December 7, 2017

Item #1

CITIZENS PARTICIPATION
Item #2

APPROVAL OF MINUTES

Item #3

TRAC GOALS, FRAMEWORK & AGENDA REVIEW
COMMITTEE GOALS

• Learn about Southern Nevada’s mobility challenges, new developments and opportunities.
• Learn about smart communities, emerging technologies and how these efforts can impact and improve mobility, accessibility and safety in Southern Nevada.
• Obtain feedback and recommendations on how to best address and prioritize mobility solutions.

MEETING FRAMEWORK

Meeting 3 - February 1, 2018 – TOD, pedestrian safety and future developments
Meeting 4 - April 5, 2018 – Funding and On Board community recommendations
Meeting 5 - June 7, 2018 – Project priorities and recommendations
Meeting 6 - August 2, 2018 – Discuss recommendations further and next steps
AGENDA REVIEW

- Traditional transit overview
- How transit transforms a community
- TRAC field trip opportunity
- On Board Update
- Smart Mobility & Innovation
- Upcoming events

Item #4

TRADITIONAL TRANSIT OVERVIEW
History of Transit in Southern Nevada

2017

2.1 MILLION RESIDENTS IN SOUTHERN NEVADA
2017
43 MILLION VISITORS IN SOUTHERN NEVADA

Current Transit System

- 39 transit routes
- 3,408 transit stops
- More than 64 million boardings in FY 2017
Vehicle Ownership

67% Do NOT Own a Personal Vehicle

55% Do NOT Have a Valid Driver’s License

Connecting Our Community

60% Of Trips Are Made To/From Work/Home

40% Of Trips Are Recreational, Medical, Social, Shopping or Educational
What is Important to Transit Riders?

- Frequency of service
- Affordability
- Reliability & On-time Performance

WE WANT TO HEAR FROM YOU!
TRANSIT LISTENING TOUR
Value of Transit to Southern Nevada

85% of riders use transit to get to work
**2015-2016**

**NATIONAL TRANSIT DATABASE**

**RANKED RTC NUMBER 1**

<table>
<thead>
<tr>
<th>Category</th>
<th>2015</th>
<th>2016</th>
<th>Improvement</th>
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</thead>
<tbody>
<tr>
<td>Operating Cost</td>
<td>$2.12</td>
<td>$2.26</td>
<td>5.2%</td>
</tr>
<tr>
<td>Subsidy</td>
<td>$1.02</td>
<td>$1.18</td>
<td>1.5%</td>
</tr>
<tr>
<td>Fare Recovery</td>
<td>51.9%</td>
<td>47.8%</td>
<td>-3.1%</td>
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</tbody>
</table>
2015-2016
NATIONAL TRANSIT DATABASE
RANKED RTC **NUMBER 1**

RTCSNV 2015  RTCSNV 2016

<table>
<thead>
<tr>
<th>OPERATING COST</th>
<th>SUBSIDY</th>
<th>FARE RECOVERY RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.12</td>
<td>$1.02</td>
<td>51.90%</td>
</tr>
<tr>
<td>$2.26</td>
<td>$1.18</td>
<td>47.80%</td>
</tr>
</tbody>
</table>

**FARE RECOVERY RATIO**

**Transit Operations Expenses and Revenue**

Revenue vs. Expense from 2007 to 2027.
Item #5

HOW TRANSIT TRANSFORMS A COMMUNITY
Sign up for January 2018 transit field trips

Item #6

ON BOARD UPDATE
YOUR FUTURE TRANSIT PLAN

WHAT WILL ON BOARD DO?

Traditional Transit Improvements
PROCESS / TIMELINE

2017

1. PURPOSE AND NEED
   Spring 2017 to Summer 2017

2. DEVELOP ALTERNATIVES
   Summer 2017 to Winter 2017

3. EVALUATE ALTERNATIVES
   Winter 2017 to Spring 2018

4. RECOMMENDATIONS AND FINAL PLAN
   Summer 2018 to Fall 2018

2018

STAKEHOLDER AND COMMUNITY ENGAGEMENT

RESORT CORRIDOR FEASIBILITY STUDY
Underlying demand for transit in Southern Nevada is driven by:

- Resident Demand driven by: Population, Employment, Activity Centers, Development Patterns

- Visitor Demand
Visitor demand related is to:

- Number and type of visitors
  - Conventioneers
  - Tourists

- Type of Transit
  - Rapid bus versus other RTC buses
  - Travel to and from the Airport
VISITOR DEMAND

- 42.9 million total visitors in 2016; growth of 0.9% per year since 2000
- 6.3 million conventioneers in 2016; growth of 3.2% per year since 2000

VISITOR USE OF TRANSIT

- 12.7 million trips per year by visitors (nearly 20% of total trips)
- Nearly 35,000 trips per day
- Over 31,000 on Deuce and SDX
VISITOR USE OF TRANSIT

- Visitors who fly to Southern Nevada are much more likely to use transit during their visit

![Bar chart showing means of travel to Southern Nevada](source: 2015 Las Vegas Visitor Profile)

VISITOR USE OF TRANSIT TO/FROM AIRPORT

- Visitor use of transit to/from McCarran International Airport is extremely low, at approximately 1% – reflects large untapped market

![Bar chart showing percent of visitors using different means of transportation](source: 2014 Southern Nevada Visitor Survey)
RESORT CORRIDOR
FEASIBILITY STUDY AREA

- Downtown
- North Strip
- Center Strip
- Strip East
- South Strip
- Airport

FEASIBILITY STUDY OVERVIEW

Scope of Work Framework:

1. Outreach and Stakeholder Engagement
2. Existing Transportation System Performance
3. Emerging Trends in Development and Transportation Services
4. High Capacity Transit Technologies
5. Transportation System Scenarios and Alternatives Development
6. Funding Sources and Financial Analysis
7. Feasibility Study
### FEASIBILITY STUDY TIMELINE (MONTHS)

<table>
<thead>
<tr>
<th>Event</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outreach &amp; Stakeholder Coordination</td>
<td>1-2</td>
</tr>
<tr>
<td>Existing Transportation System Performance</td>
<td>3</td>
</tr>
<tr>
<td>Emerging Trends</td>
<td>4-5</td>
</tr>
<tr>
<td>Transit Technologies</td>
<td>6</td>
</tr>
<tr>
<td>Scenario &amp; Alternative Development</td>
<td>7-8</td>
</tr>
<tr>
<td>Funding &amp; Financing</td>
<td>9-11</td>
</tr>
<tr>
<td>Report &amp; Presentations</td>
<td>12</td>
</tr>
</tbody>
</table>

### MARYLAND PARKWAY
WHY MARYLAND PARKWAY?

Connects to the top 5 transit lines

High-productivity route

Links key destinations

85,685 Jobs

93,096 Residents

RTC BUS ROUTES

Bonneville Transit Center

South Strip Transfer Terminal
PROPOSED ROUTE

- Downtown to Airport
- 8.7-Mile Route
- Technology Options:
  - Bus Rapid Transit
  - Light Rail
- 25 Station Locations
  0.35-mile spacing

WHAT ARE WE TRYING TO ACHIEVE?

- Improve mobility
- Maximize transportation choices
- Faster, more reliable and attractive
- Instill a sense of place
- Foster economic development
SIDE-RUNNING CONCEPT
### BENEFIT / COST COMPARISON

<table>
<thead>
<tr>
<th></th>
<th>Existing Route 109</th>
<th>Enhanced Route 109</th>
<th>BRT Build Alternative</th>
<th>LRT Build Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridership (opening year)</td>
<td>9,000</td>
<td>10,000</td>
<td>13,300</td>
<td>16,100</td>
</tr>
<tr>
<td>Average travel time (min)</td>
<td>49</td>
<td>49</td>
<td>41</td>
<td>32</td>
</tr>
<tr>
<td>Capital cost (2016 $ / YOE $)</td>
<td>$15M</td>
<td>$29M</td>
<td>$298M / $366M</td>
<td>$573M / $705M</td>
</tr>
<tr>
<td>O&amp;M cost (2016 $)</td>
<td>$5.9M</td>
<td>$6.8M</td>
<td>$7.2M</td>
<td>$11.5M</td>
</tr>
<tr>
<td>O&amp;M cost per boarding</td>
<td>$1.87</td>
<td>$1.94</td>
<td>$1.55</td>
<td>$2.04</td>
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</tbody>
</table>
Open Discussion

- In your travels nationally and internationally, how many of you have used public transportation? Why did you choose that mode of transportation?

- What experiences have you, your employees or someone you know, had with RTC transit?

- What transit improvements, including different mobility options, would you like to see in Southern Nevada’s future?

- Do you see public transit as one of our community’s assets?

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Item #8

SMART MOBILITY & INNOVATION
PRIVATE INDUSTRY UPDATE
Aptiv Heritage: Delphi Snapshot

- 2016 Revenue: $16.7 Bil
- 2016 EBIT: $2.2 Bil
- Countries: 46
- Major Manufacturing Facilities: 126
- Major Global Technical Centers: 15
- Engineers & Scientists: 20,000
- Employees: 173,000
- Market Capitalization: $26 Bil
For decades Delphi has been inside your car... now Aptiv will be moving beyond it
Mobility: Pushing the boundaries of

- **TECHNOLOGY**
  - IoT
  - Security
  - Cloud
  - Connectivity
  - Software
  - Data
  - AI
  - Vision
  - Edge
  - Mobile
  - Energy

- **BUSINESS MODEL**
  - Services
  - Content
  - Software license
  - Data Exchange
  - Asset Sharing
  - Revenue Sharing
  - Cost Saving
  - Advertisement

Demonstrated Automated Driving Leadership
A RICH HISTORY OF FIRSTS AND MILESTONES ON PATH TO AUTOMATED DRIVING

**2007**
DARPA Challenge with Ottomotika: Birthplace of autonomous driving; on the road even before Google

**2015**
1st automated drive at CES: One of two companies that passed autonomous vehicle permit testing in urban/residential area in Nevada
- 1st Coast to Coast automated drive: 3400 miles in 99% autonomous mode
- Acquired Ottomotika: Spin-off of Carnegie Mellon University

**2016**
V2everything™ automated drive at CES: V2V, V2P, V2I unique HMI personal device connectivity
Automated Mobility on Demand Pilot: Low speed, point-to-point, autonomous, mobility-on-demand service in Singapore

**2017**
Most complex highway + urban drive at CES: V2P, V2I and unique HMI with personal device connectivity
Acquired NuTonomy: MIT heritage, autonomous technology leader
Most Complex Highway+Urban drive at CES 2017

2017

152
Ride & Drives
Day & Nightime

4 x 7
4 vehicles over 7 days at CES

>1,400 miles traveled in live Las Vegas conditions

~99% miles traveled in Automated mode

Global Automated Driving Capabilities

Delphi Labs Silicon Valley
- Integration vehicle, software, sensors, and multi-domain
- Collaboration partner selection
- Test open road

Auburn Hills
- Infotainment
- HMI/UX
- Troy test route
- M-City Test Bed

Kokomo, Indiana
- Advanced radar
- Advanced Vision
- Advanced Fusion
- Functional Safety
- Open Road Test 2016

Gothenburg, Munich, Stuttgart
- Customer support
- V2X
- Installation
- EU Standards

Krakow, Poland
- Radar
- Camera
- Component Test
- System Test

Shanghai
- China customers
- Vision
- 360 vision
- China specific use-cases

Bangalore
- Software development
- Verification
- Modeling and Simulation

Pittsburgh Tech Center
- Software Development
- Software Architecture
- New Feature Development
- Feature development and test (open road)

Singapore
- Radar/Vision Manufacturing
- Advanced Process and Packaging
- AMD Pilot

Wuppertal
- Advanced Radar
- Advanced Vision
- Advanced Fusion
- Functional Safety
- Open Road Test 2016

Japan/Korea
- Customer Support

Agoura Hills, CA
- Advanced radar design
- Sensor Fusion

Kokomo, Indiana
- Advanced Radar
- Advanced Vision
- In-vehicle V2X
- Driver state monitor
- HMI/UX development
- Functional Safety
- Cybersecurity

Auburn Hills
- Advanced Radar
- Advanced Vision
- Advanced Fusion
- Functional Safety
- Open Road Test 2016
• Significant Aptiv presence and showcase in 2018
• Innovative autonomous experience demonstration – technology, use case
• Partnerships, ecosystem for success
• Importance of Las Vegas for continued technology and business model enhancements

**Why Smart Cities & Communities**

- traffic
- safety
- environment
- parking
- data sharing
- equitable
- quality of life
- coverage
- efficiency

- safe
- accessible
- available
- reliable
- affordable
- first/last-mile
- universal ride payment

**mobility requirements**

**constraints**

**Epicenter for Mobility**

- resources
- growth
- congestion
- regulations
- infrastructure
- expertise
Urban mobility challenges by 2050*

50% of world population living in cities > 70%

freight +40%

CO₂ emissions 5x
CO₂ cost 4x
CO₂ travel time 3x

Benefits of mobility automation to cities*

-28% vehicles
-44% parking spaces
-30% travel time
-66% emissions
-87% accidents

*AD Little

*BCG
Aptiv approach to Smart Cities

FOR
• consumer
• commercial
• public transit

WHAT
• connected
• autonomous
• mobility platform

HOW
• partners
• govt
• OEM

VALUE
• efficiency
• equitable
• safety
• data
• rev source
• license

Smart City Pilots

Singapore
Trial of an urban, point-to-point, low-speed, autonomous, mobility-on-demand (AMoD) service in Singapore’s one-north business park

Boston
Commercially viable AMoD solution with fleet management, connectivity and data analytics enabling efficient city operations

Smart City pilots in multiple regions
Well Positioned Enable Smart Mobility Benefits

URBAN MOBILITY CHALLENGES BY 2050

+70% Of Population
5x Emissions
4x Cost
3x Travel time
+40% freight

BENEFITS OF MOBILITY AUTOMATION TO CITIES

28% Less Vehicles
44% Fewer Parking Spaces
30% Shorter Travel Time
66% Lower Emissions
87% Fewer Accidents

Uniquely positioned to address mobility’s toughest challenges

The future. Now.
Delphi Drive – 3400 miles Coast to Coast

Data collection during San Francisco to New York City drive

Global Footprint

Global scale with regional capabilities
UPCOMING EVENTS

OPEN DISCUSSION
Item #11

FINAL CITIZENS PARTICIPATION