Des Moines Metropolitan Area Integrated Corridor Management Bundle Results

March 4, 2020

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DES MOINES METRO AREA

Bundle Evaluation Categories

- Systems Management – Mileage reduced during peaks
- Mobility – Hours of travel reduced during peaks
- Reliability – System mileage reliable (LOTTR)
- Accessibility – Portion of jobs within 1 hour walk-to-transit trip
- Integration / Connectivity – Mode shift to transit / non-motorized
- Safety – Reduction in fatal and serious injury crashes

Reference Scenarios

- Future No-Build
  - Heavily congested
  - Increased vehicle crashes
- LRTP (Roadway Portion) Scenario
  - 4% reduction in fatal and injury crashes
  - 23% improvement in peak hour congestion
  - 4% improvement in travel time reliability
  - 3% improvement in regional accessibility

Bundle Evaluations

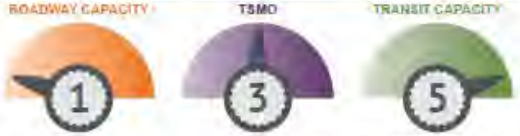
BUNDLE 1: Aggressive Freeway Build

Aggressive Freeway Build - This bundle of strategies requires considerable freeway widening to accommodate future metro growth. Investments on other major non-Freeway roadways, transit, and the use of technology are secondary to building out the freeway system.

BUNDLE 2: Intensive Transportation Management

Intensive Transportation Management - This bundle of strategies focuses on high levels of investment in technology and management of the system. Initially, the system will be optimized to the existing roadway network, but over time the approach will augment management strategies like signal optimization, dynamic shoulder use, ramp metering, and transit signal priority with strategic widening to remove bottlenecks

BUNDLE 3: Transit & Travel Demand Management



Transit and Travel Demand Management - This bundle of strategies will focus all investment toward high occupancy vehicles and transit to move more travelers on the existing roadway network more efficiently. Jointly, this bundle will aggressively incentivize demand management strategies to reduce the peak period congestion.

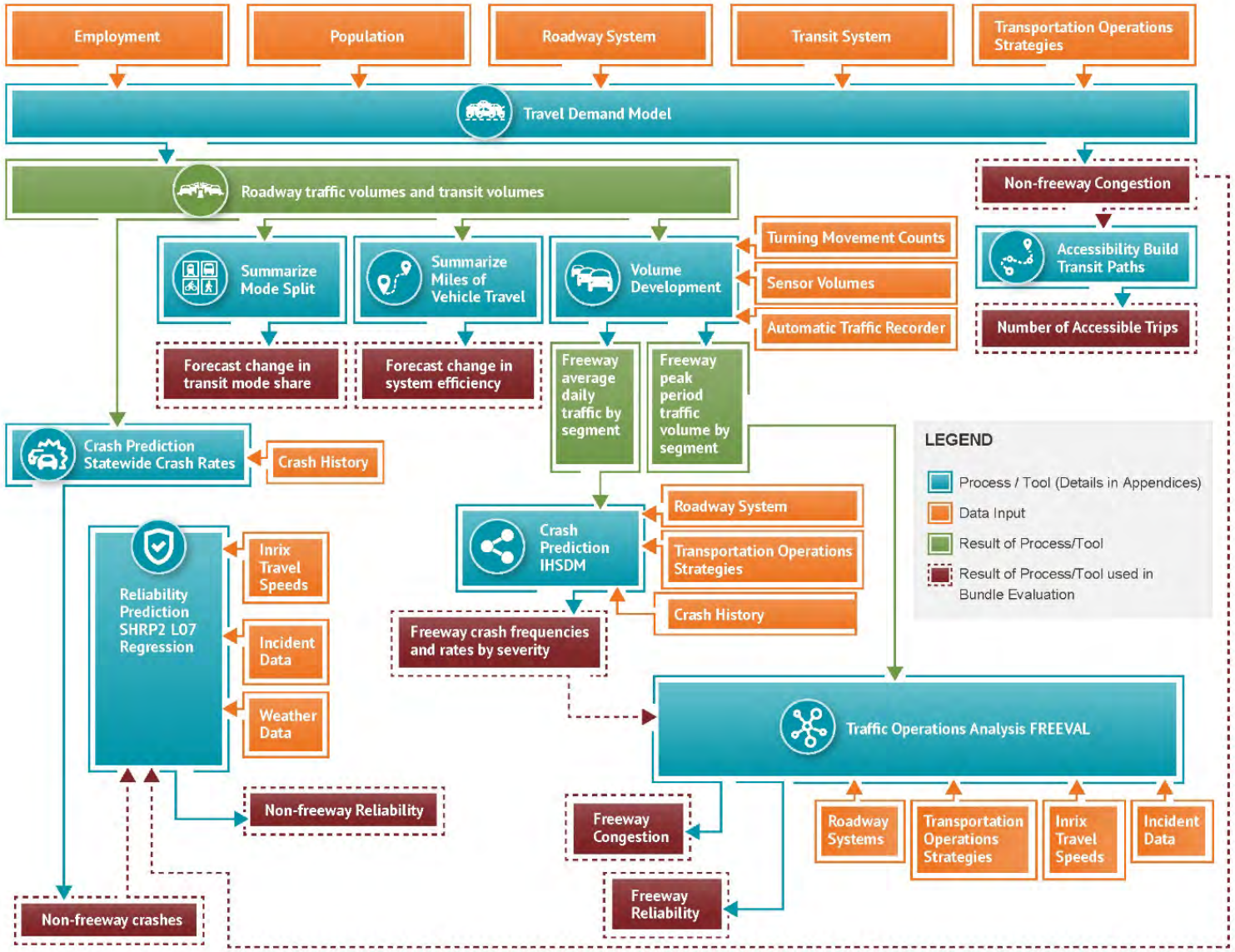
BUNDLE 4: Balanced

Balanced - This bundle of strategies will include a balanced approach to technology and new build investments on the arterial and freeway systems.

BUNDLE 5: Targeted Transportation Management

Targeted Transportation Management - This bundle of strategies will focus on high levels of investment in technology and management of the system with significantly reduced spending on major new infrastructure (freeway widening, arterial widening, and transit capacity).

Bundle Evaluations



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Bundle Commuter Profiles

Meet Commuter Chris

- Just moved to the Des Moines metro area in the year 2050
- Lives in an apartment in West Des Moines and works downtown
- Evaluating her travel options
- Heard from neighbors that her part of town allows for a really easy commute, but some options are easier than others based on the metro's transportation system

Bundle Commuter Profiles

Aggressive Freeway Build

The metro's ICM program has deployed an **AGGRESSIVE FREEWAY BUILD** approach, with the following impact to Chris's trip:

Systems Management
Limited. Chris's work has a rigid schedule, not encouraging options to commute outside of peak travel times.

Mobility
Moderate. City streets leading to I-235 operates as a string of red lights, but traffic flows on the freeway well.

Reliability
On the worst travel days, delays can occur, causing Chris to be late coming home.

Accessibility
Reasonable access to the public transit system.

Integration/ Connectivity
Focused on freeway travel.

Safety
Heavily focused on the freeway.

Bundle Commuter Profiles

Intensive Transportation Management

The metro's ICM program has deployed an **INTENSIVE TRANSPORTATION MANAGEMENT** approach, with the following impact to Chris's trip:

Systems Management

Good. Chris's work has a flexible schedule, encouraging options to move trips out of peak travel times.

Accessibility

Moderate access to the public transit system.

Mobility

Good. Ramp meters prior to entering the corridor add some delay, but once on the freeway traffic flows well.

Integration/ Connectivity

Focused on efficient travel modes. Chris can earn an incentive by using rideshares or utilizing public transportation.

Reliability

On the worst travel days, delays rarely occur and Chris is rarely late coming home.

Safety

Safety improvements made an impression on the neighborhood. Reducing crashes still needs to be a key transportation priority.

Bundle Commuter Profiles

Transit & Travel Demand Management

The metro's ICM program has deployed a **TRANSIT AND TRAVEL DEMAND MANAGEMENT** approach, with the following impact to Chris's trip:

Systems Management

Good. Chris's work has a flexible schedule, encouraging options to move trips out of peak travel times.

Mobility

Poor. The city street leading to the freeway operates as a string of red lights, and on the freeway, plan for stopped traffic when approaching downtown.

Reliability

On the worst travel days, delays can cause Chris to get home late and miss dinner with her family.

Accessibility

Good access to the public transit system.

Integration/ Connectivity

Focused on efficient travel modes. Chris can earn an incentive by using rideshares or utilizing public transportation.

Safety

Safety improvements made an impression on the neighborhood. Reducing crashes still needs to be a key transportation priority.

Bundle Commuter Profiles

Balanced

The metro's ICM program has deployed a **BALANCED** approach, with the following impact to Chris's trip:

Systems Management

Good. Chris's work has a flexible schedule, encouraging options to move trips out of peak travel times.

Accessibility

Moderate access to the public transit system.

Mobility

Good. Ramp meters prior to entering the corridor add some delay, but once on the freeway traffic flows well.

Integration/ Connectivity

More focused on personal vehicle drivers.

Reliability

On the worst travel days, delays rarely occur and Chris is rarely late coming home.

Safety

Safety improvements made an impression on the neighborhood. Reducing crashes still needs to be a key transportation priority.

Bundle Commuter Profiles

Targeted Transportation Management

The metro's ICM program has deployed a **TARGETED TRANSPORTATION MANAGEMENT** approach, with the following impact to Chris's trip:

Systems Management
Good. Chris's work has a flexible schedule, encouraging options to move trips out of peak travel times.

Mobility
Good. Ramp meters prior to entering the corridor add some delay, but once on the freeway traffic flows well.

Reliability
On the worst travel days, delays rarely occur and Chris is rarely late coming home.

Accessibility
Moderate access to the public transit system.

Integration/ Connectivity
Focused on efficient travel modes. Chris can earn an incentive by using rideshares or utilizing public transportation.

Safety
Safety improvements made an impression on the neighborhood. Reducing crashes still needs to be a key transportation priority.

Bundle Summary

	Safety	Mobility	Reliability	Integration and Connectivity	Accessibility	Systems Management
Balanced	10%	28%	6%	< 0.5%	6%	<1%
Intensive Transportation Management	9%	26%	6%	0.5%	6%	1%
Transit and Travel Demand Management	8%	4%	0%	2%	8%	1.5%
Aggressive Freeway Build	3%	16%	4%	< 0.5%	2%	-1%
Targeted Transportation Management	7%	20%	5%	< 0.5%	6%	> 0.5%

Legend

Green – Large Benefit from Bundle

Blue – Medium Benefit from Bundle

Black – Negligible / Negative Change due to Bundle

Bundle Activity Score Card

Ranking highest (1) to lowest (5) preference

Capital Cost Summary

	Bundles				
	Aggressive Freeway Build	Intensive Transportation Management	Transit and Travel Demand Management	Balanced	Targeted Transportation Management
Implementation Packages	$112 M	$457 M	$229 M	$258 M	$406 M
BUNDLE TOTAL (INCLUDING ROADWAY CAPACITY COSTS)	**$2.8 B**	**$840 M**	**$300 M**	**$2.3 B**	**$480 M**

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Bundle Activity Score Card

Round 2 – Considering Costs

Ranking highest (1) to lowest (5) preference

Des Moines Metropolitan Area Integrated Corridor Management Implementation Strategies

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Advanced Freeway Management

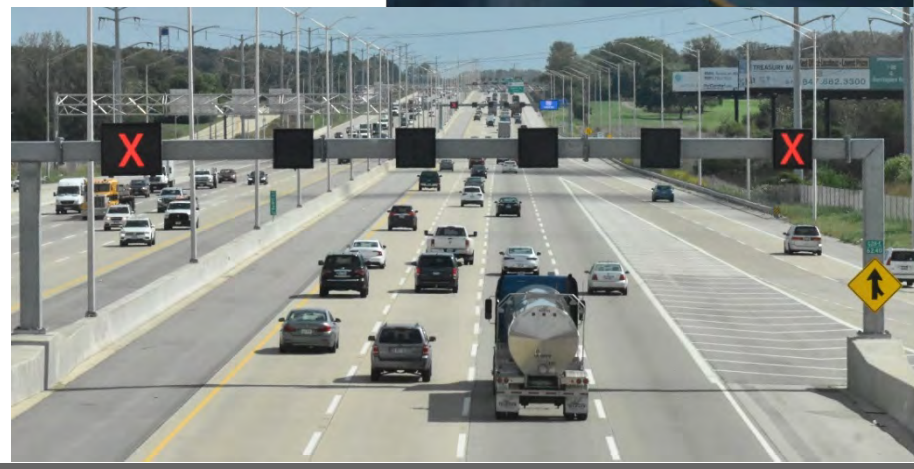
The combination of freeway-based dynamic strategies that improve detection and control.

Strategies

- Primary (1): Lane use control, queue warning, dynamic speed advisories, ramp metering
- Primary (2): Dynamic shoulder use
- Prerequisite: Traffic data collection, network surveillance
- Complements: Event management, traveler information

Benefits

- Safety: Approx. 30% reduction in crashes (combined ATM)
- Mobility: Approx. 10% increase in speeds (ramp metering)
- Reliability: Approx. 40% reduction in stops (dynamic speed)



Costs

- Capital: $1.5M/mile (Primary 1)
  $3.0M/mile (Primary 1+2)
- Bundle Range: $0 - $121M
- Operational: $375k - $550k per year

Traffic Signal Control

The upgrade and coordination of arterial traffic signals to improve operations and control across jurisdictions.

Strategies

- Primary (1): Traffic signal management
- Primary (2): Adaptive traffic signal control
- Prerequisite: Traffic data collection, network surveillance
- Complements: Event management, transit operations, transit signal priority

Benefits

- Safety: Approx. 6% reduction of crashes
- Mobility: Approx. 30% reduction in delay
- Reliability: Approx. 10% reduction in stops

Costs

- Capital: $3,000/signal/year (Primary 1)
  $50,000/signal (Primary 2)
- Bundle Range: $0 - $112M
- Operational: $0 (minimal) per year

Infrastructure Enhancement

The construction of infrastructure to expand capacity along constrained roadways, eliminate bottlenecks, and/or improve safety and traffic flow for all or specific users.

Strategies

- Primary: Access control, bottleneck removal, freight-rail improvements, cycle tracks, acceleration & deceleration lanes.
- Prerequisite: None
- Complements: Advanced freeway management, freight operations, transit operations, event management

Benefits

- Safety: Approx. 15% reduction in crashes (adding a raised median)
- Mobility: 9-14% reduction in delay (lengthening an acceleration lane)

Costs

- Capital: Varies (~$1M/mile raised median)
  ($500k/signal for turn lanes)
- Bundle Range: $0 - $162M
- Operational: $0 (minimal) per year

Transit Preferential Treatment

The combination of strategies that encourage greater use of transit or other multi-occupant forms of travel through application of preferential treatments.

Strategies

- Primary (1): Transit lanes/queue jump
- Primary (2): Express bus service, bus on shoulder, park and ride lots
- Prerequisite: None
- Complements: Transit operational enhancements, travel demand management

Benefits

- Reliability: Approx. 25% increase in on-time performance (bus on shoulder)

Costs

- Capital: $800k/signal (Primary 1)
  Varies (Primary 2)
- Bundle Range: $0 - $169M (Primary 1)
- Operational: $0 (minimal) per year

Transit Operational Enhancement

The combination of strategies that enhance transit system efficiency, on-time performance and reliability, and general user experience and acceptance.

Strategies

- Primary (1): Transit signal priority
- Primary (2): Dynamic transit capacity assignment, bus rapid transit, transfer connection protection, fare strategies.
- Prerequisite: Traffic data collection, network surveillance, traveler information
- Complements: Transit preferential treatments

Benefits

- Mobility: Approx. 3 - 7% decrease in SOV travel (transit subsidies)
- Mobility: Approx. 2% increase in transit use

Costs

- Capital: $6,000/signal (Primary 1)
  Varies (Primary 2)
- Bundle Range: $0 - $4.6M (Primary 1)
- Operational: $150k - $450 k (Primary 1)

Capital Cost Summary

Capital Costs		Bundle				
		Aggressive Freeway Build	**Intensive Transportation Management**	**Transit and Travel Demand Management**	**Balanced**	**Targeted Transportation Management**
Implementation Package	Advanced Freeway Management	-	$124 M	$54 M	$21 M	$121 M
	Traffic Signal Control	$112 M	$112 M	-	$112 M	$112 M
	Infrastructure Enhancement	-	$162 M	$4 M	$65 M	$114 M
	Transit Preferential Treatment	-	$58 M	$169 M	$58 M	$58 M
	Transit Operation Enhancement	-	$0.5 M	$1 M	$0.5 M	$0.5 M
Total		**$112 M**	**$457 M**	**$229 M**	**$258 M**	**$406 M**

Capital Cost Summary

	Bundles				
	Aggressive Freeway Build	Intensive Transportation Management	Transit and Travel Demand Management	Balanced	Targeted Transportation Management
Implementation Packages	$112 M	$457 M	$229 M	$258 M	$406 M
BUNDLE TOTAL (INCLUDING ROADWAY CAPACITY COSTS)	**$2.8 B**	**$840 M**	**$300 M**	**$2.3 B**	**$480 M**

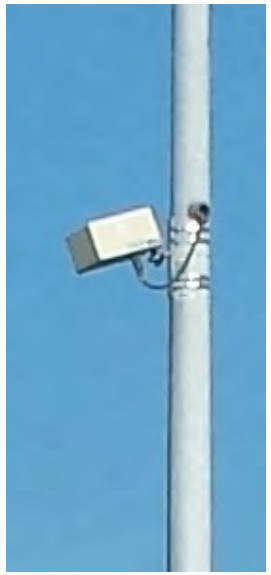
Operational Cost Summary

Operational Costs		Bundle				
		Aggressive Freeway Build	**Intensive Transportation Management**	**Transit and Travel Demand Management**	**Balanced**	**Targeted Transportation Management**
Implementation Package	Advanced Freeway Management	-	$555k	$405k	$377k	$546k
	Traffic Signal Control	-	-	-	-	-
	Infrastructure Enhancement	-	-	-	-	-
	Transit Preferential Treatment	-	-	-	-	-
	Transit Operation Enhancement	-	$154k	$450k	$154k	$154k
Total		**$0**	**$709k**	**$855k**	**$531k**	**$700k**

Basic/Enhanced Traffic Data & Communication

The combination of data collection, network surveillance, and traveler information technologies required to detect traffic conditions in the field, monitor and adjust operations, assess performance, and communicate with drivers. These packages also include related TMC enhancements required to perform these functions.

A significant amount of basic traffic data and communication functions have been deployed within the region with adequate geographic coverage. Future expansion of basic traffic data and communication, or the addition of enhanced traffic data and communication, would be contained within and implemented as part of other strategy packages.



Costs

- Costs included as part of other strategy packages.

Parking Management

The combination of strategies used to reduce demand for, or time searching for, parking. These strategies can include wayfinding, pricing, and/or other management techniques.

In downtown Des Moines, wayfinding and pricing techniques are in place for on-street and garage spaces. The City of Des Moines recently (2017) underwent an evaluation of their parking assets to better manage assets and made significant changes in 2018.

Strategies

- Primary: Dynamic parking wayfinding, parking reservations, dynamically priced parking
- Prerequisite: Traffic data collection, traveler information
- Complements: Event Management, transit operations

Benefits

- Mobility: 7% reduction in traffic volumes
- Reliability: 43% reduction in time to find parking

Transportation Demand Management

The combination of public agency and/or private employer strategies that reduce use of single-occupant forms of transportation, shift travel to off-peak periods, and/or eliminate travel altogether.

Strategies

- Primary: Mobility on demand, transit incentives, carpooling/vanpooling, transportation management associations, dynamic ridesharing, congestion pricing, telecommuting, flexible work hours, bike sharing, mobility-as-a-service.
- Prerequisite: None
- Complements: Transit operations, parking management

Benefits

- Safety: 2.5% reduction in crashes per 5% shift to telecommuting.
- Mobility: 13-30% reduction in trip rate in participating employers

Event Management

The combination of strategies that mitigate impacts caused by incidents, weather, construction, special events and/or other temporary events (e.g., debris and stalled vehicles).

Several of these strategies already exist in the region such as freeway service patrols (Highway Helper) and intelligent work zones, among others.

Strategies

- Primary: Highway Helper, incident response team, quick clearance, scenario planning, road weather management, intelligent work zones, special event management
- Prerequisite: None
- Complements: Advanced freeway management, freight operations, enhanced traveler information

Benefits

- Safety: Approx. 70% reduction in secondary crashes (incident response)
- Mobility: Approx. 6 mi/hr increase in speed after plow (weather response)

Enhanced Traveler Information

Combinations of strategies that expand or enhance forms of traveler information currently used within integrated corridors. Strategies help make traveler information more relevant to users so they can alter travel plans while en-route or pre-trip.

Strategies

- Primary: Comparative travel time messaging, predictive traveler information
- Prerequisite: Traffic data collection and communication
- Complements: Advanced freeway management, freight operations, parking management, event management

Benefits

- Mobility: 85% shift in routes based on survey (comparative travel time messaging)
- Reliability: 12% reduction in travel times (dynamic rerouting)