# Appendix D

# Spreadsheet Transit Model Documentation

# VCTC Simple Ridership Forecast Model

## Instructions

RIDERSHIP ESTIMATE SHEET

User Inputs:

User can change and provide inputs in all areas shaded in yellow.

The User needs to enter data on the following characteristics for each route:
- Column A: Name of Transit Agency administering route
- Column B: Route name
- Column C: Route Day Type service days associated with this route breakdown
- Column D: Current ridership consistent with Route Day Type - *Required*
- Column E: Current headway in minutes - *Required*
- Column F: New headway in minutes - *Required*

*The required fields must be completed before model can produce an outputs.*

The User needs to answer Yes or No to the following questions for each route:
- Column G: Will majority of the route serve a growing economic environment?
- Column H: Will majority of the route serve middle and high income areas?
- Column I: Will majority of the route serve walkable areas?
- Column J: Will the route have timed transfers at major transfer points?

SHEET PROTECTION

All sheets are sheet protected to prevent from changing assumptions, formulas and formats. If details need to be changed please contact the Ventura County Transportation Commission.

| | | |
|---|---|---|
| **Data Type** | Average Daily Passenger Boardings | User can only complete areas shaded in yellow. |
| **Current Data Month** | March | * indicates field required for output calculation. |
| **Current Data Year** | 2009 | |

| Operator | Route Name | Day Type | Current Boardings * | Current Headway * | New Headway * | Med/high Income ? | Growing Economy? | Walkable? | Timed Transfers? | Potential Ridership | Potential % Change |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample Transit* | *Sample Route* | *Sun* | *200* | *60* | *15* | *Yes* | *Yes* | *No* | *Yes* | ***626*** | ***213%*** |
| Gold Coast Transit | GCT 10-11: SATICOY | Sun | 145 | 30 | 20 | Yes | Yes | Yes | No | **178** | **23%** |
| Gold Coast Transit | GCT 10-11: SATICOY | Sat | 168 | 30 | 20 | Yes | Yes | Yes | Yes | **216** | **29%** |
| Gold Coast Transit | GCT 10-11: SATICOY | M-F | 380 | 30 | | Yes | | | No | | |
| Gold Coast Transit | GCT 11-10: SATICOY | Sun | 167 | 30 | | Yes | Yes | Yes | Yes | | |
| Gold Coast Transit | GCT 11-10: SATICOY | Sat | 182 | 30 | 20 | Yes | No | Yes | No | **214** | **18%** |
| Gold Coast Transit | GCT 11-10: SATICOY | M-F | 350 | 30 | 20 | No | Yes | Yes | Yes | **431** | **23%** |
| Gold Coast Transit | GCT 12: VENTURA HARBOR | Sun | 18 | 45 | 30 | Yes | No | Yes | No | **23** | **26%** |
| Gold Coast Transit | GCT 12: VENTURA HARBOR | Sat | 62 | 45 | 30 | Yes | Yes | Yes | Yes | **90** | **47%** |
| Gold Coast Transit | GCT 12: VENTURA HARBOR | M-F | 46 | 45 | 30 | Yes | No | Yes | No | **58** | **26%** |
| Gold Coast Transit | GCT 15: EL RIO/NORTHEAST | Sun | 90 | 35 | 30 | Yes | Yes | Yes | No | **100** | **11%** |
| Gold Coast Transit | GCT 15: EL RIO/NORTHEAST | Sat | 106 | 35 | 30 | No | No | Yes | Yes | **124** | **17%** |
| Gold Coast Transit | GCT 15: EL RIO/NORTHEAST | M-F | 170 | 35 | 30 | Yes | Yes | Yes | No | **189** | **11%** |
| Gold Coast Transit | GCT 16N: OJAI-MAIN ST (NB) | Sun | 375 | 20 | 30 | No | No | Yes | No | **359** | **-4%** |
| Gold Coast Transit | GCT 16N: OJAI-MAIN ST (NB) | Sat | 366 | 20 | 15 | Yes | Yes | Yes | Yes | **397** | **9%** |
| Gold Coast Transit | GCT 16N: OJAI-MAIN ST (NB) | M-F | 569 | 20 | 15 | No | No | No | No | **583** | **2%** |
| Gold Coast Transit | GCT 16S: OJAI-MAIN ST (SB) | Sun | 157 | 20 | 30 | Yes | No | Yes | No | **147** | **-6%** |
| Gold Coast Transit | GCT 16S: OJAI-MAIN ST (SB) | Sat | 289 | 20 | 150 | Yes | No | Yes | No | **245** | **-15%** |
| Gold Coast Transit | GCT 16S: OJAI-MAIN ST (SB) | M-F | 256 | 20 | 150 | Yes | No | Yes | No | **217** | **-15%** |
| Gold Coast Transit | GCT 18AA - Oxnard High Tripper | M-F | 56 | 1440 | 1440 | Yes | Yes | yes | Yes | **64** | **15%** |
| Gold Coast Transit | GCT 18AB - Oxnard High Tripper | M-F | 25 | 1440 | 1440 | Yes | No | yes | No | **25** | **0%** |
| Gold Coast Transit | GCT 18BA - Oxnard High Tripper | M-F | 25 | 1440 | 1440 | | | | | **25** | **0%** |
| Gold Coast Transit | GCT 18BB - Oxnard High Tripper | M-F | 15 | 1440 | 1440 | | | | | **15** | **0%** |
| Gold Coast Transit | GCT 18CA - Oxnard High Tripper | M-F | 12 | 1440 | 1440 | | | | | **12** | **0%** |
| Gold Coast Transit | GCT 18CB - Oxnard High Tripper | M-F | 14 | 1440 | 1440 | Yes | No | Yes | Yes | **16** | **15%** |
| Gold Coast Transit | GCT 18DA - Oxnard High Tripper | M-F | 25 | 1440 | 1440 | | | | | **25** | **0%** |
| Gold Coast Transit | GCT 18DB - Oxnard High Tripper | M-F | 16 | 1440 | 1440 | | | | | **16** | **0%** |
| Gold Coast Transit | GCT 18EA - Oxnard High Tripper | M-F | 5 | 1440 | 1440 | | | | | **5** | **0%** |
| Gold Coast Transit | GCT 18EB - Oxnard High Tripper | M-F | 10 | 1440 | 1440 | | | | | **10** | **0%** |
| Gold Coast Transit | GCT 18FA - Oxnard High Tripper | M-F | 30 | 1440 | 1440 | | | | | **30** | **0%** |
| Gold Coast Transit | GCT 18FB - Oxnard High Tripper | M-F | 24 | 1440 | 1440 | | | | | **24** | **0%** |
| Gold Coast Transit | GCT 1A - PORT HUENEME-OTC | Sun | 291 | 20 | | | | | | | |
| Gold Coast Transit | GCT 1A - PORT HUENEME-OTC | Sat | 470 | 20 | | | | | | | |
| Gold Coast Transit | GCT 1A - PORT HUENEME-OTC | M-F | 769 | 20 | | | | | | | |
| Gold Coast Transit | GCT 1B: PORT HUENEME-OTC | Sun | 615 | 20 | | | | | | | |
| Gold Coast Transit | GCT 1B: PORT HUENEME-OTC | Sat | 749 | 20 | | | | | | | |

| | | |
|---|---|---|
| **Data Type** | Average Daily Passenger Boardings | User can only complete areas shaded in yellow. |
| **Current Data Month** | March | * indicates field required for output calculation. |
| **Current Data Year** | 2009 | |

| Operator | Route Name | Day Type | Current Boardings * | Current Headway * | New Headway * | Med/high Income ? | Growing Economy? | Walkable? | Timed Transfers? | Potential Ridership | Potential % Change |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample Transit* | *Sample Route* | *Sun* | *200* | *60* | *15* | *Yes* | *Yes* | *No* | *Yes* | ***626*** | ***213%*** |
| Gold Coast Transit | GCT 1B: PORT HUENEME-OTC | M-F | 801 | 20 | | | | | | | |
| Gold Coast Transit | GCT 2-3: COLONIA & SOUTHSIDE | Sun | 275 | 40 | | | | | | | |
| Gold Coast Transit | GCT 2-3: COLONIA & SOUTHSIDE | Sat | 348 | 40 | | | | | | | |
| Gold Coast Transit | GCT 2-3: COLONIA & SOUTHSIDE | M-F | 502 | 40 | | | | | | | |
| Gold Coast Transit | GCT 4A - 5: NTH OXNARD - PARKWEST | Sun | 171 | 40 | | | | | | | |
| Gold Coast Transit | GCT 4A - 5: NTH OXNARD - PARKWEST | Sat | 201 | 40 | | | | | | | |
| Gold Coast Transit | GCT 4A - 5: NTH OXNARD - PARKWEST | M-F | 681 | 40 | | | | | | | |
| Gold Coast Transit | GCT 4B: NORTH OXNARD | Sun | 176 | 40 | | | | | | | |
| Gold Coast Transit | GCT 4B: NORTH OXNARD | Sat | 338 | 40 | | | | | | | |
| Gold Coast Transit | GCT 4B: NORTH OXNARD | M-F | 433 | 40 | | | | | | | |
| Gold Coast Transit | GCT 6AN: OXNARD-VENTURA (NB) | Sun | 406 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6AN: OXNARD-VENTURA (NB) | Sat | 542 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6AN: OXNARD-VENTURA (NB) | M-F | 830 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6AS: OXNARD-VENTURA (SB) | Sun | 300 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6AS: OXNARD-VENTURA (SB) | Sat | 187 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6AS: OXNARD-VENTURA (SB) | M-F | 687 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6BN: OXNARD-VENTURA (NB) | Sun | 236 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6BN: OXNARD-VENTURA (NB) | Sat | 369 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6BN: OXNARD-VENTURA (NB) | M-F | 533 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6BS: OXNARD-VENTURA (SB) | Sun | 298 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6BS: OXNARD-VENTURA (SB) | Sat | 417 | 20 | | | | | | | |
| Gold Coast Transit | GCT 6BS: OXNARD-VENTURA (SB) | M-F | 657 | 20 | | | | | | | |
| Gold Coast Transit | GCT 7: SOUTH OXNARD | Sun | 32 | 40 | | | | | | | |
| Gold Coast Transit | GCT 7: SOUTH OXNARD | Sat | 44 | 40 | | | | | | | |
| Gold Coast Transit | GCT 7: SOUTH OXNARD | M-F | 34 | 40 | | | | | | | |
| Gold Coast Transit | GCT 8N: OTC | Sun | 119 | 40 | | | | | | | |
| Gold Coast Transit | GCT 8N: OTC | Sat | 101 | 40 | | | | | | | |
| Gold Coast Transit | GCT 8N: OTC | M-F | 102 | 40 | | | | | | | |
| Gold Coast Transit | GCT 8S: OXNARD COLLEGE | Sun | 156 | 40 | | | | | | | |
| Gold Coast Transit | GCT 8S: OXNARD COLLEGE | Sat | 93 | 40 | | | | | | | |
| Gold Coast Transit | GCT 8S: OXNARD COLLEGE | M-F | 467 | 40 | | | | | | | |
| Gold Coast Transit | GCT 9: GISLER/ELM | Sun | 27 | 40 | | | | | | | |
| Gold Coast Transit | GCT 9: GISLER/ELM | Sat | 80 | 40 | | | | | | | |
| Gold Coast Transit | GCT 9: GISLER/ELM | M-F | 21 | 40 | | | | | | | |
| Gold Coast Transit | GCT EXP 30XN - OTC/VCT (NB) | Sat | 0 | 40 | | | | | | | |

| | | |
|---|---|---|
| **Data Type** | Average Daily Passenger Boardings | User can only complete areas shaded in yellow. |
| **Current Data Month** | March | * indicates field required for output calculation. |
| **Current Data Year** | 2009 | |

| Operator | Route Name | Day Type | Current Boardings * | Current Headway * | New Headway * | Med/high Income ? | Growing Economy? | Walkable? | Timed Transfers? | Potential Ridership | Potential % Change |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample Transit* | *Sample Route* | *Sun* | *200* | *60* | *15* | *Yes* | *Yes* | *No* | *Yes* | ***626*** | ***213%*** |
| Gold Coast Transit | GCT EXP 30XN - OTC/VCT (NB) | M-F | 156 | 40 | | | | | | | |
| Gold Coast Transit | GCT EXP 30XS - VTC/OTC (SB) | M-F | 39 | 40 | | | | | | | |
| Gold Coast Transit | GCT EXP 31XN - OJAI/GVT CENTER (NB) | M-F | 12 | 2 | | | | | | | |
| Gold Coast Transit | GCT EXP 31XS - OJAI /GVT CENTER (SB) | M-F | 8 | 2 | | | | | | | |
| Gold Coast Transit | GCT EXP 32XN - OJAI/OTC (NB) | M-F | 10 | 2 | | | | | | | |
| Gold Coast Transit | GCT EXP 32XS - OJAI/OTC (SB) | M-F | 3 | 2 | | | | | | | |
| Gold Coast Transit | GCT EXP 617N: C ST - OTC ESPLANADE (NB) | M-F | 10 | 2 | | | | | | | |
| Gold Coast Transit | GCT EXP 617S: ESPLANADE - OTC (SB) | M-F | 2 | 2 | | | | | | | |
| VISTA | VISTA COASTAL EXPRESS LOOPED | Sun | 49 | 15 | | | | | | | |
| VISTA | VISTA COASTAL EXPRESS LOOPED | Sat | 82 | 15 | | | | | | | |
| VISTA | VISTA COASTAL EXPRESS LOOPED | M-F | 398 | 15 | | | | | | | |
| VISTA | VISTA COASTAL EXPRESS Sat LOOPED | Sun | 134 | 60 | | | | | | | |
| VISTA | VISTA COASTAL EXPRESS Sat LOOPED | Sat | 111 | 60 | | | | | | | |
| VISTA | VISTA CONEJO LOOPED | Sat | 0 | 4 | | | | | | | |
| VISTA | VISTA CONEJO LOOPED | M-F | 33 | 4 | | | | | | | |
| VISTA | VISTA CSUCI SHUTTLE (CAMARILLO) | Sat | 42 | 15 | | | | | | | |
| VISTA | VISTA CSUCI SHUTTLE (CAMARILLO) | M-F | 100 | 15 | | | | | | | |
| VISTA | VISTA CSUCI SHUTTLE (OXNARD ROUTE) | Sat | 18 | 60 | | | | | | | |
| VISTA | VISTA CSUCI SHUTTLE (OXNARD ROUTE) | M-F | 101 | 60 | | | | | | | |
| VISTA | VISTA EAST COUNTY MON-FRI LOOPED | Sat | 55 | 60 | | | | | | | |
| VISTA | VISTA EAST COUNTY MON-FRI LOOPED | M-F | 206 | 60 | | | | | | | |
| VISTA | VISTA HIGHWAY 101 LOOPED | Sun | 1 | 30 | | | | | | | |
| VISTA | VISTA HIGHWAY 101 LOOPED | Sat | 12 | 30 | | | | | | | |
| VISTA | VISTA HIGHWAY 101 LOOPED | M-F | 397 | 30 | | | | | | | |
| VISTA | VISTA HIGHWAY 101 Sat LOOPED | Sat | 61 | 60 | | | | | | | |
| VISTA | VISTA HIGHWAY 101 Sat LOOPED | M-F | 36 | 60 | | | | | | | |
| VISTA | VISTA HIGHWAY 126 LOOPED | Sun | 179 | 60 | | | | | | | |
| VISTA | VISTA HIGHWAY 126 LOOPED | Sat | 167 | 60 | | | | | | | |
| VISTA | VISTA HIGHWAY 126 LOOPED | M-F | 378 | 60 | | | | | | | |
| VISTA | VISTA HIGHWAY 126 Sat LOOPED | Sun | 75 | 60 | | | | | | | |
| VISTA | VISTA HIGHWAY 126 Sat LOOPED | Sat | 291 | 60 | | | | | | | |
| VISTA | VISTA SANTA PAULA COMMUTER | M-F | 44 | 2 | | | | | | | |
| Simi Valley Transit | SIMI VALLEY A | Sat | 394 | 30 | | | | | | | |
| Simi Valley Transit | SIMI VALLEY A | M-F | 773 | 30 | | | | | | | |
| Simi Valley Transit | SIMI VALLEY B | Sat | 348 | 30 | | | | | | | |

| | | |
|---|---|---|
| **Data Type** | Average Daily Passenger Boardings | User can only complete areas shaded in yellow. |
| **Current Data Month** | March | * indicates field required for output calculation. |
| **Current Data Year** | 2009 | |

| Operator | Route Name | Day Type | Current Boardings * | Current Headway * | New Headway * | Med/high Income ? | Growing Economy? | Walkable? | Timed Transfers? | Potential Ridership | Potential % Change |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sample Transit* | *Sample Route* | *Sun* | *200* | *60* | *15* | *Yes* | *Yes* | *No* | *Yes* | ***626*** | ***213%*** |
| Simi Valley Transit | SIMI VALLEY B | M-F | 623 | 30 | | | | | | | |
| Simi Valley Transit | SIMI VALLEY C | Sat | 165 | 60 | | | | | | | |
| Simi Valley Transit | SIMI VALLEY C | M-F | 258 | 60 | | | | | | | |
| Simi Valley Transit | SIMI VALLEY D | Sat | 59 | 90 | | | | | | | |
| Simi Valley Transit | SIMI VALLEY D | M-F | 104 | 90 | | | | | | | |
| Thousand Oaks Transit | Thousand Oaks Route 1 - GOLD | M-F | 231 | 45 | | | | | | | |
| Thousand Oaks Transit | Thousand Oaks Route 2 - GREEN | M-F | 190 | 20 | | | | | | | |
| Thousand Oaks Transit | Thousand Oaks Routes 3 & 4 - RED | M-F | 135 | 45 | | | | | | | |
| Camarillo Area Transit | CAMARILLO 1 TO COMMUNITY CENTER | M-F | 66 | 60 | | | | | | | |
| Moorpark Transit | MOORPARK ROUTE 1 | M-F | 10 | 60 | | | | | | | |
| Moorpark Transit | MOORPARK ROUTE 2 | M-F | 123 | 60 | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Please Contact Kim Chan at Jacobs Engineering if you need more lines.

# Model Assumptions

A route-by-route model that factors up current ridership based on the elasticity factors from the TCRP report for service frequency changes. The factors vary depending on important route characteristics, as indicated by the literature. Similarly, factors for timed transfers are used to account for bus meet improvements, scaled based on headway.

IMPORTANT NOTE: This model is very limited as it uses factors that are interpolations or averages of a few case studies. It is also not able to estimate ridership on new routes; it can only estimate new ridership on existing routes given changes in service levels. Similarly, this model should not be used to assess dramatic changes in route service level, such as peak-only commuter service with 1 or 2 buses per day upgraded to all-day service. Service changes like these are outside the ability of this model to assess.

In contrast, actual ridership depends on specific local characteristics, including but not limited to:

- Origin and destination trip patterns
- Travel time to key activity centers
- Competing transit service availability
- Population & employment densities
- Parking costs
- Transit system connectivity
- Frequency

Since this model does not directly account for any of these important factors, its results must be viewed cautiously. However, it should produce a rough order-of-magnitude estimate of ridership given service frequency changes. The model assumptions include the following five factors, based on observations of the route and the area it serves:

(1) A base elasticity of 0.3 for service improvements in a suburban environment.
(2) If the majority of the route serve a healthy and growing economic environment, then an additional elasticity of 0.2
(3) If the majority of the route serves middle and high income areas, then an additional elasticity of 0.2
(4) If the majority of the route serves walkable areas, then an additional elasticity of 0.2
(5) - For routes with a current headway of 60 minutes or greater, assume a 100% factor.
- For routes with a current headway of 31-59 minutes, assume a 75% factor.
- For routes with a current headway of 30 minutes, then assume a 50% factor
- For routes with a current headway of 16-29 minutes, then assume a 25% factor
- For routes with a current headway of 15 minutes or less, then assume a 10% factor.

To account for ridership gains with the scheduling of timed transfers for the route's major transit centers, regardless of other improvements, the following scale is proposed:

- For routes with a new headway of 60 minutes or greater, then assume a 15% factor.
- For routes with a new headway of 31-60 minutes, then assume a 12% factor.
- For routes with a new headway of 30 minutes, then assume a 10% factor.
- For routes with a new headway of 16-29 minutes, then assume a 5% factor.
- For routes with a new headway of 15 minutes or less, then assume a 1% factor.

Finally, assume a maximum cap to the system ridership increase of 300%.
These assumptions are based on our interpretation of the available research.

# VCTC Simple Ridership Forecast Model

## Model Input Factors

The User has no need to change these factors. These are only changed if the model assumptions change.

| Factor Name | Input | Description |
|---|---|---|
| | | |
| *General Service Improvements* | | |
| Base Elasticity | 0.30 | Improvements in a suburban environment |
| | | |
| *Increase Factor due to Route Conditions* | | |
| Economic Growth | 0.20 | Majority of route serves a growing economic environment |
| Middle / High Income | 0.20 | Majority of route serves middle and high income areas |
| Walkable | 0.20 | Majority of route serves walkable areas |
| | | |
| *Increase Factor for Decreased Headways* | | |
| 60 minutes plus | 1.00 | Current headway is 60 minutes or more |
| 31-59 minutes | 0.75 | Current headway is 31-59 minutes |
| 30 minutes | 0.50 | Current headway is 30 minutes |
| 16-29 minutes | 0.25 | Current headway is 16-29 minutes |
| 15 minutes or less | 0.10 | Current headway is 15 minutes or less |
| | | |
| *Increase Factor for Timed Transfers* | | |
| 60 minutes plus | 0.15 | New headway is 60 minutes or more |
| 31-59 minutes | 0.12 | New headway is 31-59 minutes |
| 30 minutes | 0.10 | New headway is 30 minutes |
| 16-29 minutes | 0.05 | New headway is 16-29 minutes |
| 15 minutes or less | 0.01 | New headway is 15 minutes or less |

| *Maximum Increase* | | |
|---|---|---|
| 300% | 4 | |