

















39°57'25 9"N 105°10'06 6"

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39°57'25.9"N 105°10'06.6"W

TOD Principles

Transit-Oriented Development promotes the creation of high-density, mixed-use developments near transit locations that prioritize pedestrian connectivity.

CYCLE

PRIORITIZE NONMOTORIZED TRANSPORT NETWORKS

OBJECTIVE A. The cycling network is safe and complete. **OBJECTIVE B.** Cycle parking and storage is ample and secure.

CONNECT

CREATE DENSE NETWORKS OF STREETS AND PATHS

OBJECTIVE A. Walking and cycling routes are short, direct, and varied. **OBJECTIVE B.** Walking and cycling routes are shorter than motor vehicle routes.

TRANSIT

LOCATE DEVELOPMENT NEAR HIGH-QUALITY PUBLIC TRANSPORT

OBJECTIVE A. High-quality transit is accessible by foot. (TOD Requirement)

MIX

PLAN FOR MIXED USES, INCOME, AND DEMOGRAPHICS

OBJECTIVE A. Opportunities and services are within a short walking distance of where people live and work, and the public space is activated over extended hours.

OBJECTIVE B. Diverse demographics and income ranges are included among local residents.

Source: Institute for Transportation and Development Policy





DENSIFY

OPTIMIZE DENSITY AND MATCH TRANSIT CAPACITY

OBJECTIVE A. High residential and job densities support high-quality transit, local services, and public space activity.

COMPACT

CREATE REGIONS WITH SHORT TRANSIT COMMUTES

OBJECTIVE A. The development is in, or next to, an existing urban area. **OBJECTIVE B.** Traveling through the city is convenient.

SHIFT

INCREASE MOBILITY BY REGULATING PARKING AND ROAD USE

OBJECTIVE A. The land occupied by motor vehicle is minimized.

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TOD Impact

Dense, transit-oriented communities reduce urban sprawl

Environment

- Less reliance on cars reduces pollution and GHG emissions
- Less land consumption preserves habitats and resources
- *Up to 3x less CO2 emissions per capita in dense US city centers than their suburbs

Health

- Less air pollution
- Shorter commutes
- · Promotes activity and social interaction via increased pedestrian connection

Inequity

- Equitable access to public transportation
- Pedestrian connectivity to services, activities, and amenities
- Potential for integration of affordable housing

Efficiency

- Increased ridership to support public transportation
- Reduction in public infrastructure costs
- Lower commute time for labor force

Pedestrian Safety and Connectivity

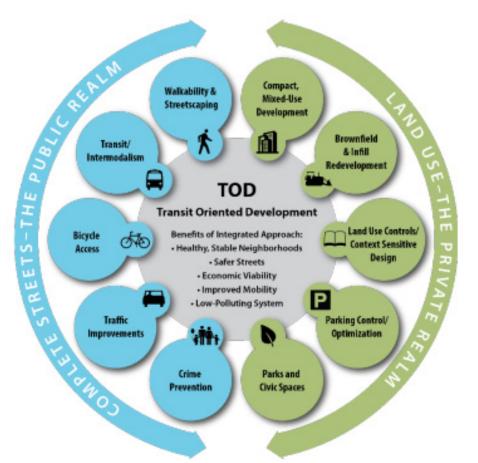
- Reduction in car use increases road safety
- Increased infrastructure for cycling and pedestrians

Source: Institute for Transportation and Development Policy, https://tod.itdp.org/why-tod-matters.html









Source: TOD Scenario Report AECOM



Source: TLCD Architecture

TOD Research - National

"Case Studies for Transit Oriented Development" prepared by Reconnecting America

- TOD produces <u>43% less</u> emissions than suburban developments (Study by Center for Transit-Oriented Development)
- TOD residents own <u>43% fewer cars</u> than those in suburban neighborhoods (Center for Transit-Oriented Development's database of transit systems)
- TOD housing produces half as many car trips as typical suburban development (Transit Cooperative Research Program PB PlaceMaking)
- TOD households spend about <u>16% less</u> on transportation than suburban households (Center for Transit-Oriented Development)
- Rosslyn Ballston Corridor in Arlington, VA TOD Study
 -50% of residents take transit to work, 73% of which walk to stations

Source: https://community-wealth.org/sites/clone.community-wealth.org/files/downloads/report-zwick.pdf

Name of Transit Zone Type ²	Average Residential Density (Households per Residential Acre)	Average Employment Proximity (Jobs/Sq Mile)	Average Block Size (Acres)	Average Transit Access (Walkable Transit Options)	AMI ³ CO ₂ e/HH (Metric Tons)	Local ³ CO ₂ e/HH (Metric Tons)
Highest Location	61.7	671,546	3.4	97.7	1.46	1.86
Efficient Transit Zones						
High Location	30.4	171,750	4.1	25.6	2.66	3.57
Efficient Transit Zones						
High Medium Location	9.3	66,973	5.4	13.2	4.61	5.25
Efficient Transit Zones						
Medium Location	3.8	46,086	12.6	6.4	6.06	6.29
Efficient Transit Zones						
Low Location Efficient	4.5	41,088	9.2	1.7	6.51	6.65
Transit Zones						
Lowest Location	0.7	17,065	39.6	0.9	8.81	8.47
Efficient Transit Zones						

Table 1: Six National Transit Zone Types - Executive Summary

^{*}AMI assumes a household with average median income, average number of people, average commute time







SUPERIOR TOD AFFORDABLE HOUSING SITE

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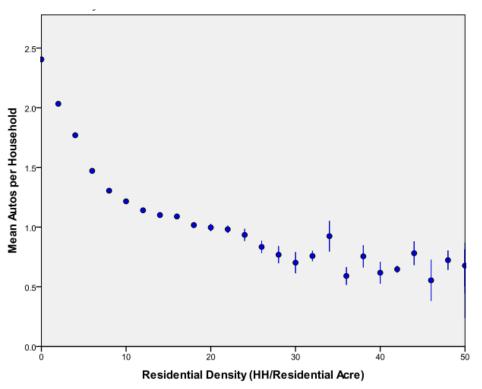


Figure 20: Autos per Household vs. Residential Density

Name of Transit Zone Type	Average Number of Households in Transit Zone	CO ₂ e/HH (Metric Tons)	Total CO₂e (Metric Tons)	CO₂e/HH for Average Census Block Group (Metric Tons)	Total CO ₂ e from an Average Census Block Group (Metric Tons)	Reduction (Metric Tons)	Percent Reduction
Highest Location Efficient	17,668	1.46	25,795	6.7	118,373	92,578	78%
High Location Efficient	9,938	2.66	26,434	6.7	66,583	40,148	60%
High Medium Location Efficient	3,434	4.61	15,830	6.7	23,007	7,177	31%
Medium Location Efficient	1,390	6.06	8,421	6.7	9,310	889	10%
Low Location Efficient	1,840	6.51	11,977	6.7	12,326	350	3%
Lowest Location Efficient	251	8.81	2,208	6.7	1,679	-529	-31%

Table 2: GHG Reductions by National Transit Zone Type - Executive Summary

TOD Research - National

"The Influence of Urban Form on GHG Emissions in the U.S. Household Sector" 2014 Sungwon Lee and Bumsoo Lee

- Doubling population-weighted density is linked to:
 - -A 48% reduction in household travel CO2 emissions
 - -A <u>35% reduction</u> in residential energy use CO2 emissions
- Doubling per capita transit subsidy is linked to:
 - 46% lower vehicle miles traveled (VMT)
 - -18% reduction in CO2 from transportation

Study analyzed the 125 largest urbanized areas in the U.S.

Source: https://www.sciencedirect.com/science/article/abs/pii/S0301421514000299?via%3Dihub

Somerville (MA) Red Line Davis Square TOD

Strategies Implemented

- Pedestrian Connectivity: Reconstructed the streetscape with pedestrian safety islands, signage and street lighting, widened sidewalks, benches, and landscaping
- Outdoor Amenities: Constructed new parks, installed street art
- Bike: Somerville Community Path (SCP)

Results

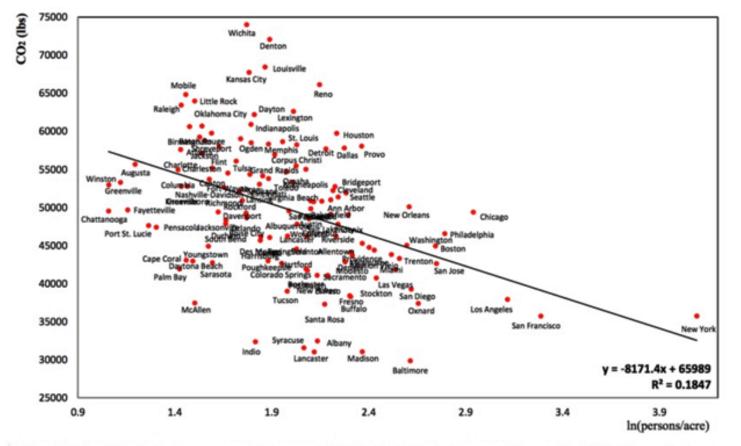
- By 2010, SCP as part of Davis TOD project had contributed to 10.1% of residents living within 1/2-mile of SCP walking to work, 4.8% cycling to work, and 33.5% taking public transit
- Between 1990-2013, Davis Red Line ridership increased over 50% from 6,300 to 12,800 daily
 - -Majority of riders arriving by walking, only 13% arriving by automobile

Source:https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=1771&context=wmelpr









The relationship between population-weighted density and annual household CO₂ emissions.

TOD Research - National

BART TOD Data 2020, 10-year Transit-Oriented Development Work Plan



Complete Communities

Partner to ensure BART contributes to neighborhood/district vitality, creating places offering a mix of uses and incomes.

- BART's TOD projects implement locally adopted plans and are developed with extensive community input.
- Construction of BART's projects occurs under labor agreements with the local trades, using prevailing wages, and incorporates small business hiring goals.
- Every 100 units of housing built on BART property generates 450 direct and indirect local jobs.
- Residential and commercial development around transit generates more services and better livability for existing neighborhoods than parking lots.



Transportation Choice

Leverage land use and urban design to encourage non-auto transportation choices both on and off BART property, through enhanced walkability and bikeability, and seamless transit connectivity.

- TOD residents walk, bike and use transit or shared mobility at least 30% more often than non-TOD residents.²
- Almost 60% of households living within ½ mile of a BART station own 1 or fewer cars.³



Sustainable Communities Strategy

Lead in the delivery of the region's land use and transportation vision to achieve quality of life, economic, and greenhouse gas reduction goals.

- Locating housing and jobs near BART stations reduces per capita driving and its associated pollution and safety impacts compared with growth in autooriented areas.
- People living near BART drive **13 to 32% fewer miles** each year than the countywide average.
- TOD produces **50% fewer auto trips** than conventional development.¹
- Household greenhouse gas emissions from development near BART are at least 12% lower than the regional average. Coupled with BART's new transportation demand management requirements, TOD can offset up to 30% of household greenhouse gas emissions.





Affordability

Serve households of all income levels by linking housing affordability with access to opportunity.

- Typical transportation costs are 24% lower for households near BART versus the regional average
- Building housing especially affordable housing

 is an effective anti-displacement tool. ABART is
 committed to ensuring at least 35% of its units are affordable, with an overall goal of building at least 7,000 affordable homes on its land by 2040.



Value Creation and Value Capture

Enhance the stability of BART's financial base by capturing the value of transit, and reinvesting in the program to maximize TOD goals.

- Residential property near BART commands a
 premium of 15 to 18% over property 5 miles or further
 from BART resulting in an estimated \$17.3 billion
 added property value to residential properties that
 can be captured for public services by municipalities,
 BART and other agencies.
- BART station areas account for 13% of property tax base in the 4 counties served by BART but only 2% of the land area.
- BART has reinvested \$80 million in land value into its TOD projects, but leveraged over \$200 million in public amenities including customer parking, station improvements and public plazas.

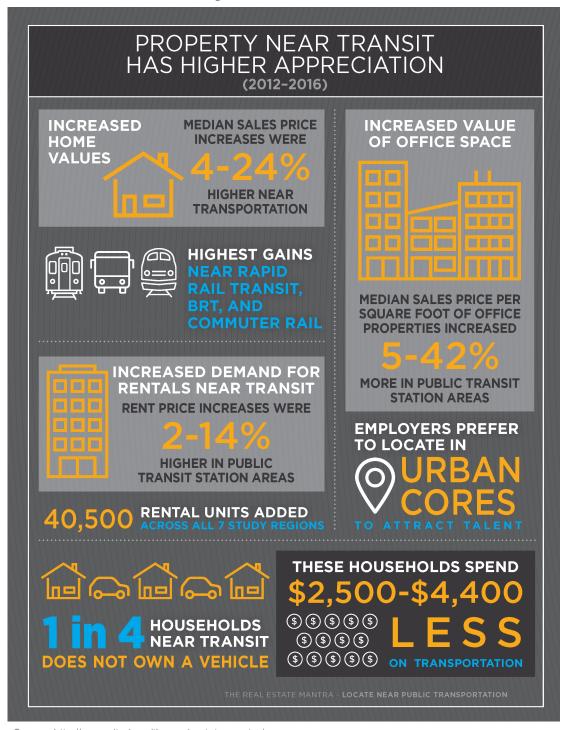


Ridership

Increase BART ridership, particularly in locations and times when the system has capacity to grow.

- TOD residents take BART for their daily needs 35 to 85% more often than those living further away.⁵
- TOD residents are nearly twice as likely to commute to work on BART than non-TOD residents.⁶ (43% vs 22%)

NJ Transit TOD Study 2012-2016



Source: http://www.njtod.org/the-real-estate-mantra/

Source: https://www.bart.gov/sites/default/files/docs/BART%20TOD_Workplan_FINAL_

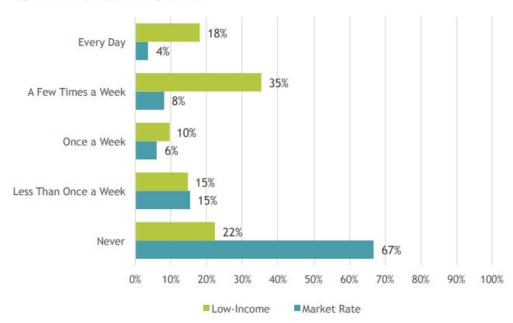






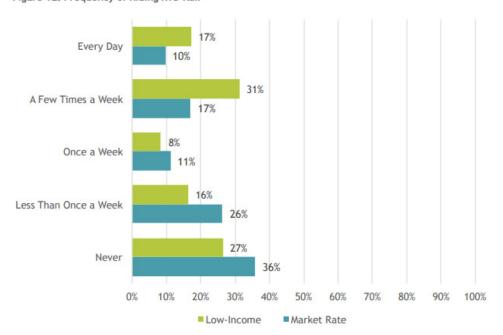
TOD Research - Regional

Figure 11: Frequency of Riding RTD Bus



Source: RTD TOD Survey

Figure 12: Frequency of Riding RTD Rail



Source: RTD TOD Survey

BOULDER COUNTY HOUSING AUTHORITY





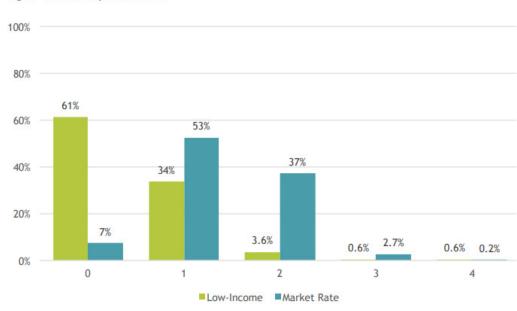
RTD Transportation Survey

- -Surveyed over 1,300 TOD residents and 100 property managers since 2016
- -61% of low-income households do not own a passenger vehicle, 93% of higher-income households own at least one

RTD Quality of Life Report 2020

- -3,300 affordable units within 1/2 mile of a rail or bus station (10% of total TOD units)
- -34,300 multi-family units within 1/2 mile of a rail or bus station built from 2000-2019
- -2.38 million tons of CO2 have been displaced by transit in Denver between 2010-2020

Figure 13: Vehicles per Household



Source: RTD TOD Survey

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TOD Case Study - Sheridan Station

Molholm/Two Creeks Neighborhood in Denver (Denver County)



- Project: 8 story, 133 unit apartment building in Lakewood
- Address: 5330 West 11th Avenue Denver, CO
- Affordability: Serves low-income residents at 30-60% AMI
- Density: 133 units on .7-acre site, 190 units/acre
- **Developer:** Mile High Development and Brinshore Development
- Architect: Johnson Nathan Strohe
- Project Value: \$40 millionCompletion Date: 2021
- Transit: Direct access to RTD's Sheridan Station (light rail), regional bike trail, RTD bus station, and Sheridan Boulevard
- Unit Mix: 92 one bedroom units, 29 two bedroom units, 12 three bedroom units
- Parking: .75 Ratio 12 spaces in the building, 88 spaces leased in adjacent RTD parking garage









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TOD Case Study - Sheridan Station



2022

Strategies Implemented:

- **Shared Parking:** Use of RTD's parking garage for residential parking to reduce additional construction costs and maximize residential space
- **Density:** 8-story building with 133 apartment units near Sheridan Station
- LIHTC: Tax credits to integrate affordable housing on the site
- **Bike Connections:** Lakewood Gulch Trail, bicycle improvements on 10th Avenue, bike storage provided to residents



2018

Benefits

- Access: Direct access to RTD's Sheridan Station provides a <20 minute commute to Union Station via Light Rail, 25 minute bike ride to Union Station via Lakewood Gulch Trail
- Equity: Affordable housing provided for 30-60% AMI







TOD Case Study - Denizen

Baker Neighborhood in Denver (Denver County)



First participant in the Transit-Oriented Development Pilot **Program in Denver**

- Project: 4 Story building, 275 units on former RTD park n' ride lot
- Address: 415 S Cherokee St Denver, CO 80223
- Affordability: Market Rate residential
- Density: 275 units on 2.87 acre site, 95.8 units/acre
- Developer: D4 Urban
- **Architect:** Kephart
- Completion Date: 2015
- Unit Mix: 105 studios, 115 one bedroom units, 55 two bedroom units
- Transit: Direct access to Alameda Light Rail Station and 6 bus lines
- Parking: 1:1 for residential, no RTD parking provided (~180 spaces previously)











Retail Space



Community Garden

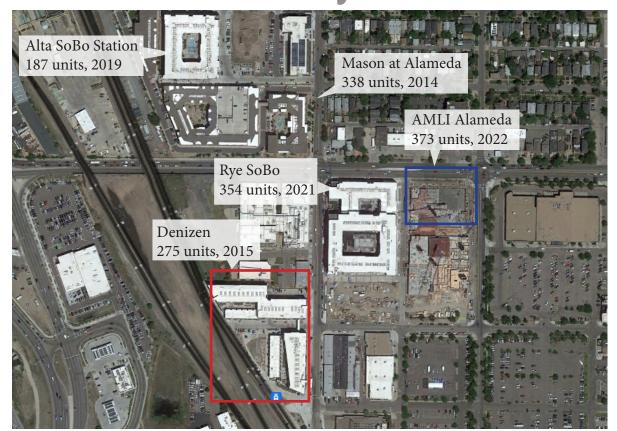


Bike Share

Source: https://www.rtd-denver.com/projects/tod/alameda-station https://www.confluence-denver.com/features/tod_denver_051816.aspx_11 https://kephart.com/architectural-portfolio/denizen https://www.rtd-denver.com/app/facilities

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TOD Case Study - Denizen



2022

Strategies Implemented

- Car Sharing: eGo Carshare program on site
- **Density:** Increased density with two 4-story buildings and 275 units near Alameda Station
- Bike Sharing: Denizen provides a bike sharing program on site
- Community Garden: Residents can grow food in the shared garden space
- Sustainability: LEED Platinum certified
- Retail: 713sf of retail space
- Outdoor Amenities: fountains, benches, landscaping, and art on site









2012

Awards Won

- City of Denver Mayor's Design Award
- NAHB Multifamily Pillars Winner for Best Green Building Concepts
- NAHB Best in Green Winner Best Multifamily Project

Transit

- 25% of Denizen residents use the light rail daily, 90% of which own a car
- 15% never ride the light rail

TOD Case Study - Belleview Station

Southmoor Park Neighborhood in Denver (Arapahoe County)

Masterplan



- **Project:** Full masterplan development of 17.5 acres to include 1,800 residences, 200k sf of shopping and dining, 2.2m sf of office space, and a hotel.
- Developer: Holland Partner Group and Front Range Land and Development Company
- **Transit:** Direct access to RTD's E, F, and R lines at Belleview Station, and bus route 73

Milehouse (A)



- Project: 5-story building, 352 units
- Address: 6750 E Chenango Avenue, Denver 80237
- Affordability: Market Rate residential
- Developer: Holland Partner Group and Front Range Land and Development Company
- Architect: Shears Adkins Rockmore
- Completion Date: 2015
- **Transit:** Direct access to RTD's E, F, and R lines at Belleview Station, and bus route 73

The Den (B)



- **Project:** 5-story building, 325 units
- Address: 6950 E Chenango Avenue Denver, CO 80237
- Affordability: Market Rate residential
- Developer: Holland Partner Group and Front Range Land and Development Company
- Architect: Eisen Group, Civitas
- Completion Date: 2016
- **Transit:** Direct access to RTD's E, F, and R lines at Belleview Station, and bus route 73







Source: https://milehighcre.com/belleview-station-completes-first-phase-of-transit-orient-ed-development/

https://sararch.com/project/belleview-station-master-plan/

https://informedinfrastructure.com/32560/belleview-station-completes-first-phase-of-transit-oriented-development-in-south-denver/

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TOD Case Study - Belleview Station

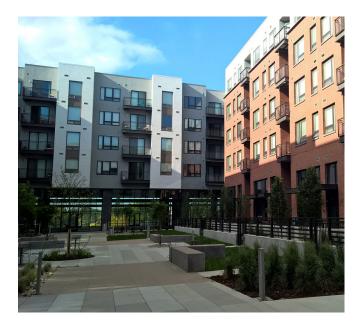




2012

Strategies Implemented

- Outdoor Amenities: 10% of land area set aside for parks and open space, public art from local artists
- Community: Sunday farmer's markets on Newport Street and Layton Avenue in the summer, dog park, live music on weekends
- **Bike:** Provide bike racks and bike lockers at the light rail station platform
- Pedestrian Connectivity: Public plazas, increased walking paths through development
- **Retail:** 70k sf of retail space between Milehouse and The Den, 100k sf of retail total in Phase 1
- Density: Phase I brought over 675 residential units in two 5-story buildings, 100k sf of retail, and 300k sf of office space to Belleview Station
- Shared Parking: Public parking in office buildings after business hours and in residential during



Public/ Gathering Space







Retail



Pedestrian Connectivity







Phase I (2A, 2B, 4S)

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TOD Case Study - 30PRL

Transit Village Neighborhood in Boulder (Boulder County)







• **Project:** 3-4 story buildings, 120 units

Address: 3001 Spruce Street Boulder, CO 80301

Affordability: 30-60% AMIDensity: 62 units/acre

Developer: Boulder Housing Partners

Architect: CoburnCompletion Date: 2021

• Unit Mix: 4 studios, 53 one bedrooms, 41 two bedrooms, 22 three bedrooms

• **Transit:** Direct access to four bus station (Boulder Junction at Depot Square, Boulder Junction at Depot Square Gate S2, Pearl & 30th, Pearl and Junction

• Parking: .83 parking ratio - 100 spaces for residents, 180 bike storage spaces for this Phase

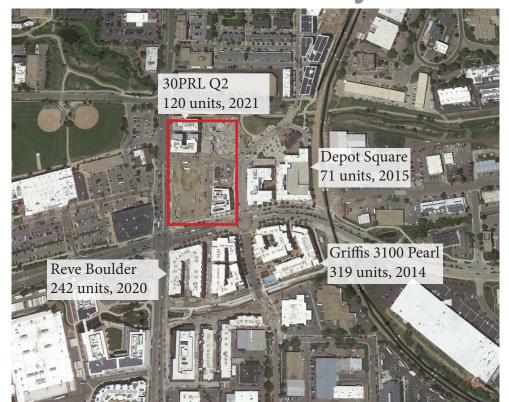


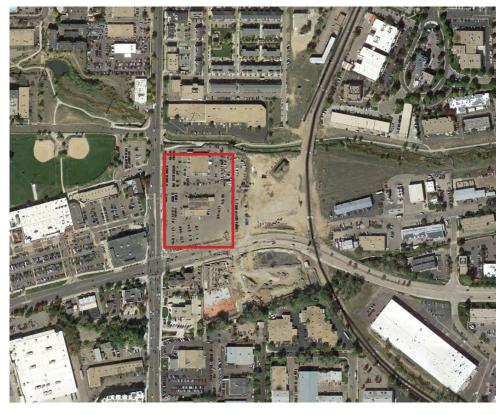




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TOD Case Study - 30PRL





2012

2022

Strategies Implemented

- Outdoor Amenities: Landscaped paths, public art walkway
- Bike: Provide bike storage for 180 bikes, connectivity to Goose Creek Path
- Pedestrian Connectivity: Increased pedestrian connection through site via north/south multi use path
- Sustainability: Solar incorporated to offset 5% of usage, projected to be higher on later phases
- **Density:** Completed phase included 120 residential units, with the total masterplan bringing 307 residential units
- Affordability: 120 units at 30-60% AMI









Public Art



Dog Park



Pedestrian Connection

TOD Case Study - Parking

Case Study Parking Ratios								
Project	Neighborhood	City	Transit Station	Residential Units	Parking Spaces	Parking Ratio	Affordability	Comments
Sheridan Station	Molholm/Two Creeks	Denver	Sheridan RTD Station	133	100	0.75	Affordable 30-60% AMI	12 in building, 88 leased from RTD garage
Traverse	Molholm/Two Creeks	Denver	Sheridan RTD Station	281	362	1.29	Market Rate	
Denizen	Baker	Denver	Alameda RTD Station	275	275	1.00	Market Rate	No additional RTD parking provided
30PRL	Transit Village	Boulder	Boulder Junction at Depot Square	120	100	0.83	Affordable 30-60% AMI	
Arroyo Village	West Colfax	Denver	Knox Station	130	84	0.65	Affordable	Workforce housing, Permanent supportive housing
The Point Crossing	Dam East/West	Aurora	Nine Mile Station	63	48	0.76	Affordable 30-80% AMI	

RTD Residential TOD Parking Study, Dec. 2020

- 42% more parking on average provided than residents use at peak demand, 50% more parking than used at income-restricted properties (5-15% is considered optimal parking management)
 -\$25,000 per parking space in Denver Metro, cost for parking impacts affordable housing delivery
- In market-Rate properties, 1.23 spaces per unit provided and only .74 spaces per unit used
- In income-restricted properties, .72 spaces per unit provided and only .36 spaces per unit used

Survey looked at TOD rental properties with 50+ units within 10-minute walk to public transit from the RTD Development Database

Table 2: Parking Available and Utilized per Unit at Property by Resident Income

Resident Income	Properties	Units	Parking Spaces	Spaces Available Per Unit	Spaces Utilized Per Unit	Percent Utilized
All Properties	86	25,333	30,478	1.20	0.70	58%
Market Rate	65	19,850	24,462	1.23	0.74	60%
Mixed Income	5	985	845	0.86	0.49	57%
Income Restricted	16	1,587	1,135	0.72	0.36	50%







TOD Research Regional

- Existing TOD
- Planned TOD

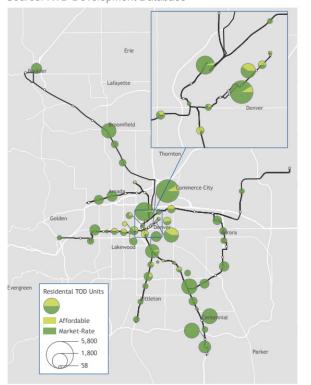
Residential Units

- 281 Existing Transit-Oriented Developments in the Denver Metro Area (over 40,000 residential units)
- 105 Planned Transit-Oriented Developments in the Denver Metro Area

Affordability:

- Existing: 3,020 affordable residential units and 2,979 mixed income residential units created
- Planned: 909 affordable residential units and 1,167 mixed income residential units planned

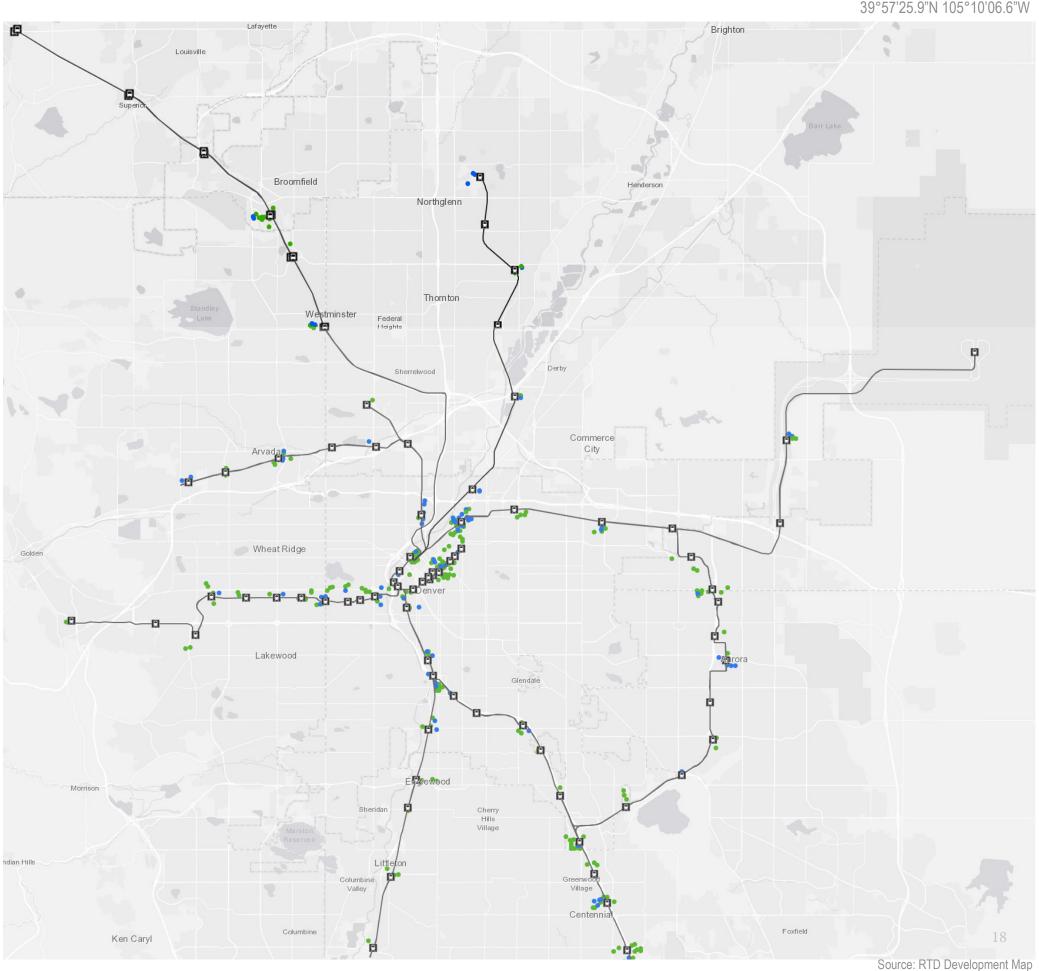
Source: RTD Development Database











39°57'25.9"N 105°10'06.6"W

Fire Resistance

Fire Safety Criteria

- **Combustibility:** Categorized by Building Type (defined by IBC). Type I and II are completely noncombustible, and Types III and IV are a mix of noncombustible and limited-combustible materials. Typical single-family homes are wood-framed which is combustible.
- **Fire Resistance:** The degree of passive protection provided to the structure itself. Type I and II have wall fire-resistance rating of 3 hours, and Type III and IV have a 2-hour rating. Single-family homes typically have a wall fire-rating of 1 hour.
- Fire Class: Describes the flame spread and smoke index of the exposed material.
- Fire Protection: Active fire protection systems (sprinklers, fire/smoke alarms, etc.)

Fire Safety Strategies for Superior TOD

- Combustibility: Project to incorporate only noncombustible and/or limited-combustible elements for exterior materials (fiber-cement panel siding, brick masonry, metal panels, etc.)
- Fire Resistance: Project to maintain a minimum 2-hour wall fire rating.
- **Fire Class:** Materials with a high fire class rating (Class A or B) to be used. Prioritization of fire-resistant materials (metal sheeting, fiber cement, brick and stone veneer, etc.)
- **Fire Protection:** Building to be 100% sprinklered, with fire/smoke alarms provided in all code required areas.

Noncombustible Exterior Materials



Metal Panels



Brick Masonry



Fiber Cement Panels

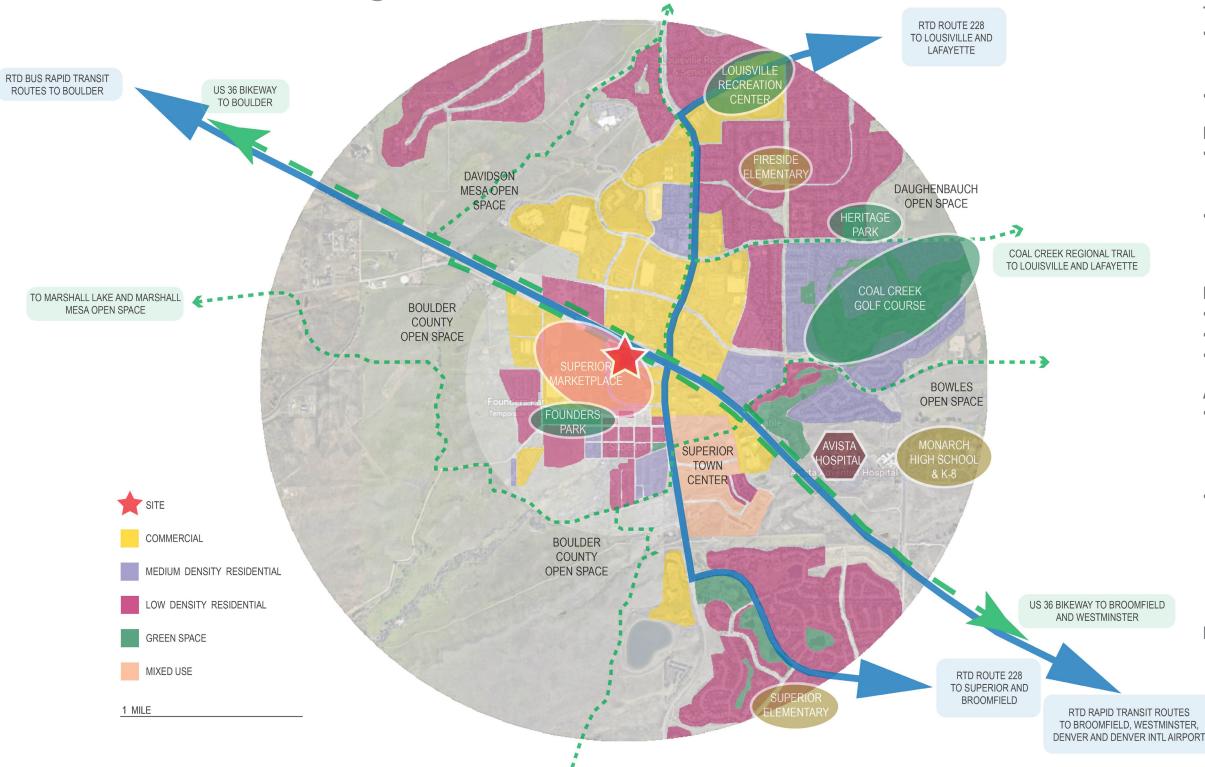






39°57'25.9"N 105°10'06.6"W

Site Context Diagram - Location



Transportation:

- Direct access to Denver Boulder Turnpike (US 36)
 - -12 minute drive to Boulder, 21 minute bus ride
 - -25 minute drive to Denver, 37 minute bus ride
- ~35 minute drive to DIA, 46 minutes bus ride

Employment:

- Boulder Major Employers:
 - -IBM, Google, Target, UC Boulder, Wells Fargo, Whole Foods, Boulder Community Health, etc.
- Superior Major Employers (within 10 minutes)
 - -Avista Adventist Hospital (~500 employees)
 - -Nexant (~550 employees)

Education:

- Monarch K-8 and High School (10 min. drive)
- Fireside Elementary (6 minute drive)
- UC Boulder (12 minute drive)

Amenities:

- Retailers (5-mile radius)
 - -Target, Costco, Whole Foods, Home Depot, Lowe's, T.J. Maxx, Starbucks, Michaels, Panera, OfficeMax, Ulta Beauty, PetSmart
- Recreation:
 - -Coal Creek Golf Course (5 minute drive)
 - -Mayhoffer-Singletree Trailhead (5 minute drive)
 - -Dutch Creek Park (10 minute drive)
 - -Warembourg Fishing Pond (8 minute drive)
 - -The Spot Climbing Gym (11 minute drive)

Health:

- -Avista Adventist Hospital (10 minute drive)
- -Boulder Medical Center (10 minute drive)





Site Diagram - Bubble Diagram









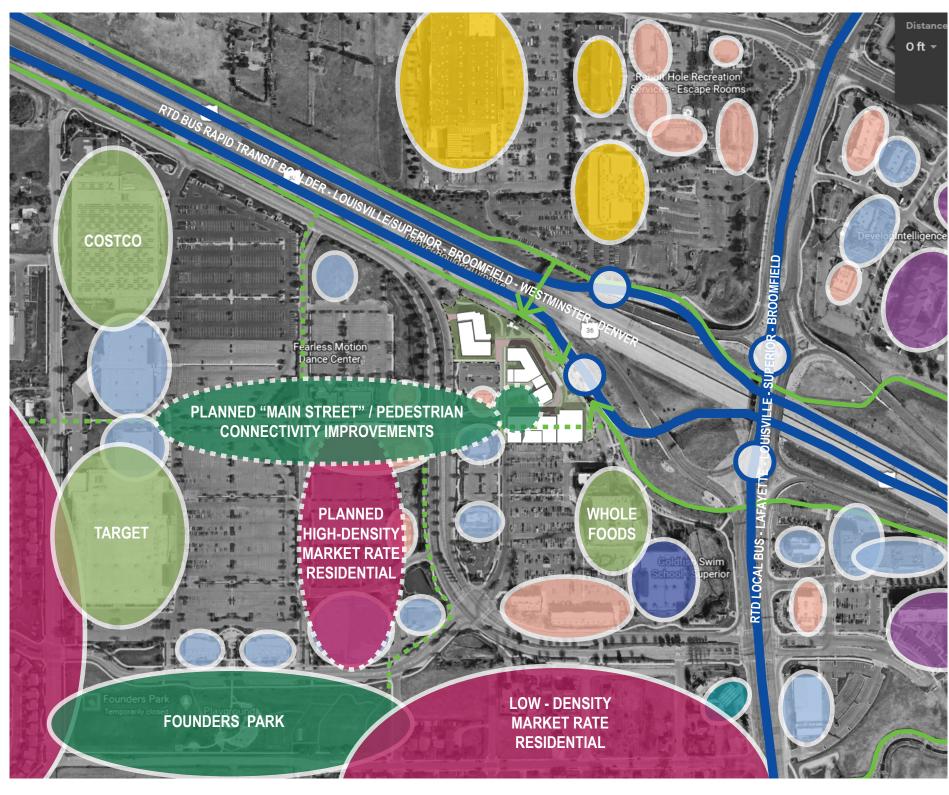


















Illustrative Site Plan

Superior TOD Affordable Housing Metrics

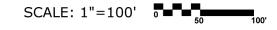
- 238,000sf of residential (100% affordable)
- 250-280 affordable dwelling units
- 5,000sf of amenity and commercial space
- 200,000sf of structured parking
 - -0.3:1 residential ratio
 - -1:1 replacement of 294 existing Park'n Ride spaces











3D Perspective

Sycamore Street Facing East









3D Perspective

Sycamore Street Facing East









39°57'25.9"N 105°10'06.6"W

3D Perspective

RTD Facing West









3D Perspective

Coffee Shop and Plaza









39°57'25.9"N 105°10'06.6"\

