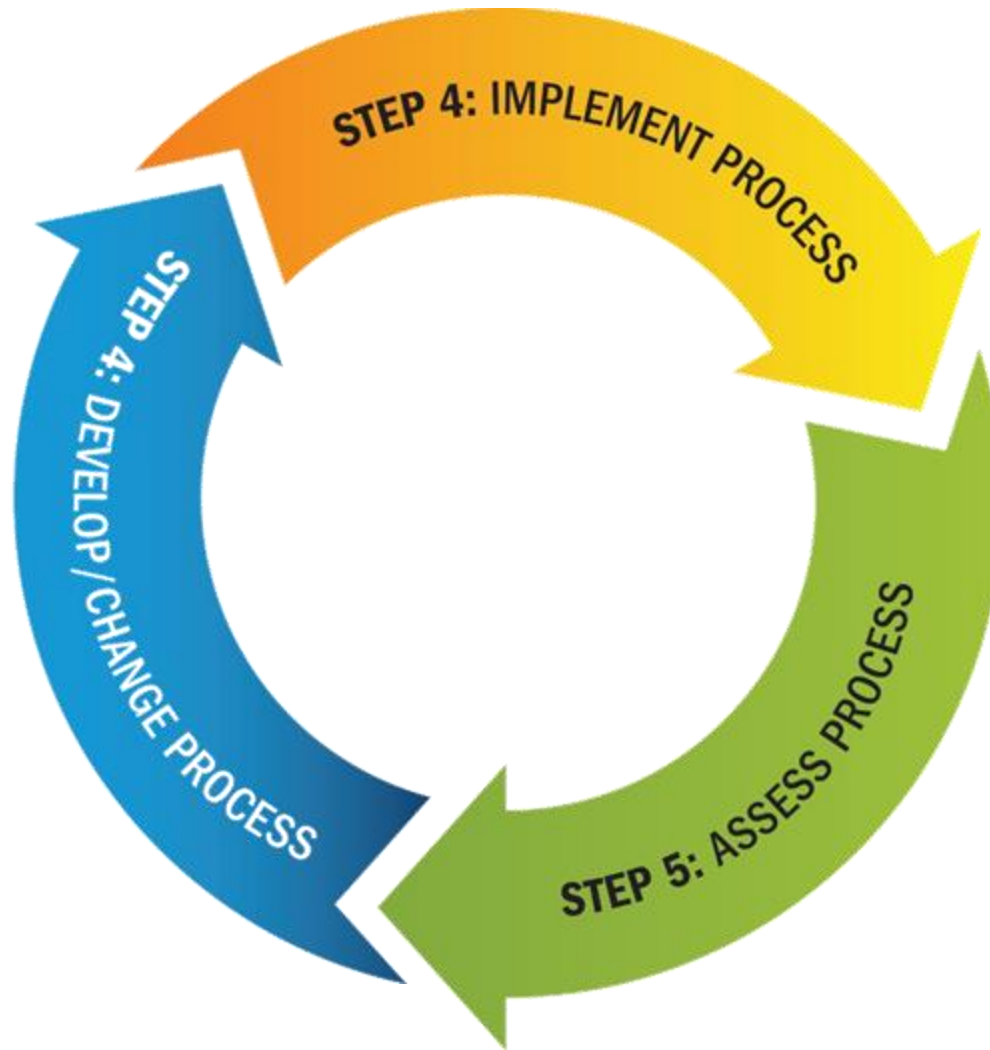
Develop/Change Process

- **Utilize map from Step 3 and influences described in Step 1**
- **Change business process to reflect changes in:**
  - Policy
  - Procedures
  - Decisions made by the group
- **Timeframe for moving forward to implementation**
  - Depends on agency's ability to develop/change the current business process
  - Unique for each agency and each situation
  - Formal or informal in nature

Implement Process

- **The approach to this step varies**
  - Number of agencies involved
  - Depth of process
- **Be sure to involve all stakeholders**
  - Office managers
  - Operators
  - Field workers
- **Timeframe for moving forward to Step 5**
  - Needs to be sufficient to allow for stabilization of new process
  - Each iteration of implementation of refined process may reduce time

San Pablo Example

- Will work with new Program for Arterial System Synchronization (PASS)
  - Group signals into logical segments
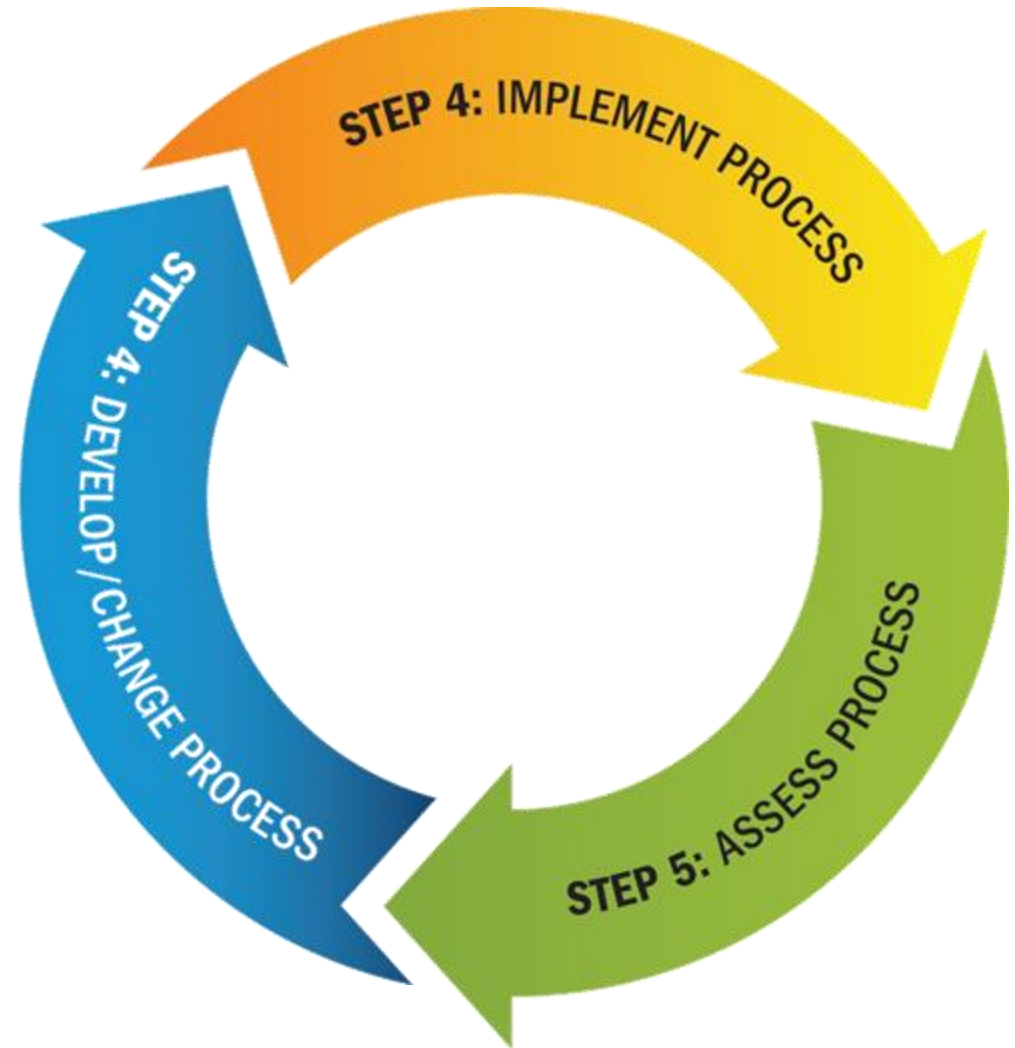 - Develop new signal timing plan

STEP 5

ASSESSING THE PROCESS

Assessing the Process

Important to determine the effectiveness of the newly developed process

Assessing the Process

- **Necessary Information:**
  - Measure of success
  - Method of continuous evaluation
  - Necessary data

- **Benefits:**
  - Better communication with senior managers and the public
  - Ongoing performance measurement
  - Measurement against pre-implementation conditions

San Pablo Example

- Improved corridor timing plans will maximize the corridor capacity during normal operating procedures
- Emergency vehicle preemption will minimize impacts on travel times during major incidents, allowing emergency vehicles to arrive at a scene more quickly.
- Transit signal priority improves the travel time reliability for the transit users

San Pablo Example

- **Each corridor has seen increases in capacity and travel time reliability**
- **MTC has seen a 10 percent improvement in travel time and 10 percent increase in speed for the entire region**

STEP 6

DOCUMENTING THE PROCESS

Documenting the Process

- **Occurs once the new process has been implemented and proven effective**

- **Includes:**
    - Details of new business process
    - Details of evaluation process
    - Benefits
    - Lessons learned
    - Roles and responsibilities of stakeholders

Documenting the Process

- **Helps to demonstrate performance**

- **Facilitate easier updates**

- **Example of documentation**
  - Internal memorandums
  - Informal memorandums of understanding
  - User guides
  - Agreements between stakeholders

- **Other types**
  - Evaluation meetings
  - Reports
  - Flowcharts

San Pablo Example

- **Final report to MTC requires**

  – Improvements to travel times

  – Fuel savings

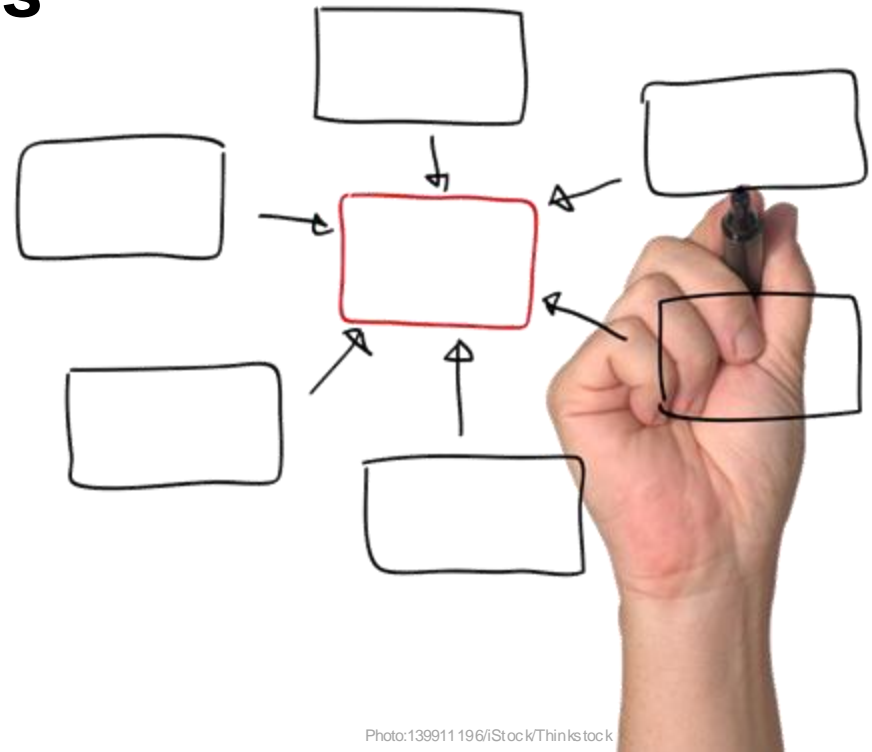 – Emission reductions

  – Benefit-cost analysis

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Institutionalizing the Process

- **The way in which a new or changed process is incorporated into existing policies or management programs**

- **Starts at the higher levels**

- **Important to link to firmly established agency goals**

Strategies and Considerations

- **Stakeholder buy-in**

  – Requires more than adoption of operational activities or processes

  – Example, strong initial buy-in from Florida DOT and FHP for Road Ranger program was key to its continuing operations

- **Tangible results**

  – Benefits and outcomes must be tangible and directly related to each agency and operating unit

Strategies and Considerations

- **Developing formal documentation that is accessible and available to everyone**

  – Example, inter-agency agreement on a network directory

- **Ensure documentation is sustainable**

  – Documents such as MOUs that require formal approval have a better likelihood of outlasting informal agreements

San Pablo Example

- Significant funding needed to interconnect communication between all signals

- Until funding is found, GPS/time clocks are installed in corridors within multiple jurisdictions

- Have established a well-integrated regional signal timing plan