Targeting Transit:

Assessing Development Opportunities Around New Jersey's Transit Stations

List and Definitions of Data Items

Below are listed all the data items included in the inventory of assets around transit facilities in New Jersey. They are divided according to whether the data relate to the station, to the surrounding neighborhood, or to the municipality in which the station is located.

Data Items Pertaining to the Station

The variables in this section pertain directly to the individual transit station and its function as a transportation facility. These features of the transit station are important no matter the type of neighborhood in which the station is located.

Master station ID [number] and **Station name** [text]: For stations served by more than one system, records for each system have been combined into a single record that summarizes station-level data in one record per station. The master station ID is the single number that uniquely identifies a station, regardless of how many modes or operators serve the station. All dual-name, multi-system stations (for example, Broadway on PATCO = Walter Rand Transportation Center on the River Line) have had a unique name assigned to them. Where two different stations on two different lines have the same name (e.g., Jersey Avenue), the name of the line is included in parentheses as part of the station name.

Municipal ID [number] and **Host municipality** [text]: The Municipal ID field uniquely identifies the municipality in which the station is physically located and allows municipal-level data items, which are indexed using this same number, to be imported easily from other files. A few stations straddle municipal borders; for purposes of simplicity these stations have been assigned to a unique host municipality, based on the street address listed for the station by the transit operator.

County [text]: The county in which the station is physically located.

Operator [text]: The name of system operator that serves the station. A value of "Multiple" is assigned for stations served by multiple operators. NJ Transit rail and NJ Transit bus are considered distinct operators.

Mode(s) served by [binary]: A series of five binary indicators (each taking value either 1 for "yes" or 0 for "no") indicating, for each of five modes, whether the station is served by that mode:

- Commuter rail
- Light rail
- Rapid transit
- Bus
- Ferry

Total number of modes [number]: The sum of the individual (1/0) indicators for the individual modes, indicating how many of the five modes serve the station.

Agency/Carrier indicators [binary]: A series of five binary (1/0) indicators indicating which of five system operators (or classes of operators) serve the station:

- NJ Transit (bus or rail)
- PATH
- PATCO
- SEPTA
- Private ferry

Amtrak service [binary]: A binary (1/0) indicator of whether the station is served by Amtrak trains. Some rush-hour Amtrak trains honor NJ Transit monthly passes and are included in the tally of frequency of service, but for many station-area residents and businesses, Amtrak inter-city service is an amenity in its own right.

Number of transfers required [number]: A series of four fields indicating how many times a rider must change vehicles (value = 0 for a one-seat ride) to get from the station in question to each of four major regional destinations:

- New York Penn Station (including the 33rd St. PATH station)
- Lower Manhattan (as represented by either the World Trade Center PATH station or one of the downtown ferry terminals as the destination, or assuming a transfer to the New York City Subway A, C, and E lines at Penn Station)
- Center City Philadelphia (defined as Market East, Suburban Station, or one of the Center City PATCO stops)
- Newark Penn Station

The count of the number of transfers is based on present schedules and service configuration, not on what might be possible with new technology. For example, Raritan Valley passengers are tallied as being required to make a transfer (at Newark Penn Station) to reach Manhattan or Secaucus, even though hybrid diesel-electric locomotives would hypothetically be able to make that trip without stopping.

Travel time to New York Penn Station [number]: A series of four fields, representing three components of travel time plus total, indicating how long it takes, in minutes, to reach New York Penn Station from the station in question, as determined by a 2009 study by the Regional Plan Assocation:

- Waiting penalty, the average time a passenger has to wait for service
- Average travel time
- Transfer penalty, the average time it takes to transfer between lines
- Total (= the sum of the previous three fields)

Number of rail transit lines serving the station [number]: The total includes commuter rail, light rail, and rapid transit. It includes not only the lines whose trains presently stop at the station, but also any additional lines whose tracks physically connect to the station, even if trains do not stop there. (For example, Secaucus Junction is counted as being served by the Raritan Valley Line, since the Raritan Valley's tracks tie into the Northeast Corridor, which passes through Secaucus, even though Raritan Valley trains currently terminate at Newark Penn Station.)

Primary line/route name and **other lines/routes** [text]: The name(s) of the rail transit line(s) serving the station. Terminal stations located where multiple inbound lines converge are indicated as such, rather than being assigned to a single line.

Frequency of service [number]**:** A series of eight fields, two fields for each of four modes (commuter rail, light rail, rapid transit, and ferry). The first field for each mode indicates the number of stops per day at each station, compiled from timetables listed on the NJ Transit or other operator website. The second field for each mode is the number of stops in the peak period (as defined by the operator), tabulated separately. Frequency of service was tabulated from published schedules in 2008.

Average weekday boardings [number]: A series of six fields – one for each of five modes (commuter rail, light rail, rapid transit, bus, and ferry) plus a total – that indicate how many riders begin a transit trip at that station on that mode on an average weekday. Data are from individual operating agencies. Riders who transfer from one line to another *within a single ticketing system* are counted only at their point of origin. Riders making a transfer that requires a new fare are counted as a new boarding for each new system they enter – for example, transferring from NJ Transit commuter rail to PATH at Newark Penn Station, or even transferring from commuter rail to the Hudson-Bergen Light Rail system at Hoboken, since transferring among NJ Transit's bus, commuter rail, and light rail facilities requires separate fare payments for all riders except those holding monthly passes. Boardings are tallied as if all trips are one-way; that is, a rider making a round trip counts as a boarding at the origin station for the initial trip and also as a boarding at the "destination" station for the return trip. Boardings are from 2012 for NJ Transit commuter rail and light rail; PATCO data are from 2008.

Parking capacity [number]: Total number of parking spaces available adjacent to the station, as tabulated in NJ Transit's annual Parking Guide. Last update is from the 2010 edition.

Structured parking [number]: Number of station-area parking spaces that are located in multi-level structures, as opposed to surface lots

Average parking spaces utilized [number]: Number of station-area parking spaces occupied on a typical weekday, as monitored by NJ Transit

Parking occupancy rate [percent]: Ratio of occupied parking spaces to total parking capacity.

Spaces per average weekday boarding [number]: Ratio of total parking capacity to average weekday boardings. This ratio gives an idea of what percent of transit riders arrive at the station by driving a car and parking it there, as opposed to walking, cycling, riding a local shuttle or taxi, or being dropped off. A ratio less than 1:1 means not every rider has a parking space and hence indicates some riders are arriving at the station via means other than driving alone; the lower the ratio, the more riders are doing so.

Spaces per station-area population [number]: Ratio of total parking capacity to the population of the station neighborhood (as defined by station-area Census tracts – see following section). A large ratio, i.e., a supply of parking far out of proportion to the local population, suggests that the station's riders are primarily arriving by car from a much larger geographic area and that the station is acting as a regional collector.

Parking ownership [number]: A series of four fields, indicating how many spaces in the total parking supply are owned by each of four classes of owners:

- NJ Transit
- Private operator
- Host municipality
- Another agency

Owner name(s) for dual- or other-owned parking [text]: If any parking spaces are owned by a government agency other than NJ Transit or a municipal government, or are jointly owned by two or more entities, this field gives the names of the owner(s).

Data Items Pertaining to the Neighborhood Around the Station

The variables in this section pertain to the area or neighborhood surrounding the station rather than to the station itself.

This project uses as its definition of the "station area" around each transit station a set of Census tracts delineated by NJ Transit that it considers to be within half a mile (roughly a 10-minute walking distance) of that station. For tracts that straddle the half-mile line, NJ Transit used its judgment about what share of the tract's population appears to fall within the circle to decide whether or not to count the tract as part of the station area. NJ Transit's analysis used 2000 Census tract boundaries. New 2010 Census tracts were recently defined by the Census Bureau, but NJ Transit has not as of June 2012 undertaken to update its station-area delineation using the new tracts. NJ Transit has also not yet identified station-area tracts for ferry or bus terminals or for a few new rail stations, including the most recent extensions of the Hudson-Bergen and Newark light rail lines.

For any data item available at the Census tract level, the transit station inventory is structured to enable the construction of station-area summaries by cumulating the tract-level values over all station-area tracts. The following is a list of Census and American Community Survey variables that have been cumulated from tract-level data to produce station-area estimates. Data are from the 2005-2009 American Community Survey 5-year estimates (which use the 2000 Census tract boundaries), unless otherwise indicated.

Number of tracts in station area [number]: The number of Census tracts that NJ Transit considers as constituting the neighborhood around the transit station.

Total land area (sq mi)

Population:

- 2000 Census population
- Population estimate from 2005-09 American Community Survey
- Population density (people per square mile)
- Percent population change, 2000 to 05-09

Housing units:

- Total housing units
- Percent of housing units that are vacant
- Number and percent that are single-family detached units
- Number and percent that are rowhouses/townhouses ("single-family attached")
- Number and percent that are duplexes (part of a structure containing two units)
- Number and percent that are multi-family units (i.e. in structures containing three or more units)

Households:

- Total households
- Average household size
- Number and percent that are single-person households
- Number and percent that are homeowners
- Number and percent that are renters

Median value of owner-occupied housing units: A median home value for the whole station neighborhood is estimated by taking a weighted average of the median home values for each of the tracts making up the station area (data on home values are self-reported on American Community Survey and are not from tax records). Each tract's median home value is weighted by the number of owner-occupied housing units in the tract. Tracts for which median home value is suppressed due to insufficient data are excluded from calculations.

Estimated median household income: A median household income for the whole station neighborhood is estimated by taking a weighted average of the median household incomes for each of the tracts making up the station area. Each tract's median household income is weighted by the number of households in the tract.

Per-capita income: This is estimated from tract-level data by taking per-capita income as reported for each tract, multiplying by the tract population to produce aggregate income for the tract, summing over all tracts in the station area to produce aggregate income for the station area, and finally dividing by the population of the station area.

Vehicle ownership:

- Estimated total number of vehicles. This is estimated for each tract by multiplying each of the Census-defined "number of vehicles" categories by the number of households tabulated in that category for that tract (using 5 as the multiplier for the "5 or more" category), summing over categories to get a tract total, and then summing the tract values to produce a station-area total.
- Average number of vehicles per household. This is estimated by dividing the estimated total number of vehicles for the station area by the number of households in the station area
- Number and percent of households having zero vehicles
- Number and percent of households having one vehicle
- Percent of households having zero or one vehicle
- Indicator of whether one-vehicle households outnumber zero-vehicle households or vice versa

Commuting:

- Total employed residents
- Employed residents not working at home (i.e., who commute)
- Number and percent who commute by:
    - Car, truck, or van
    - Public transportation:
        - Transit total
        - Bus
        - Rail
    - Walking or biking

Average daily boardings as a percent of transit commuters: Ratio of transit ridership at the station (as reported by the transit agency) to the number of residents in the station area who report (in the American Community Survey) commuting by transit. A high value of this ratio indicates that much of the ridership at the station is coming from beyond the station neighborhood. A very low value may indicate that the station is located in an area from which other stations are also accessible and are more convenient, and hence many of the transit commuters in the neighborhood are using other stations.

The comparisons are not perfect, for several reasons: the two variables in the ratio are from two different sources; ACS data only asks about commuting, while agency ridership data includes transit trips for all purposes, not just work; the possible values for the ridership data are mutually exclusive (a rider cannot board transit at more than one station simultaneously), while an ACS-reported commuter could be counted as living in the neighborhood of more than one station (many Census tracts are located within half a mile of multiple stations); and the ACS commute data counts the commuter only once, at his/her place of residence, while transit agency ridership data counts commuters on both legs of the trip. Still, stations' relative positions on the list, if not the absolute values of their ratios, can help indicate if a station is serving as a regional collector or a commuting destination (both situations in which daily boardings would tend to outstrip substantially the number of commuters who report actually living in the station neighborhood) or some other hub of transit activity that is out of proportion to the number of nearby residents who report commuting by transit.

Presence of a downtown [binary]: A binary (1/0) indicator indicating whether the station's host municipality (or, in the case of larger municipalities with multiple transit stations, the station's host neighborhood) also hosts a Main Street program, a Special Improvement District (SID) or Business Improvement District (BID), or some other organization run by local merchants that focuses on services (such as street cleaning or maintenance of benches, trash cans or other amenities) aimed at improving the pedestrian experience. The indicator is based on a list being compiled by Downtown New Jersey. The presence of such an organization focused on the municipality or neighborhood in which a transit station is located can be interpreted as a sign that the station is surrounded by a traditional downtown environment and thus may already feature many of the foundational elements of transit-oriented development.

Data Items Pertaining to the Station's Host Municipality

The transit station inventory is structured so that any data item available at the municipal level can be added easily to the inventory, with the municipal value automatically applied to any station located in that municipality. At present, only the variables listed below are included, but many others can be added.

Total employment, 2009 [number]: Employment information is not yet available at the Census tract level, so this data is at the municipal level, regardless of any employment center's actual distance from transit within the municipality

Jobs per employed resident [number]: This ratio is an indicator of the degree to which the municipality could be considered an employment center. A municipality with more jobs than employed residents experiences a net influx of people during the workday. Both data items are from the New Jersey Department of Labor and were updated in 2009.

Percent built-out (2007) [number]: A built-out percentage is computed for each municipality from land use / land cover data analyzed by researchers at Rowan and Rutgers universities, using aerial photography commissioned by the state Office of GIS. The percent built-out is computed as the ratio of developed land to all developable land, where "developable" includes both already-developed land and land that can still be developed in the future but excludes lands that cannot be developed because of environmental constraints or because they are permanently preserved.