LRT AND STREETCAR SYSTEMS INTERFACE

Transportation Planning Board
Technical Committee Meeting

February 7, 2014

PROJECT OVERVIEW

BACKGROUND AND PURPOSE

- Numerous surface transit projects are being advanced around the region
- Metro is facilitating regional coordination among project sponsors and stakeholders to maximize potential compatibility of the proposed systems
- Goal is to ensure that the systems maximize compatible features across projects:
  - Provide most **convenient systems** for customers
  - Provide **predictability** to region's transit customers
  - Avoid future problems: **"Why didn't they think about this?"**
  - **Accountability to communities** for decisions/operations
  - Mitigate risks and enhance **cost effectiveness**

WMATA ROLE IN LRT AND STREETCAR PROJECTS

- Project Development
  - District of Columbia streetcar feasibility and concept design
  - Columbia Pike environmental documentation and concept design
- Design Coordination
  - Purple Line interface at existing Metrorail stations
  - District of Columbia streetcar vehicle procurement
  - Planning for operation of interlined/connecting rail and bus services
- Momentum Strategic Plan
  - Improve Regional Mobility and Connect Communities through enhancing access and intermodal connections, promote interoperability
- Regional Transit System Plan (RTSP)
  - 2040 Plan with recommendations for high-capacity transit corridors (incl. LRT, BRT, Streetcar) to pair with Metrorail core capacity improvements

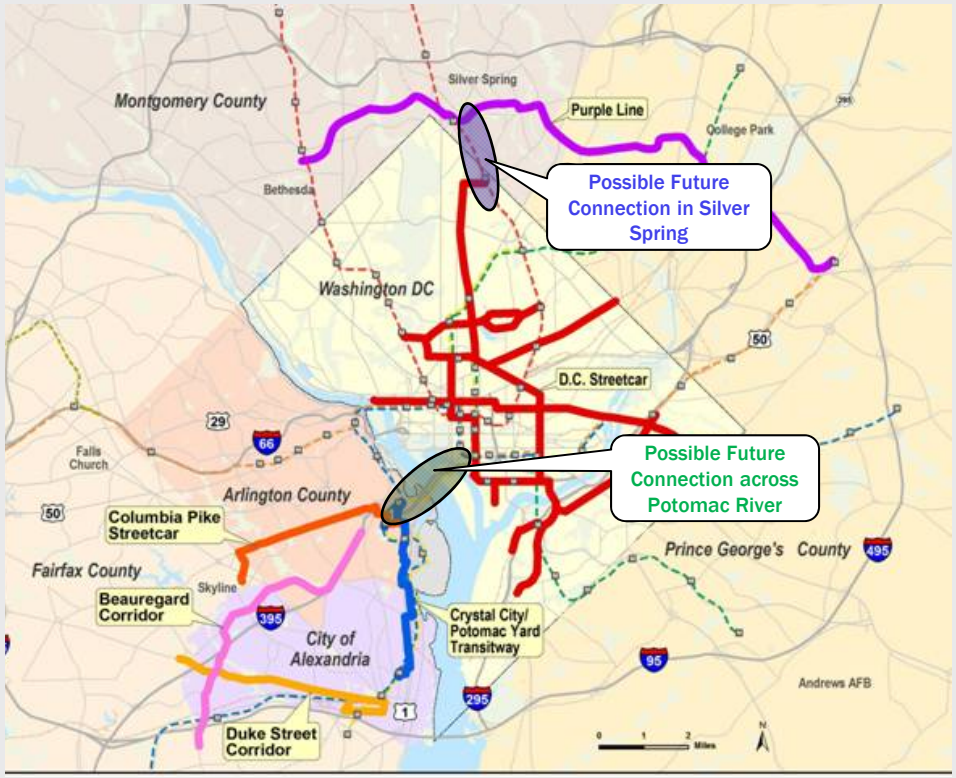
CONTINUUM OF INTEROPERABILITY

Most likely aspects for coordination

- Knowledge sharing
- Common criteria for common elements
- Services connect at common stations
- Shared staff and training
- Shared parts and equipment storage
- Joint vehicle procurement
- Shared specialized maintenance functions
- Service is interlinked

POTENTIAL FUTURE CONNECTIONS

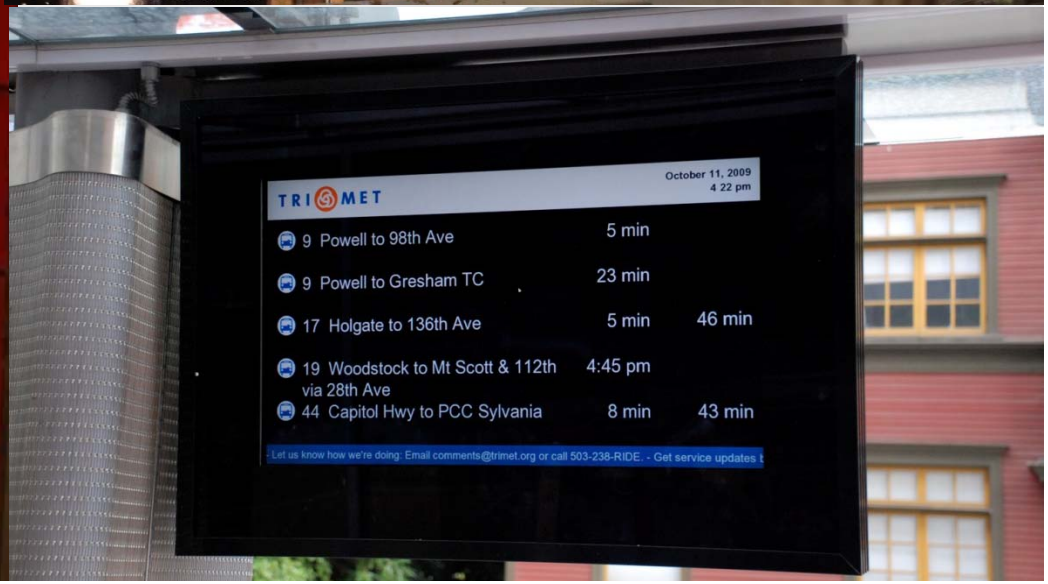
- Potential DC Streetcar connection into Silver Spring
- Streetcar alignment connections and common maintenance locations among proposed Northern Virginia streetcar systems



ASSESSMENT OF INTEROPERABILITY

- Key interoperability categories:
  - Power supply
  - Vehicle types and specifications
  - Guideway design
  - Communication Systems
- Survey of current design criteria (DDOT, Purple Line, Arl. Co., WMATA) shows that sponsors are not explicitly considering interoperability
- Assess benefits of individual interoperability actions

PASSENGER INFORMATION AND COMMUNICATION REVIEW



OVERVIEW OF PASSENGER INFORMATION TOPICS

State of practice, customer expectations, and the DC area experience related to:

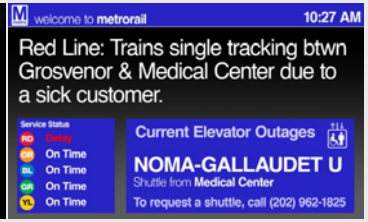
1. Visual Displays
2. Web-based Information
3. System branding & Wayfinding
4. Service Disruption Communication

VISUAL DISPLAYS

Local Displays

Metrorail (PIDs)

Metrorail (Kiosk Information displays)



Real Time Transit Screens

Arlington County Commuter Services

Coffee shop in Courthouse

Metrorail Pylon

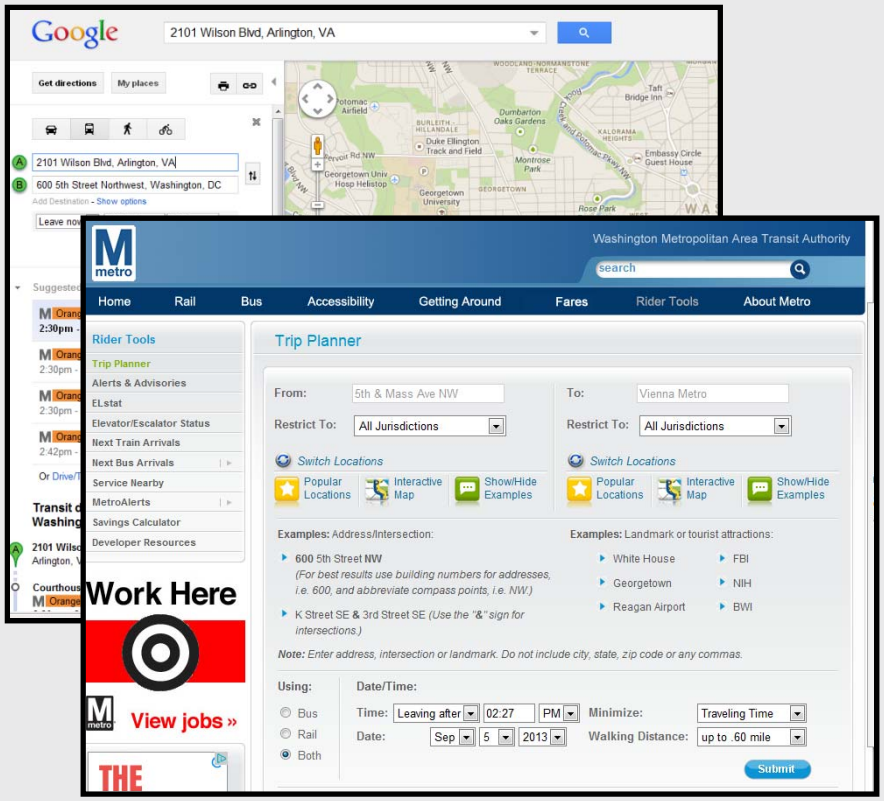
Columbia Pike Super Stop

Real Time Bus Stop Displays

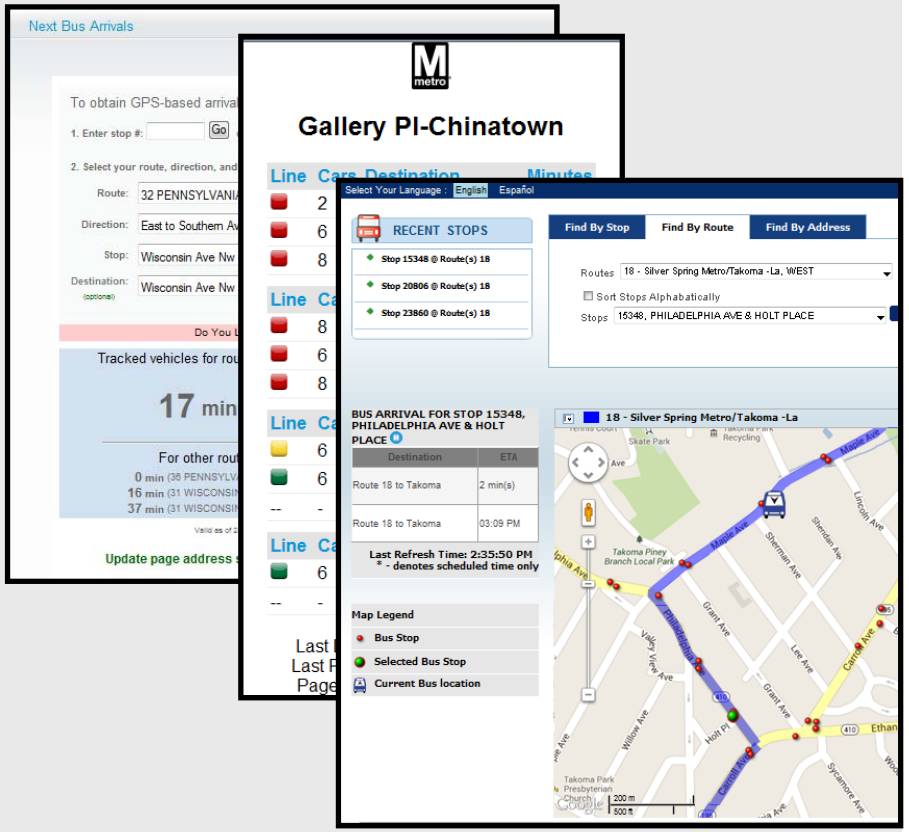
Regional Bus Stop Flags

WEB-BASED INFORMATION

Trip Planning



Real Time Arrivals



SYSTEM BRANDING & WAYFINDING

- Regional Transit Logos

metrobus

Purple Line

dcstreetcar

Ride On
Montgomery County Transit

circulator

metro

DASH

FAIRFAX CONNECTOR

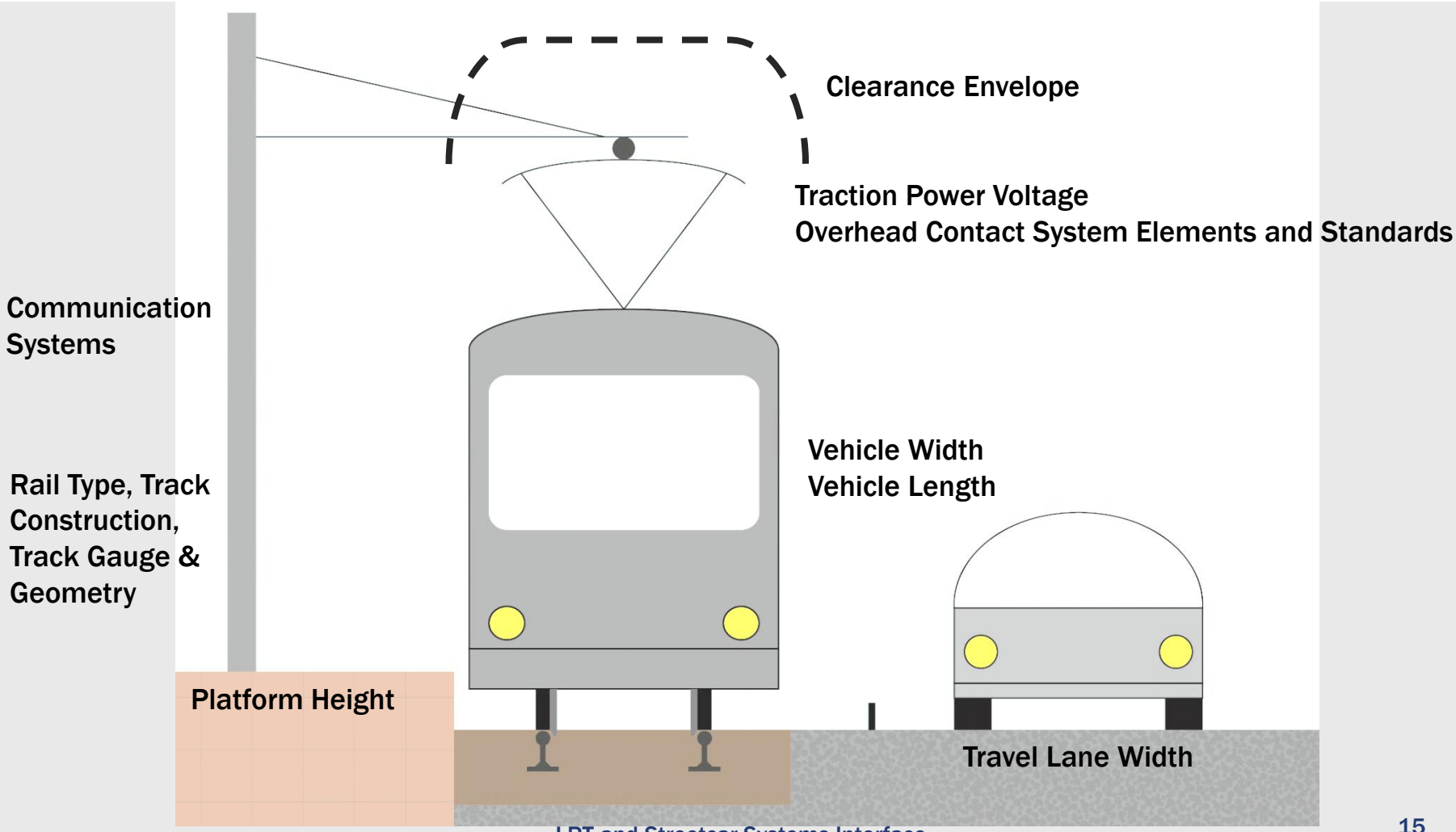
Sound Transit
Wayfinding Symbols

INFRASTRUCTURE REVIEW

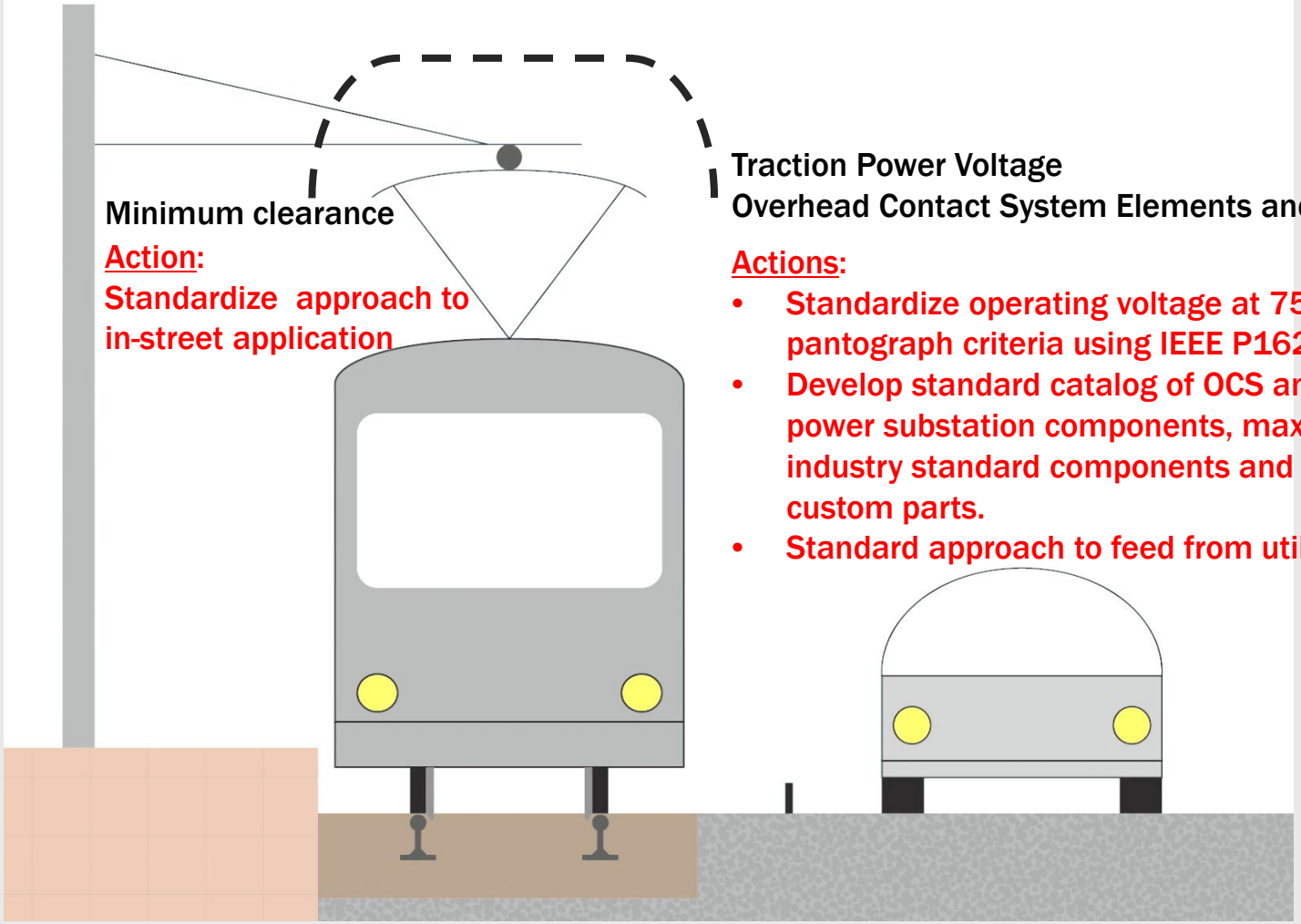
OVERVIEW OF INFRASTRUCTURE TOPICS

- **Power Supply**
  - Traction Power Voltage
  - Overhead Contact System Elements and Standards
- **Vehicle Characteristics**
  - Width
  - Length
  - Platform Height
  - Clearance Envelope
- **Guideway Design**
  - Route Geometry
  - Track Construction
  - Track Gauge & Geometry
  - Travel Lane Width
- **Communication Systems**

MINIMUM INFRASTRUCTURE REQUIREMENTS: TYPICAL ELEMENTS



POWER SUPPLY



Minimum clearance

Action:
Standardize approach to in-street application

Traction Power Voltage
Overhead Contact System Elements and Standards

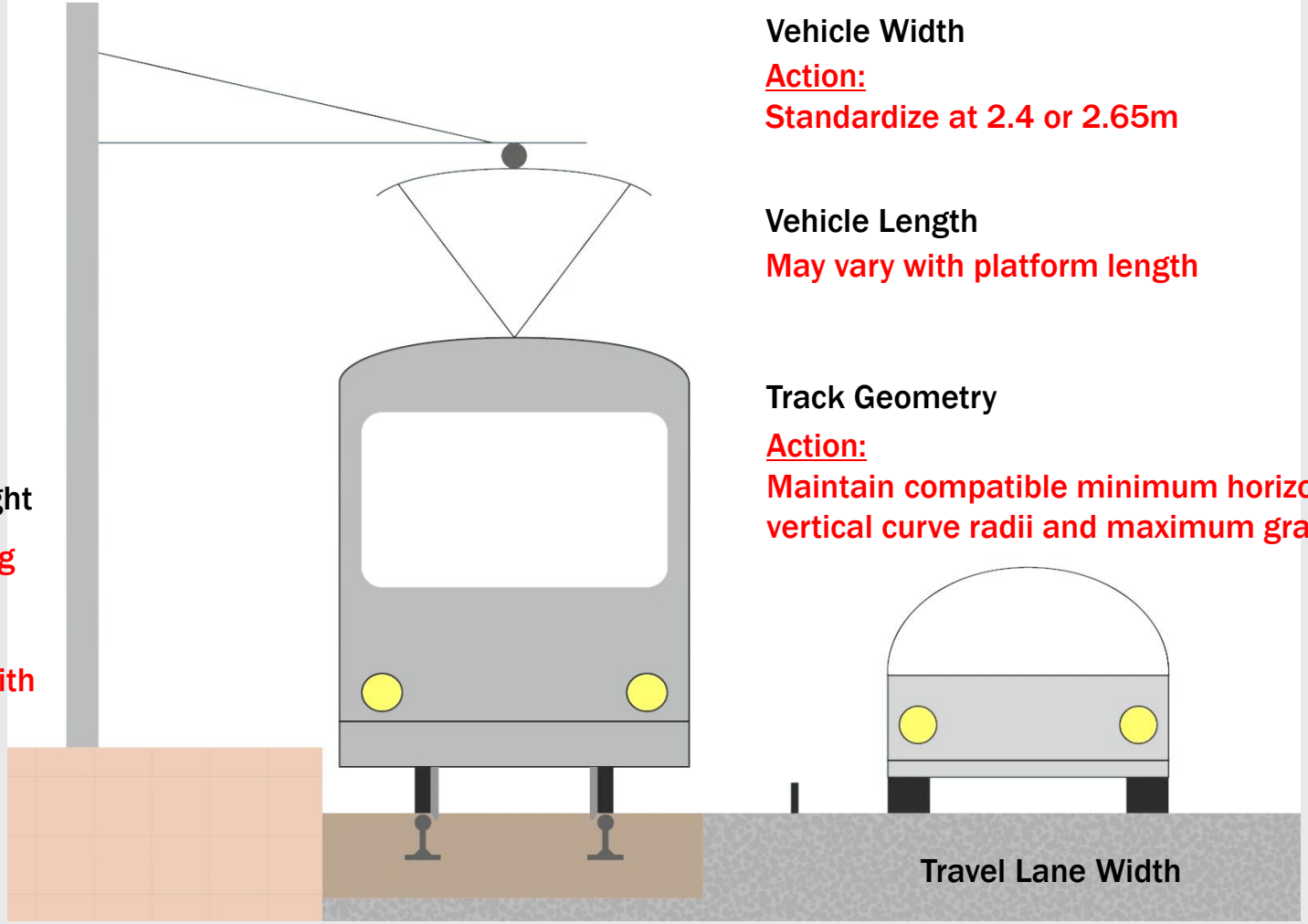
Actions:

- Standardize operating voltage at 750V, pantograph criteria using IEEE P1629.
- Develop standard catalog of OCS and traction power substation components, maximizing industry standard components and minimizing custom parts.
- Standard approach to feed from utility provider.

VEHICLE CHARACTERISTICS

Platform Height

Level boarding platform not generally compatible with parallel bus service



Vehicle Width

Action:

Standardize at 2.4 or 2.65m

Vehicle Length

May vary with platform length

Track Geometry

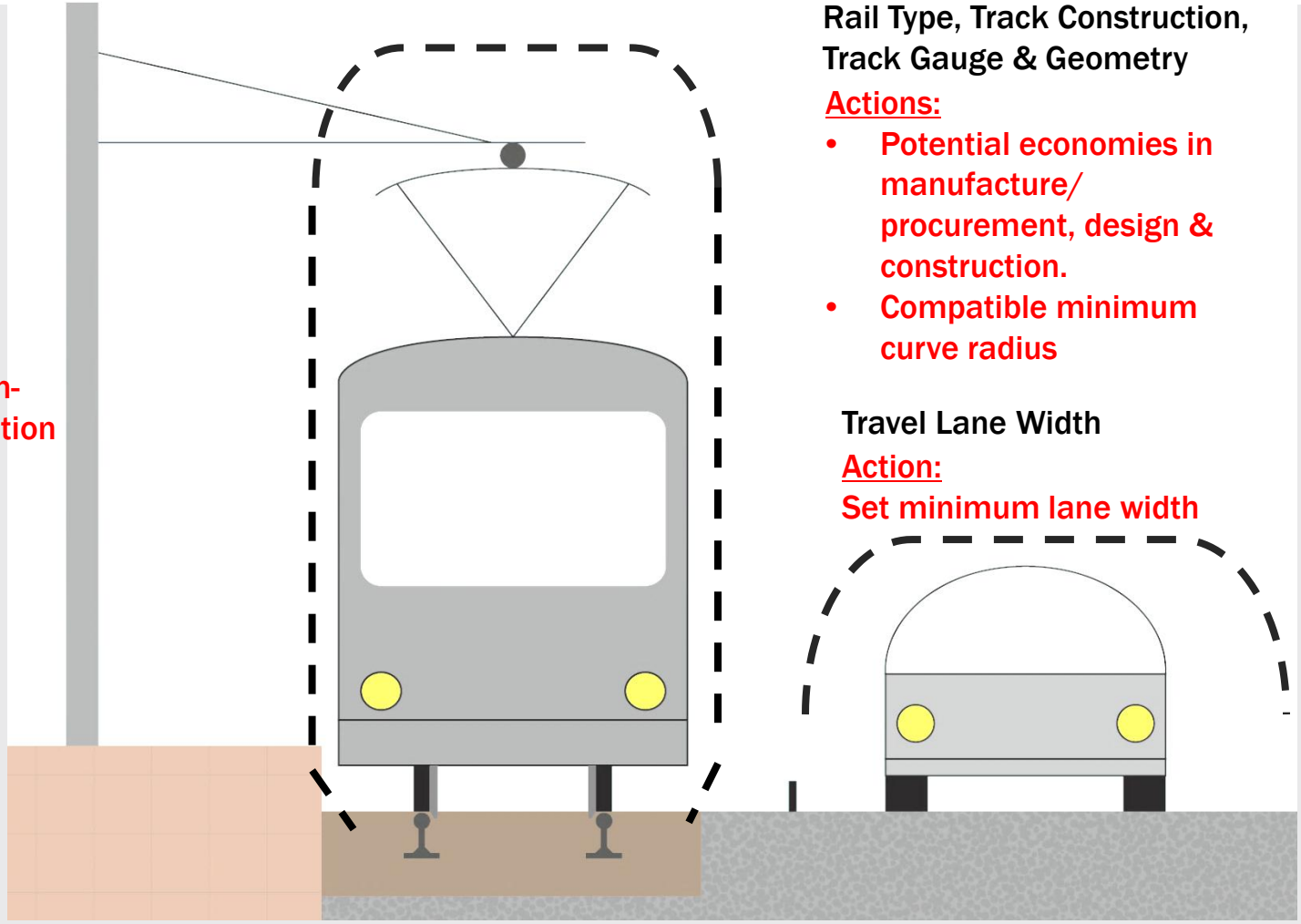
Action:

Maintain compatible minimum horizontal and vertical curve radii and maximum grade

GUIDEWAY DESIGN

Clearance Envelope

Action:
Standardize approach to in-street application



Rail Type, Track Construction, Track Gauge & Geometry

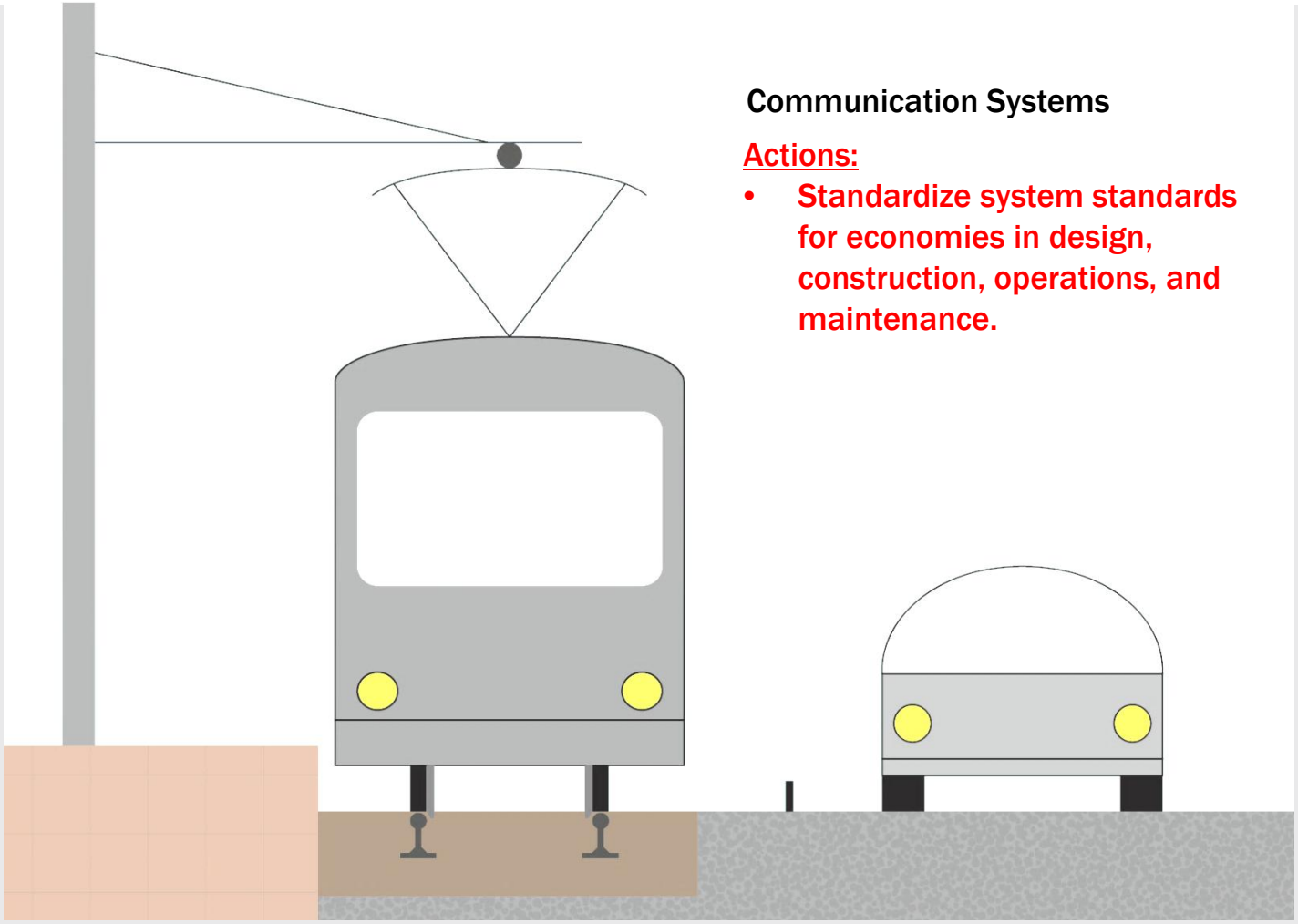
Actions:

- Potential economies in manufacture/ procurement, design & construction.
- Compatible minimum curve radius

Travel Lane Width

Action:
Set minimum lane width

COMMUNICATION SYSTEMS



Communication Systems

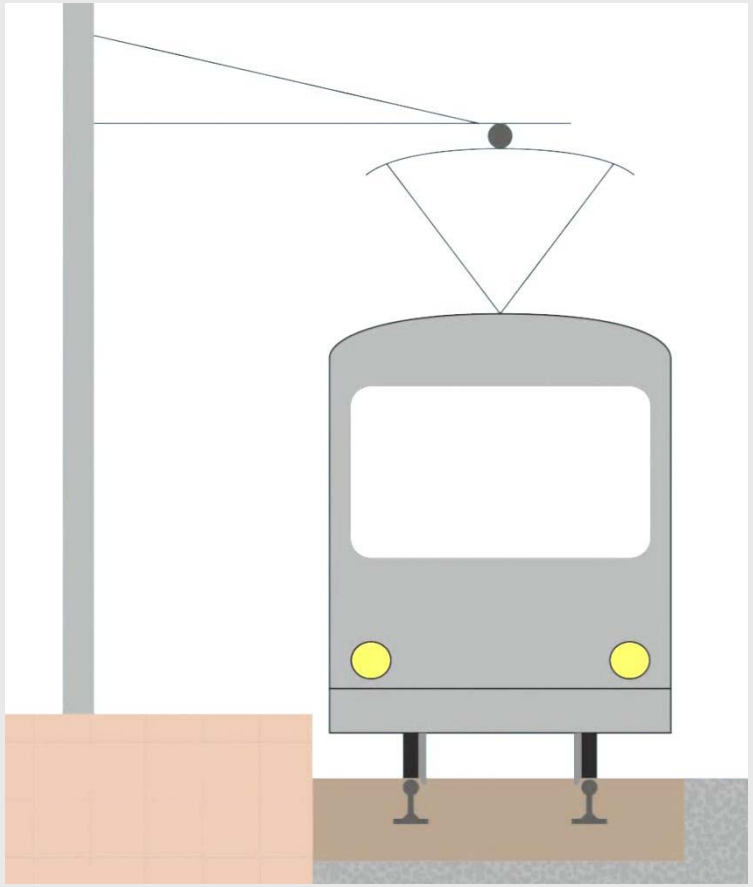
Actions:

- Standardize system standards for economies in design, construction, operations, and maintenance.

LRT and Streetcar Systems Interface

VEHICLE DESIGN CRITERIA REVIEW

DESIGN CRITERIA STANDARDS: VEHICLE DIMENSIONS



Vehicle Width – Standardize at 2.4 or 2.65m
Vehicle Length – Variable with platform length

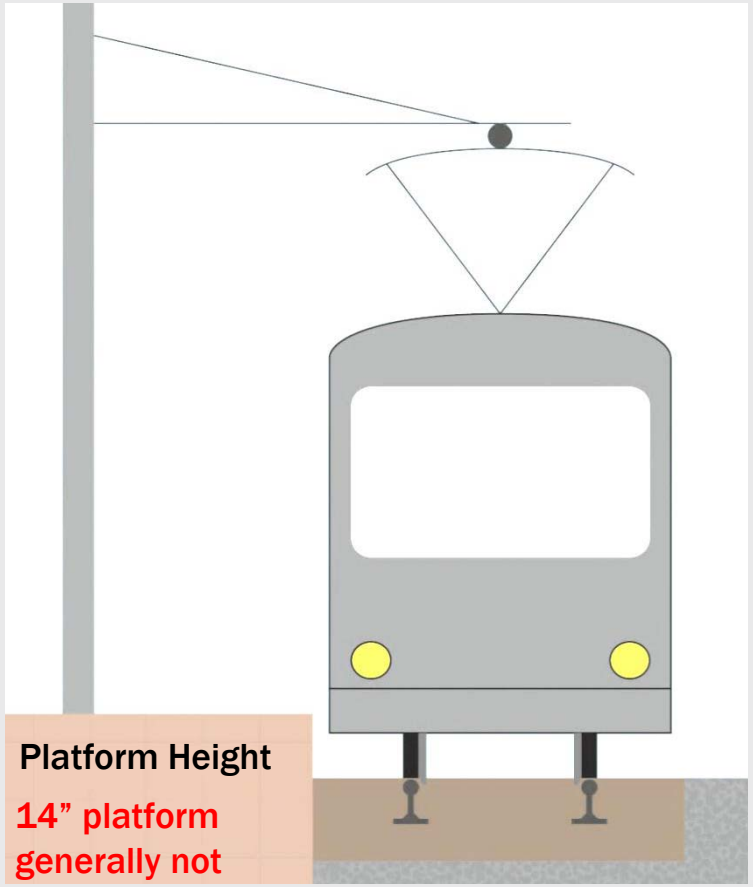
Vehicle Width

DC Streetcar	Arlington Co. Streetcar	MTA Purple Line
8 ft (2.44m)	7.9-8.7 ft (2.4-2.65m)	8.7 ft (2.65m)

Vehicle Length

DC Streetcar	Arlington Co. Streetcar	MTA Purple Line
66 ft (20.12m)	62-100 ft (20-30m)	97 ft (30m)

DESIGN CRITERIA STANDARDS: PLATFORM CONFIGURATION



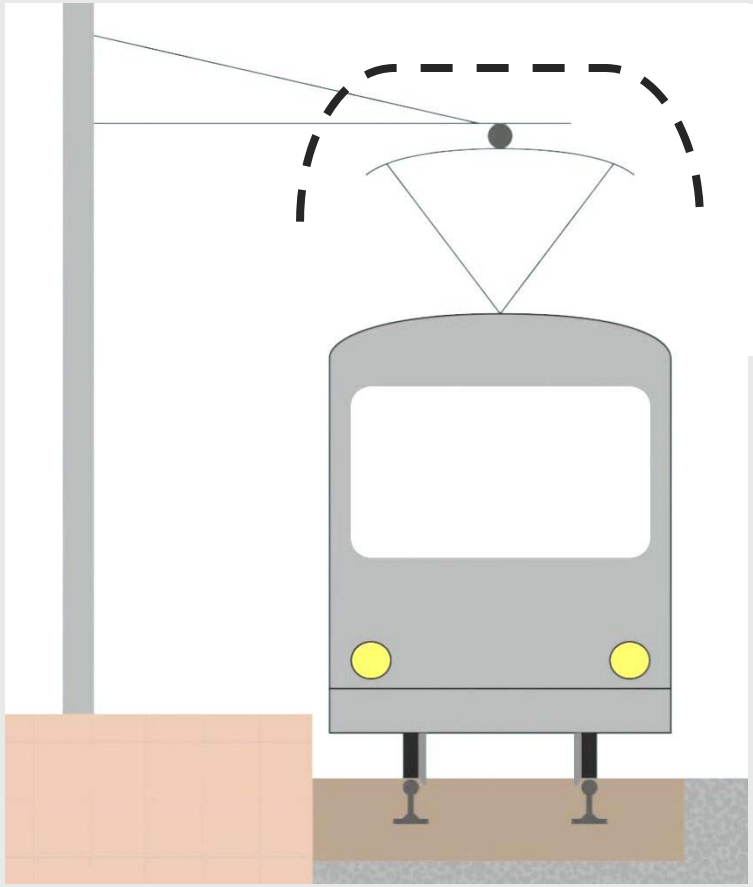
Platform Height

14” platform generally not compatible with buses

Platform Configuration

DC Streetcar	Arlington Co. Streetcar	MTA Purple Line
14” platforms (fully level boarding), but separate platforms for buses	10” platforms (near level boarding) shared with buses	14” platforms (fully level boarding)

DESIGN CRITERIA STANDARDS: PANTOGRAPH DIMENSIONS



Overhead Contact System Elements and Standards

Standardize pantograph criteria using IEEE P1629. Develop standard catalog of OCS components, maximizing industry standard components and minimizing custom parts.

Pantograph Dimensions

DC Streetcar	Arlington Co. Streetcar	MTA Purple Line
Operating height between 13' min and 20.5' max.	22' desirable, with 13'6" min. In a shared guideway, no less than 18'.	Range between 13.1' min and 23' max.

CONCLUSIONS AND NEXT STEPS

CONCLUSIONS: PASSENGER INFORMATION

- Move ahead to study “back end” feasibility of:
  - Standardized passenger information displays
  - Compatible trip planning applications (e.g. through Metro website)
  - Other collaborations based on facilitated discussion
- Document goals and criteria

CONCLUSIONS: INFRASTRUCTURE

- Define physical/infrastructure interoperability elements that are worth pursuing regardless of the project delivery method
- Prioritize interoperability elements
  - Greatest cost savings
  - Greatest benefit to passengers
- Cost benefit analysis will assist in decision process
  - Quantifying long-term savings

CONCLUSIONS: VEHICLES

1. **Define standard vehicle width or widths**
   2.4 m (narrow) or 2.65 m (wide)
2. **Coordinate decisions on vehicle length and capacity**
3. **Apply standard minimum turning radius**
   Use 25 m or require 18 or 20 m capabilities
4. **Coordinate floor height and boarding method**
   Partial or 100% low floor
   Fully level or near level
5. **Coordinate efforts toward off-wire capability**
   Custom design based on duty cycle
6. **Share lessons learned on procurement**

INTEROPERABILITY TECHNICAL SESSIONS

Session Date	Technical Session Topic	Agenda Items
September 19, 2013	**Passenger Information and Communications**	• Local transit provider perspectives • Information technology perspectives • Transit user and data user perspectives
November 19, 2013	**Infrastructure (guideway, track, systems, passenger stations, control systems)**	• Basic infrastructure compatibility • Construction and operations perspectives • Application to design-build contracts/concessionaires
January 16, 2014	**Vehicle Specifications**	• Vehicle procurement basics • Vehicle orders and economies of scale • Manufacturers perspectives
February 2014	Operations and Maintenance	• Coordinated maintenance activities • Workforce training • Improving operational efficiency
March 2014	Administrative Efficiencies	• Coordinated activities • Legal and institutional efficiency
April 2014	Fare Collection	• WMATA NEPP update • Pilot application and lessons learned

NEXT STEPS AND MORE INFORMATION

- Continue technical coordination sessions
  - Operations and Maintenance
  - Administrative Efficiencies
  - Fare Collection
- Develop technical memoranda
  - Detailed case studies
  - Quantifying benefits associated with interoperability actions

For more information, please contact:

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