Transportation Modeling Forum

June 17, 2025

Links Referenced in Presentation

- Open Data Portal

- ABM3 Releases

- ABM3 Wiki

- ABM3 GitHub Repository Branch

- ABM2+ GitHub Repository Branch

- SANDAG Draft 2025 Regional Plan Modeling Data Request Form

- 2025 Regional Plan Network Explorer

- Draft 2025 Regional Plan

Agenda

Welcome

ABM3 Release

2025 Regional Plan / Sustainable Communities Strategy (SCS) Update
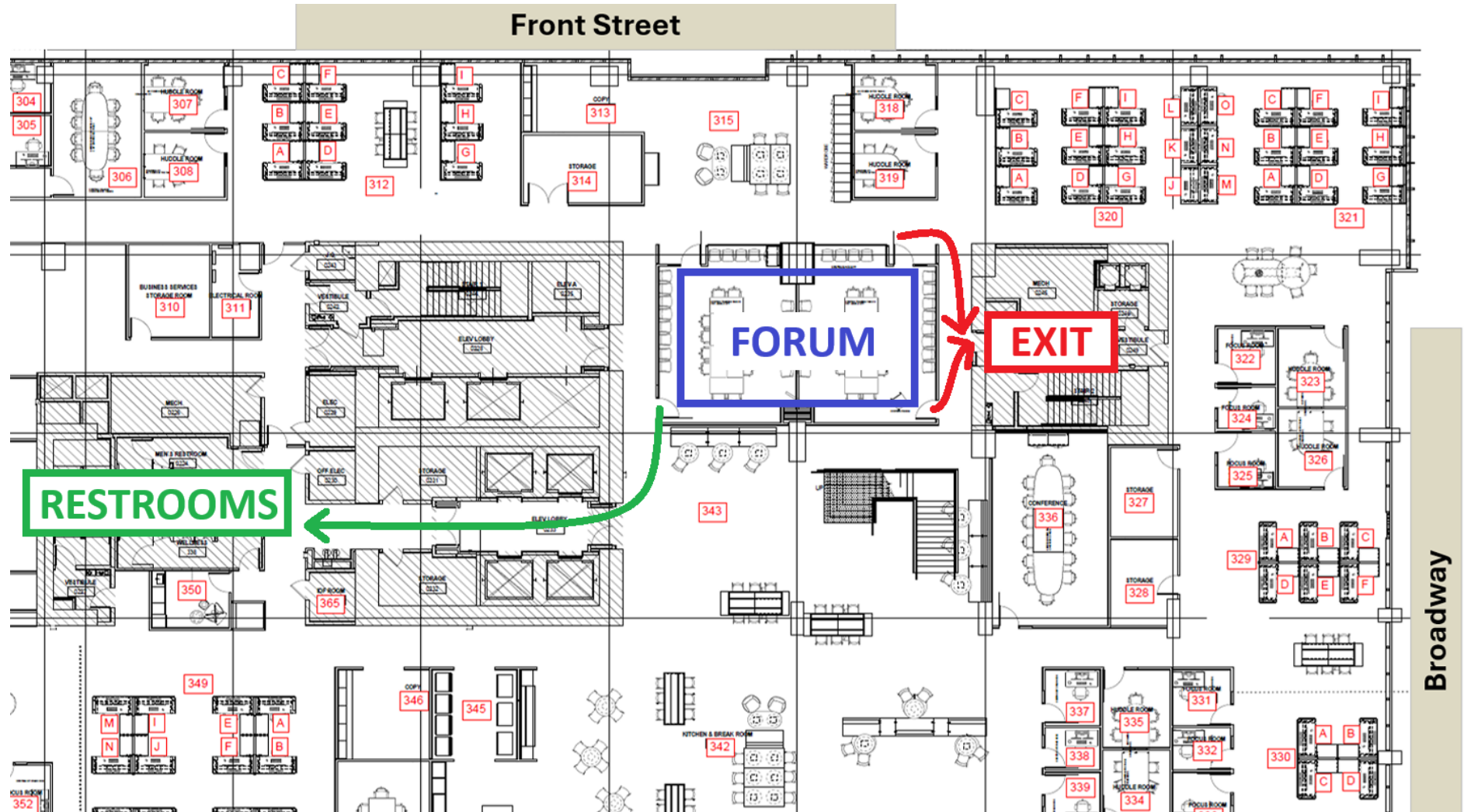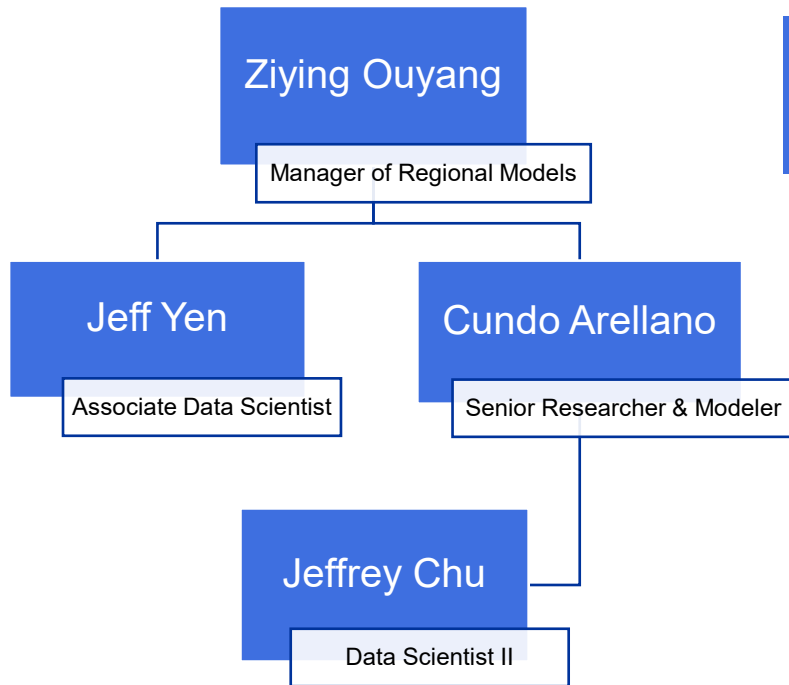
Service Bureau Update

Q&A

Welcome

- 25th Transportation Modeling Forum

- New Data Science Director: Grace Miño

- New Office at West: 1011 Union Street

- New Data Portal: **opendata.SANDAG.org**

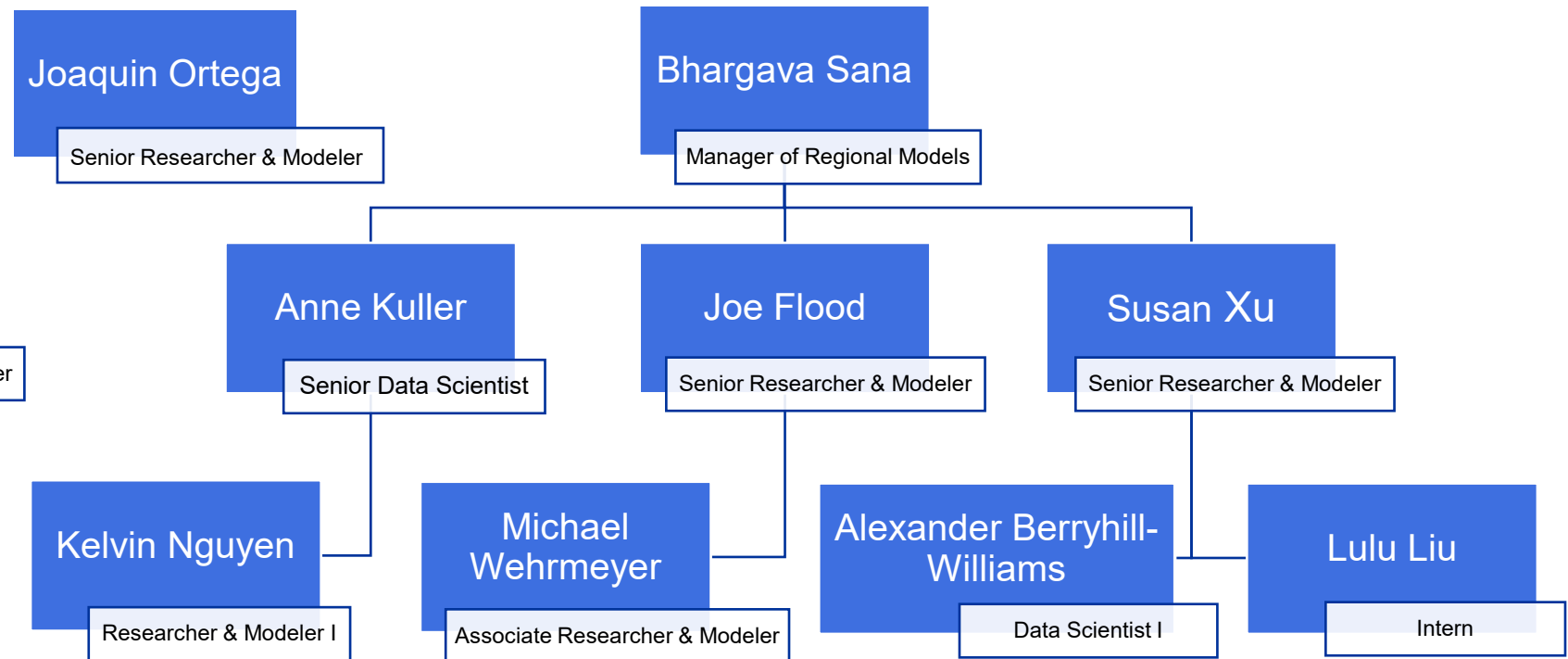# Welcome

Welcome – Transportation Analysis & Modeling

TAM - Application

Ziying Ouyang
Manager of Regional Models

Jeff Yen
Associate Data Scientist

Cundo Arellano
Senior Researcher & Modeler

Jeffrey Chu
Data Scientist II

Joaquin Ortega
Senior Researcher & Modeler

TAM - Development

Bhargava Sana
Manager of Regional Models

Anne Kuller
Senior Data Scientist

Joe Flood
Senior Researcher & Modeler

Susan Xu
Senior Researcher & Modeler

Kelvin Nguyen
Researcher & Modeler I

Michael Wehrmeyer
Associate Researcher & Modeler

Alexander Berryhill-Williams
Data Scientist I

Lulu Liu
Intern

ABM3 Release

Development Timeline

Jan-Feb 2024
- Azure Storage & Visualization Pipeline
- Sensitivity Testing

Mar-Apr 2024
- Technical Advisory Committee (TAC)
- Commercial Vehicle Model
- Transportation Network Editing Database (TNED) in Production

May-Jul 2024
- Started ABM3 releases (https://github.com/SANDAG/ABM/releases)
- Network Coding

Aug-Dec 2024
- Draft 2025 Regional Plan Runs
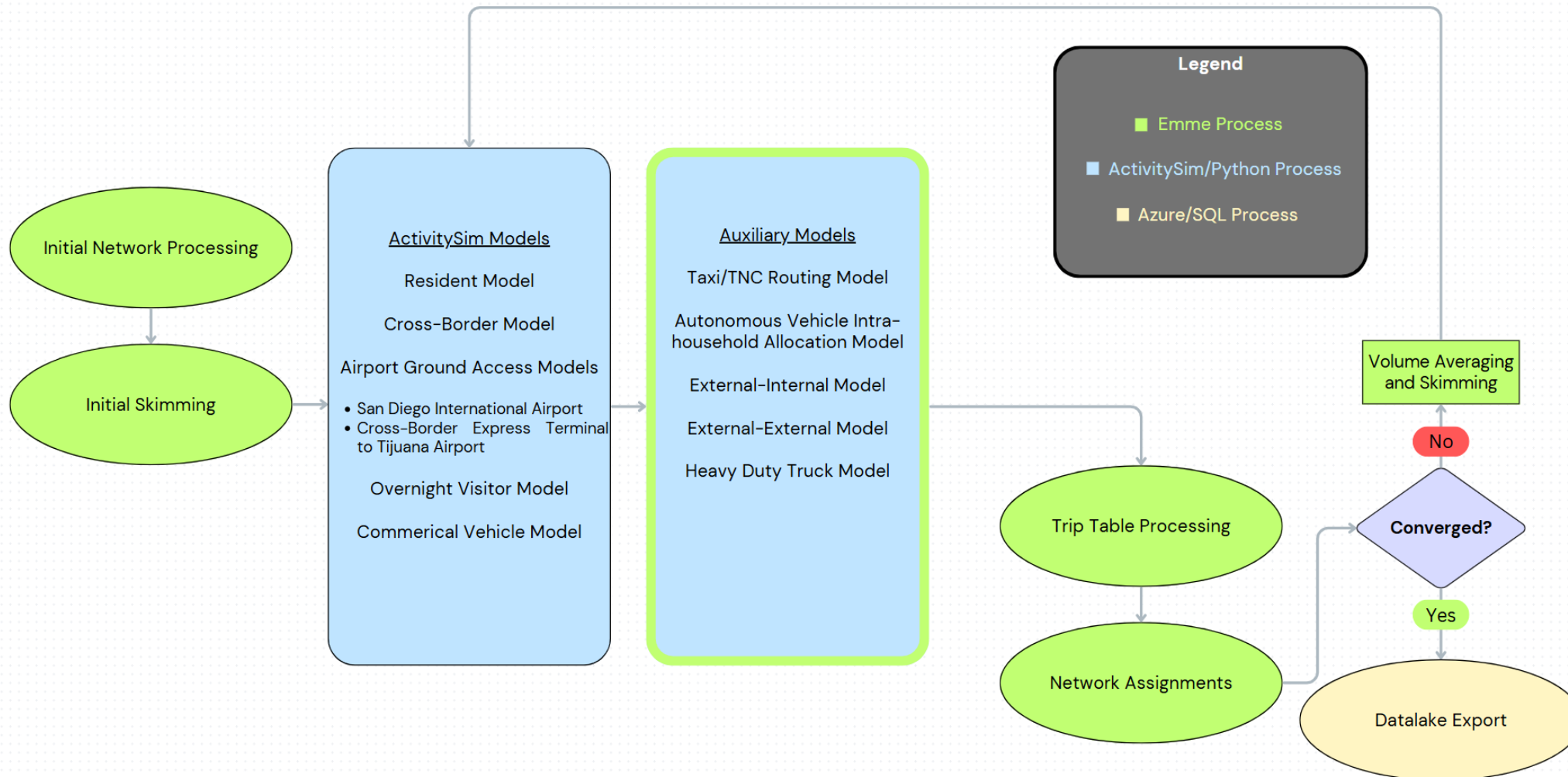- ABM3 Bugfixes & Documentation

ABM3 Key Features

- **Activity-Based Model**
  - — Take synthetic population as input
  - — Simulate one typical weekday
- **ABM1, ABM2, ABM2+ all used CT-RAMP**
  - — Java-based
- **ABM3 uses ActivitySim**
  - — Open-source and Python-based
  - — Developed by consortium of public agencies
    - 10 MPOs
    - 2 US State DOTs
    - 2 International Agencies

ABM3 Key Features

- Models that use ActivitySim
  - Resident
  - Visitor
  - Crossborder
  - Airport access
  - Commercial Vehicle
    - Uses synthetic establishments
- Non-ActivitySim Models
  - EI, EE
 - Heavy Truck
  - TNC/AV Routing

ABM3 Key Features

Initial Network Processing

Initial Skimming

ActivitySim Models

Resident Model

Cross-Border Model

Airport Ground Access Models
- San Diego International Airport
- Cross-Border Express Terminal to Tijuana Airport

Overnight Visitor Model

Commerical Vehicle Model

Auxiliary Models

Taxi/TNC Routing Model

Autonomous Vehicle Intra-household Allocation Model

External-Internal Model

External-External Model

Heavy Duty Truck Model

Legend

■ Emme Process

■ ActivitySim/Python Process

■ Azure/SQL Process

Trip Table Processing

Network Assignments

Volume Averaging and Skimming

No

Converged?

Yes

Datalake Export

ABM3 Key Features

- New resident model components
  - External workplace location and tour destination models
  - Vehicle type choice and allocation
  - Transit pass ownership and subsidy
- New policies
  - E-bike/E-scooter added as options in mode choice
  - EV Rebates included in vehicle type choice
  - Microtransit/NEV incorporated into pooled TNC mode

ABM3 vs ABM2+ Comparison

- Software Platform & Configuration
- Zone Systems
- Model Updates
- Model Flow & Enhancements
- Inputs & Outputs

ABM3 vs ABM2+ Comparison
*Software Platform & Configuration
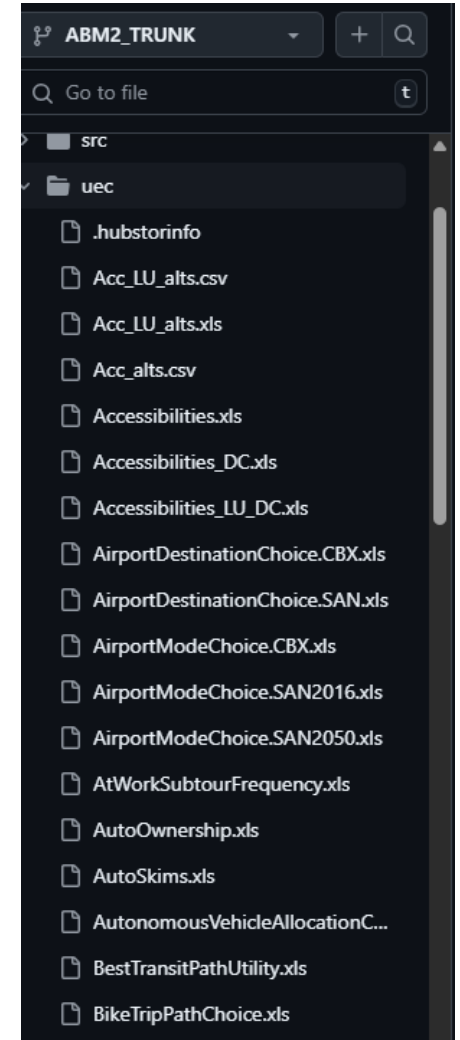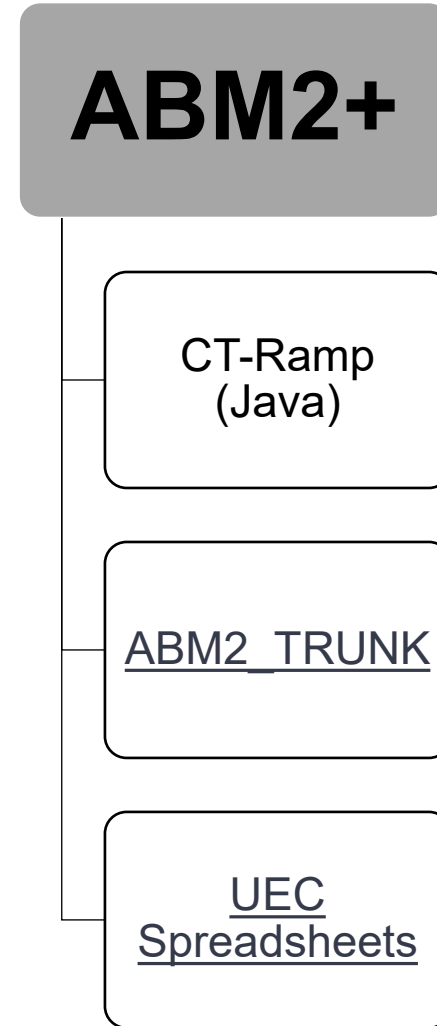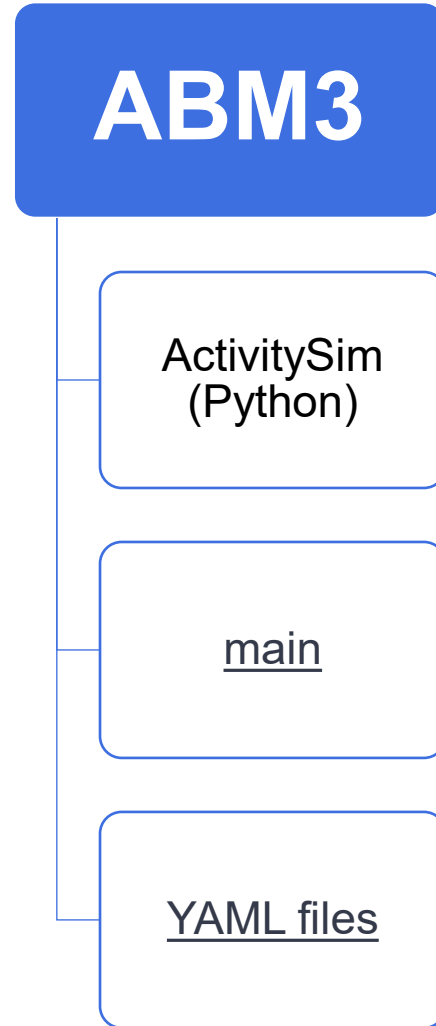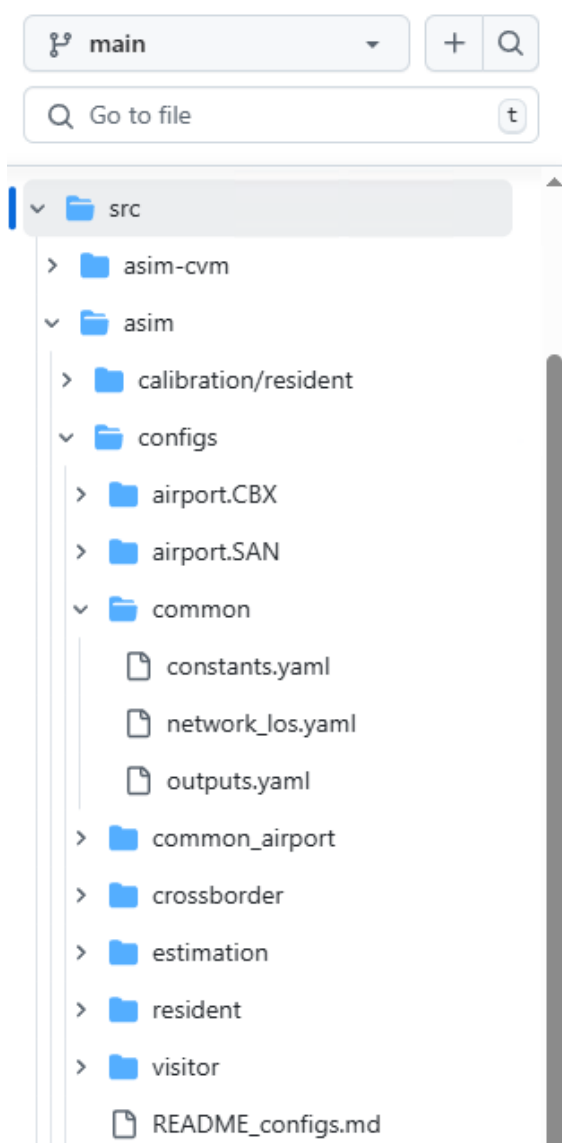
ABM3 vs ABM2+ Comparison
*Zone Systems

ABM3

2-Zone

(TAZ and MGRA)

Transit skims are **TAZ-TAZ**

1365 matrices
7 access/egress

ABM2+

3-Zone

(TAZ, MGRA and TAP)

Transit skims are **TAP-TAP**

405 matrices:
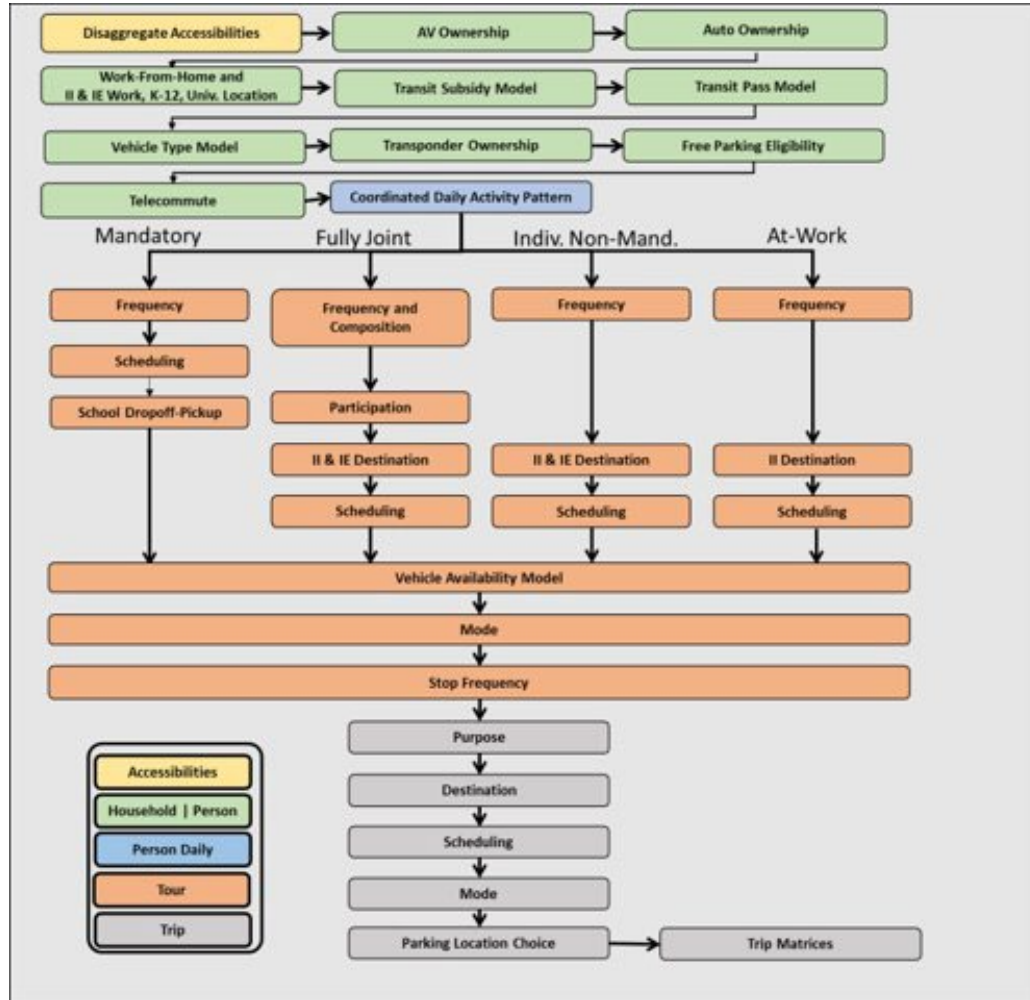4 access/egress modes

ABM3 vs ABM2+ Comparison
*Model Updates

- ABM3 is based on post pandemic household survey

- Airport model has new access options

- CBM updated to 2019 cross-border survey and dynamic border wait times

- CVM developed using ActivitySim platform and updated to 2022 commercial vehicle survey

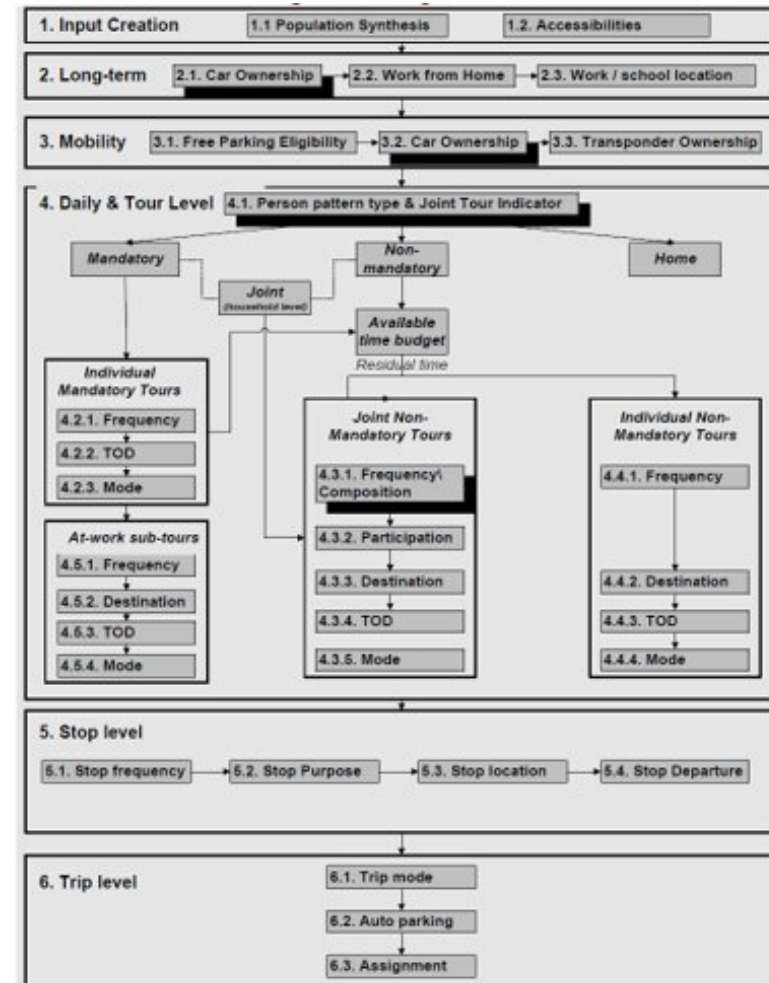- Internal-external model explicitly added to resident model within ActivitySim

ABM3 vs ABM2+ Comparison
*Model Flow & Enhancements

ABM3 (resident)

ABM2+ (resident)

ABM3 vs ABM2+ Comparison
*Inputs

	ABM3	ABM2+
Synthetic Population	• Series 15 forecast • Population Sim outputs	• Series 14 forecast • Popsyn outputs
Land use	• Series 15 forecast • REMI (regional economic forecast model); UDM Plus • Employment sectors updated	• Series 14 forecast • UDM/Urbansim lite

ABM3 vs ABM2+ Comparison
*Outputs

	ABM3	ABM2+
Traffic Skims	…/output/skims/traffic_skims_[tod].omx i.e. <traffic_class>_<vot>_TIME_<time_period>	…/output/traffic_skims_[tod].omx i.e. <time_period>_<traffic_class>_<vot>_TIME
Transit Skims	…/output/skims/transit_skims_[tod].omx • Create transit skims and assignments between TAZs • Added access/agress mode dimensions	…/output/transit_skims.omx • Create transit skims and assignments between TAPs
Trip List	…/output/resident/final_trips.csv • Include internal-external and resident trips • Updated trip modes: EBIKE & ESCOOTER	…/output/indivTripData_3.csv …/report/individualTrips.csv • Resident trips only
Tour List	…/output/resident/final_tours.csv • Added EBIKE and ESCOOTER to tour mode • Column names are different from ABM2+	…/output/indivTourData_3.csv …/report/individualTours.csv

Reporting and Visualization

What's Next for ABM?

- Upgrade to latest ActivitySim (v1.4.0)

- Transition data pipeline to Databricks Unity Catalog

- Advance to latest EMME for traffic & transit assignment

- Update transit parameters using the 2023 On-Board Survey (OBS)

- Update San Diego International Airport model

2025 Regional Plan (RP) & Sustainable Communities Strategy (SCS) Updates

Draft 2025 RP SCS Released

SB375 Greenhouse Gas (GHG) Target*

Target Year	CARB Target	GHG
2035	19%	19.3%
2050	N/A	19.5%

*SB375 reductions are based on automobiles and light trucks measure against the 2005 baseline.

ABM3 Testing

2022 Scenario:
Inputs, Parameters, and Scripts

Draft 2025 RP Inputs and Outputs

SANDAG Draft 2025 Regional Plan Modeling Data Request Form

2025 RP Scenario Name Elements

- Elements used to define a model scenario
  - Model and release versions
    - New travel surveys, and/or new features
  - Socioeconomic, demographic, land use, employment inputs
    - Known as the land use series
  - Plan assumptions
    - Networks and policies

2025 RP Scenario Name Elements

- RP Models

	Draft 2025 RP	Amended 2021 RP
ABM Model	ABM3	ABM2+
ABM Version Release	15.2.1	14.2.2
RP Years	2022, 2035, 2050	2016, 2025, 2035, 2050
Land Use Version	Series 15	Series 14

- TAZ & MGRA numbering different between Series 14 and Series 15
  - TAZ = Traffic Analysis Zone, MGRA = Master Geographic Reference Area

2025 RP Scenario Name Elements

- Elements used to define a model scenario
  - Model version and release
    - ABM2+ 14.2.2, ABM3 15.2.1
  - Socioeconomic, demographic, land use, employment inputs
    - Series 14, Series 15
  - Plan assumptions
    - Build, No Build
- Specifics when requesting modeling data
  - Add citation to your work
    - SANDAG Activity Based Model ##, Release v##.#.#, Growth Forecast Series ##, Forecast Year #### ####, Reference Scenario ID ###, Month/Year of Model Run

What Will the Region Look Like in the Future?
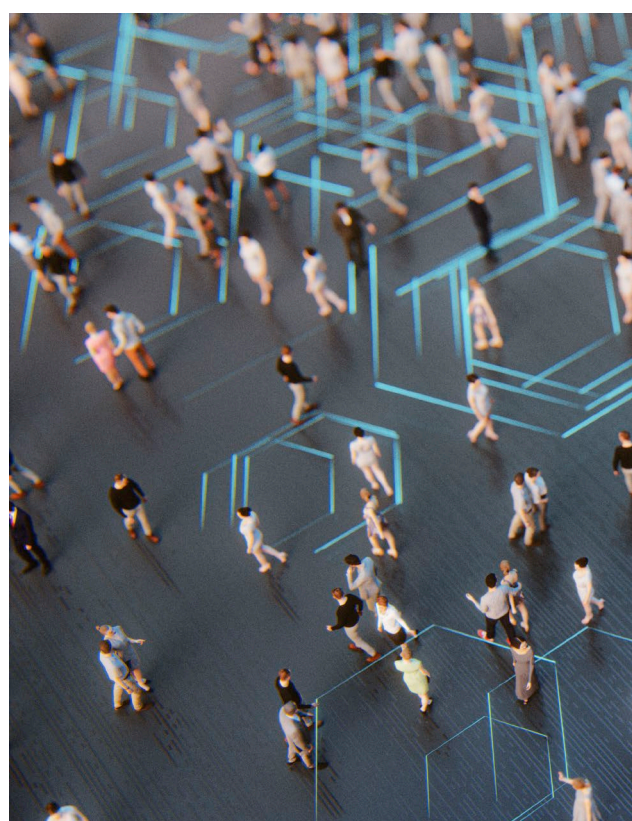
Population peaks around 2042 and then decreases

Population will be older

More houses needed

More jobs and people working longer

Draft Series 15 Regional Growth Forecast Results

Forecast

Population

Year	Value
2022	3.29 million
2029	3.33 million
2035	3.40 million
2040	3.43 million
2050	3.40 million

Jobs (Total)

Year	Value
2022	2.14 million
2029	2.18 million
2035	2.23 million
2040	2.29 million
2050	2.37 million

Jobs (Wage & Salary)

Year	Value
2022	1.61 million
2029	1.64 million
2035	1.68 million
2040	1.72 million
2050	1.78 million

Housing Stock

Year	Value
2022	1.24 million
2029	1.32 million
2035	1.37 million
2040	1.41 million
2050	1.44 million

Households

Year	Value
2022	1.16 million
2029	1.23 million
2035	1.28 million
2040	1.3 million
2050	1.33 million

Sources: SANDAG Series 15 Draft Regional Growth Forecast with SCS Land Use Pattern, SANDAG Annual Estimates, and SANDAG Intercensal Estimates

Subregional Forecast
Projected Change in Population, Housing, and Jobs (2022–2050)

Jurisdiction	Population Change #	Population Change %	Housing Change #	Housing Change %	Jobs (wage & salary) Change #	Jobs (wage & salary) Change %
Carlsbad	1,191	1.0%	6,124	12.7%	5,986	7.5%
Chula Vista	48,142	17.4%	26,330	29.9%	28,365	38.0%
Coronado	-1,055	-4.7%	304	3.1%	281	0.9%
Del Mar	-219	-5.6%	111	4.2%	50	1.3%
El Cajon	-6,415	-6.1%	1,690	4.6%	4,450	10.2%
Encinitas	-1,693	-2.8%	2,108	7.9%	846	3.2%
Escondido	398	0.3%	6,186	12.5%	2,102	3.9%
Imperial Beach	-892	-3.4%	843	8.4%	2,533	49.9%
La Mesa	-1,297	-2.1%	1,915	7.3%	2,216	8.8%
Lemon Grove	-979	-3.6%	753	8.2%	1,431	18.0%
National City	103	0.2%	2,462	13.9%	3,184	8.2%
Oceanside	10,341	6.0%	13,868	20.5%	17,163	35.7%
Poway	-214	-0.4%	1,929	11.5%	281	0.8%
San Diego	65,975	4.8%	107,612	19.4%	67,463	7.7%
San Marcos	16,306	17.4%	10,395	32.2%	12,182	30.4%
Santee	3,809	6.5%	3,628	16.9%	1,474	8.3%
Solana Beach	-670	-5.2%	369	5.7%	142	1.5%
Vista	-1,291	-1.3%	3,399	10.1%	2,635	6.8%
Unincorporated	-18,596	-3.6%	12,793	7.2%	17,973	11.5%
Region	**112,944**	**3.4%**	**202,819**	**16.4%**	**170,757**	**10.6%**

Source: SANDAG Series 15 Draft Regional Growth Forecast with SCS Land Use Pattern

Draft Series 15 Summary

The Draft Series 15 Regional Growth Forecast has been a collaborative effort between SANDAG and our member agencies

Key takeaways include:

- Series 15 presents a slow growth scenario for the San Diego region which mirrors state trends and the California Department of Finance projection

- An aging population is projected, with more older adults and fewer children

- Housing pressure is projected to ease as units are continually added

- Strong job growth is projected, in part due to stable prime working age population and increased labor force participation

2025 RP Process

Evaluate Network Projects & Policies → Prepare Network Concepts → Draft Plan & EIR (ABM3 v15.2.1) → Final Plan & EIR (ABM3 vXX.X.X)

2025 RP Policy Dials

Technology

- Smart Signals
- ATDM Reliability
- Electric Vehicles

Economic (Cost)

- Managed Lanes / HOV Toll Rates
- Auto Operating Cost
- Parking Rates
- Transit Fares

Travel Choice

- Managed Lane / HOV Occupancy
- Vanpool*
- Carshare*
- Ebike share
- Microtransit
- Telework

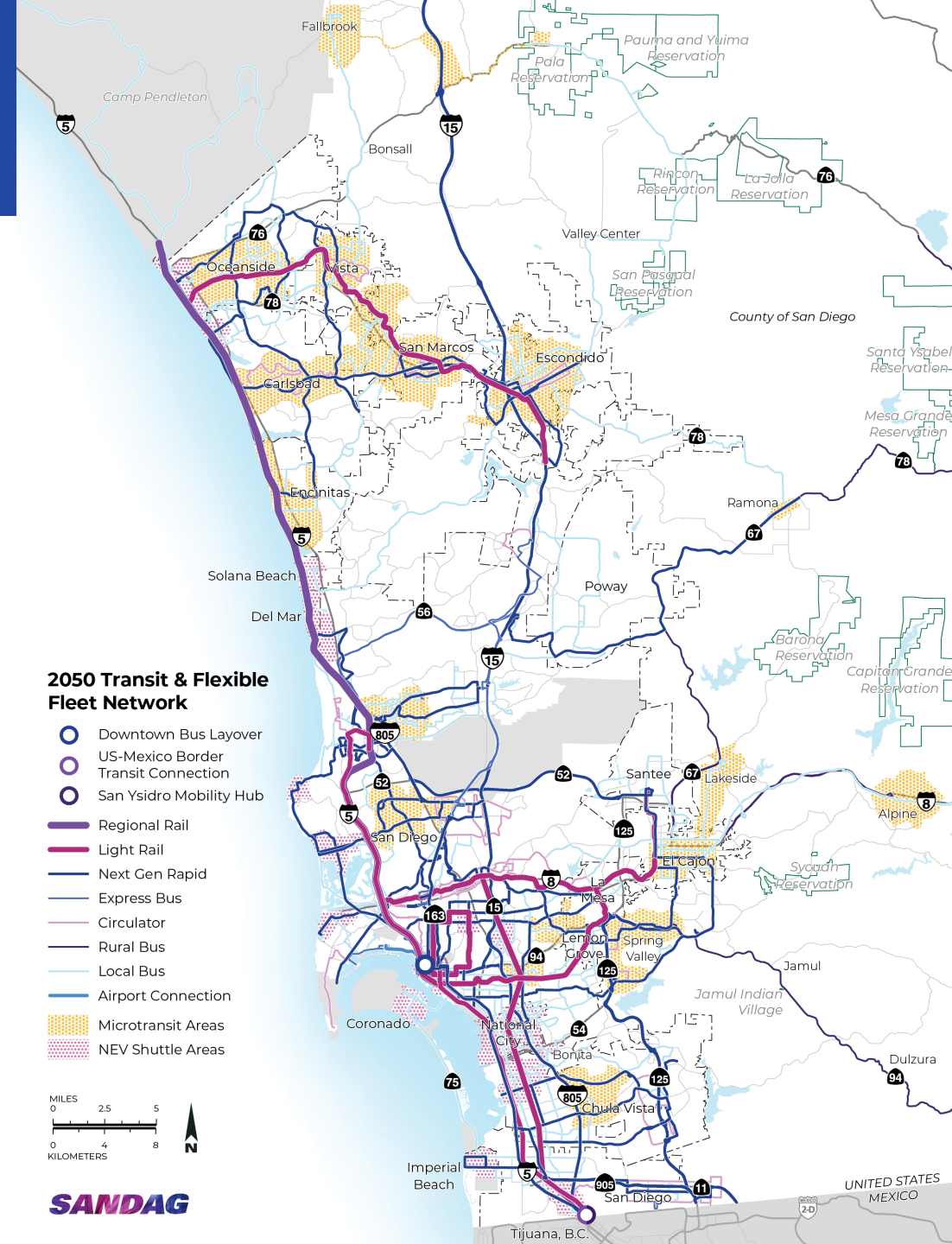*Handled off-model*

2025 RP Draft Transportation Network

- Overview of SANDAG Transportation Networks
  - Transportation Network Editing Database (TNED)
  - Tools and Applications:
    - TNED Repository*
    - 2025 Regional Plan Network Explorer
    - SANDAG ABM Roadway Network Review Tool**

    * *Not available publicly yet*

    ** *For member jurisdiction access only*

Transit Networks

- 2035 Highlights
  - 35 new Rapid Routes
  - Increased frequency
  - Longer service hours
  - More rural transit service
  - 21 Microtransit Areas
  - 15 NEV Shuttle Areas

- 2050 Highlights
  - Purple Line
  - Coaster Extension to Camp Pendleton
  - Balboa Park Streetcar

2050 Transit & Flexible Fleet Network

- ○ Downtown Bus Layover
- ○ US-Mexico Border Transit Connection
- ○ San Ysidro Mobility Hub
- Regional Rail
- Light Rail
- Next Gen Rapid
- Express Bus
- Circulator
- Rural Bus
- Local Bus
- Airport Connection
- Microtransit Areas
- NEV Shuttle Areas

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Highway Networks

- 2035 Highlights
  - 2-Lane Managed Lanes (MLs): I-5, I-805, SR 15/I-15, SR 52, SR 78
  - Reversible ML HOV: SR 75
 - ML Connectors: I-5/I-805, I-5/SR 78, I-15/I-805, I-15/SR 78
  - Freeway Connectors: I-5/SR 78, SR 94/SR 125
  - Toll Removal: SR 125
  - Direct Access Ramp: I-5, I-15 (2)
  - Transit Operation Improvement: I-805
  - SR 11 freeway connection to Otay Mesa East POE
- 2050 Highlights
  - 2-Lane MLs: I-5, SR 15/I-15, SR 52, SR 56, SR 94, SR 163
  - 4-Lane MLs: I-15, I-805
  - Reversible ML HOT: SR 75
  - ML Connectors: I-15/SR 52, SR 94/I-805, SR 52/I-805, I-805/SR 163, I-15/SR 94

2050 Complete Corridors & Transportation System Management Network

- ■ Direct Access Ramp
- ■ Transit Operational Improvement
- ● Interchange and Arterial Operational Improvements
- ● Managed Lane Connector
- ● Rural Intersections and Interchanges
- Goods Movement
- Reversible Managed Lane
- 2 Managed Lanes
- 4 Managed Lanes
- Rural Corridor Improvements
- Transportation Technology/ Smart Intersection System (SIS)
- Smart Infrastructure
- Smart Borders
- Smart Corridors
- Operational Improvements
- Freeway Connection to OME POE
- Toll Removal

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Active Transportation Networks

- 721 mi. of Planned Bikeways - 178 projects

- 182 mi. of Bikeways Existing/In Construction

- A 320-mi. increase in the 2025 Active Transportation Network (compared to 2021)

- Network for Users of All Ages and Abilities as Class I, Class IV, or "Class V" bikeways

Class I

Class IV

Class V

Traffic Calming
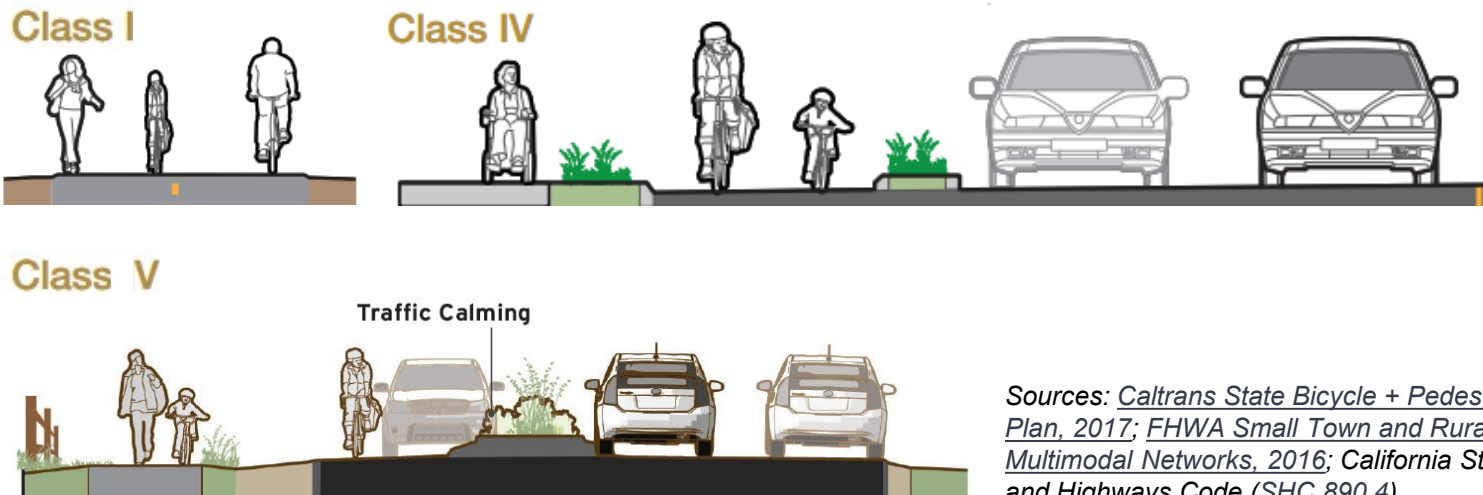
Sources: _Caltrans State Bicycle + Pedestrian Plan, 2017_; _FHWA Small Town and Rural Multimodal Networks, 2016_; California Streets and Highways Code (_SHC 890.4_)

2050 Active Transportation Network
— On-Street Bikeway
— Off-Street Bikeway
— On-Street & Off-Street Bikeway

MILES
0   2.5   5

KILOMETERS
0   4   8

N

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Performance Measures

Convenient

Decreased travel time for all modes including commercial vehicles

Equitable

Increased access to basic needs and opportunities

Healthy

Increase in transportation related physical activity

Safe

More safe active transportation infrastructure

Performance Measures

- Primary PM categories
  — Access to Basic Needs (also for Title VI/social equity)
  — Access to Opportunities (also for Title VI/social equity)
  — SB 375 Greenhouse Gas (GHG) Emissions
  — Vehicle Miles Traveled (VMT)

- Draft 2025 RP Chapter 3: **www.SANDAG.org/2025rpchapter3**
- Draft 2025 RP Appendix E: **www.SANDAG.org/2025rpappendixe**
- Draft 2025 RP Appendix N: **www.SANDAG.org/2025rpappendixn**

Service Bureau Update

Service Bureau Update

- Service Bureau back in 2026

- Will primarily focus on member agency work

- ABM3 Wiki: **SANDAG.github.io/ABM/**

Next for SANDAG & TAM

- Public Review of Draft 2025 RP

- Release of Draft Environmental Impact Report (EIR)

- Finalize 2025 RP SCS and EIR

- Update Data Dissemination for the 2025 RP Final Plan

- Prepare for Service Bureau

- Next Forum: Winter 2025/26

Questions?

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SANDAG.org

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