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POINT LOMA/AIRPORT
TROLLEY EXTENSION STUDY

TECHNICAL MEMORANDUM
Ridership Estimate

November, 1982

DKS Associates

Traffic • Transportation • Engineering

TECHNICAL MEMORANDUM RIDERSHIP ESTIMATES

This Technical Memorandum details the methodology used to estimate the ridership potential for each alignment and alternative combination.

Ridership Findings

The ridership analysis led to the following findings:

1. The range of potential ridership is between 3,100 and 4,300 average daily trips.
2. The extension of the Trolley to a median station on Harbor Drive with shuttle service or pedestrian access to the airport is estimated to produce approximately two-thirds the ridership a direct airport terminal connector would generate.
3. If service is extended to Barnett Avenue via Alternative 3 and operated into late evening hours (to accommodate recreational trips into the downtown) then approximately 1,000 additional daily trips could be attracted from the Naval Training Center.
4. An average six percent of the projected number of 1985 trips between the airport and within the service area of the East and South Trolley Lines would use the Trolley to reach the airport.

Approach/Methodology

Two separate market areas were evaluated to generate the ridership estimates for the Point Loma Extension. These were:

- o Population and employment in the vicinity of each station.
- o Unique generators within the extension corridor.

Population and Employment

Projections of the total population and employment within one-quarter mile of the proposed Point Loma Extension stations (1985 to 2000) were provided by SANDAG. Using factors generated in the "E" and "L" Street station analysis* four (4) percent of the potential trips based on these projections, representing projected transit walk trips within one-quarter mile of the station, were assumed to use the Trolley. To estimate the patronage potential of a terminus station at Rosecrans Loma or Barnett a 0.7 of one percent factor of potential trips based upon total population from one-quarter to two miles from the station was calculated. This assumes possible bus route restructuring for feeder service to the Trolley.

Unique Generators

Four unique patronage generators within the Trolley corridor were also evaluated for their contribution to trolley ridership. They included:

- o the airport;
- o new downtown developments;
- o the Naval Training Center;
- o and Harbor Island.

* Evaluation of Adding Trolley Stations at "E" Street or "L" Street in Chula Vista--MTDB--August 1982.

Airport

Rapid transit use data at four airports was analyzed to determine an appropriate modal split for transit access to the San Diego International Airport. The airports surveyed were: Boston/Logan Airport; Cleveland-Hopkins Airport; Washington D.C./National Airport; and Chicago's O'Hare Airport. In summary, transit use to all airports ranged between six to fifteen percent.* Service requiring the use of shuttle buses or other indirect transit linkages generated lower ridership levels, by approximately one-third.

For San Diego International Airport, of the total daily 1985 person trips generated at the Airport which were destined for the downtown (City Center area) or were within the service area of the East and South Line stations, a six percent modal split to the airport was assumed if the Trolley station was located within the airport. For Alternative 2-A which provides a station on Harbor Drive and requires a shuttle or pedestrian access to the airport a four percent model split was used.

New Downtown Developments

The major development projects proposed by the Santa Fe Railroad, San Diego County and the Port of San Diego were evaluated to determine their potential for generating additional Trolley patronage. Using conservative trip generation factors and model split percentages, two percent of the total person trips generated from these three developments were assumed to use transit. Of these, 85 percent were assumed to ride the Trolley. Lane Field is one of the sites under consideration for the proposed Convention Center. The Center is not included in the ridership projection and could generate additional Trolley ridership if developed at Lane Field.

* Rail Transit Service to Airport, Point Loma/Airport Trolley Extension Special Study--MTDB--October 1982.

Naval Training Center

The Training Center has 4,000 students and 1,000 personnel living on-base in barracks. These personnel would find Trolley service through the late evening to be very attractive. Currently, many students use taxis to get downtown in the evening. It was assumed that the Trolley could capture approximately 50 percent of these evening trips.

Harbor Island

Harbor Island has some 750 hotel rooms within one-quarter mile of a Harbor Drive Trolley Station.

In summary, the ridership projections are composed of two factors. First, ridership generated from the projected population and employment adjacent to the new stations along the Point Loma extension. Secondly, ridership generated by unique activities along the Trolley extensions including the airport, the new waterfront development west of "C" Street and Kettner Boulevard, the Naval Training Center and Harbor Island. Ridership projections by market area are summarized in Table I. Specific ridership calculations and details are provided below:

Table I
RIDERSHIP POTENTIAL - By Market Area

<u>Market Area</u>	<u>Daily Ridership</u>	
	<u>Low</u>	<u>High</u>
Population and Employment	1,110	1,450
Unique Generators		
Airport	1,120	1,670
New Development	610	1,230
Naval Training Center	-	1,000
Harbor Island	-	225

Population and Employment Market Element

Based upon SANDAG projections, total year 2000 employment and population within one-quarter mile (walk trips) of the Point Loma extension stations was determined (stations are shown on Exhibit 1). This data is summarized in Table 2. Trolley ridership was generated using a four percent transit factor for walk trips and 0.7 of one percent for Station #13 and #14 feeder bus and park-and-ride trips.

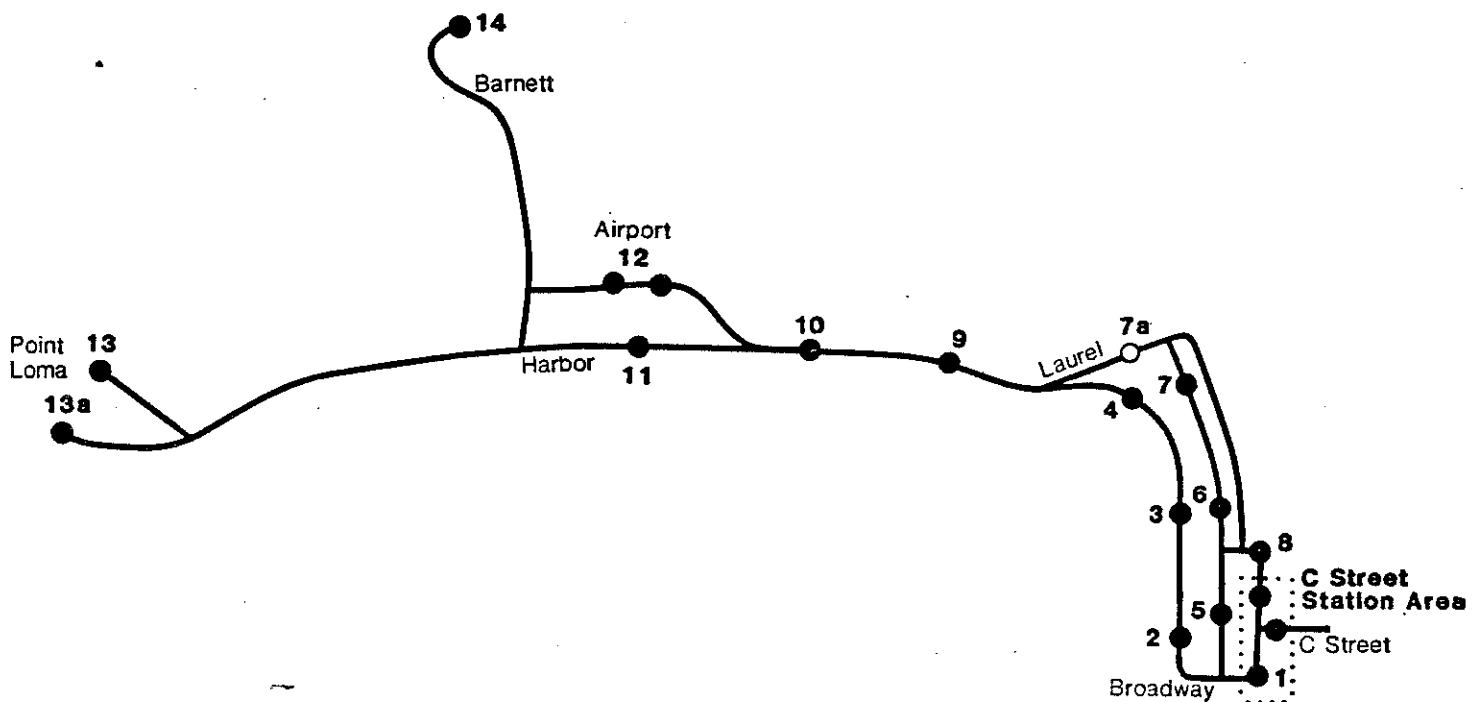


EXHIBIT 1

Table 2
POPULATION/EMPLOYMENT BASED TROLLEY RIDERSHIP
 (SANDAG Data)

<u>Station</u>	<u>Employment</u>	+	<u>Population</u> X .04	<u>Trolley Ridership</u>
50 1. "C" Street	N/A		N/A	N/A
2. Harbor/Broadway	2,486		96	103
3. Harbor (Ash to Grape)	3,497		2,221	229
4. Harbor (Solar)	2,879		15	116
5. Pacific (Broadway to Ash)	2,486		98	103
6. Pacific/Cedar	3,497		2,221	229
7. Pacific (Solar)	2,879		15	116
8. Beech	3,182		2,183	215
9. Harbor (Ryan)	5,794		-	233
10. Harbor (Winship)	2,280		-	91
11. Harbor (Airlane)	1,380		-	55 *
12. Airport terminals	NA		NA	NA **
13. Harbor or Nimitz	971		447	57
- (Bus Feeder/Park & Ride)	12,114		43,971	393
14. Barnett	3,294		1,349	186
- (Bus Feeder/Park & Ride)	17,559		44,937	437

* Airport station in median of Harbor Drive. Excludes Air passenger projections.

** Not applicable — used alternative data for projection.

Unique Generators

Airport Market

Of the total future travel projected between the San Diego Airport and the CBD, South Line and East Line, 27,900 total daily trips would be within the service area of the Trolley system. Using a six percent model split factor. A maximum of 1,674 Trolley-airport trips would be generated. (Should Alternative 2A be selected, requiring a shuttle between the station and the airport only 1,116 trips would be generated.) The allocation of the Trolley trips on a proportional basis produced 579 additional trips to the downtown area, 635 to the South Line and 460 to the east line. These ridership increases are shown in Table 3.

Table 3
AIRPORT RIDERSHIP
 (South/East Line Destinations)

<u>Link/Station</u>	<u>Maximum Ridership</u>	<u>Minimum Ridership</u>
11-Harbor (Airline)	-	1,116
12-Airport Terminals	1,674	
Downtown	579	386
East Line	635	423
South Line	<u>460</u>	<u>307</u>
	1,674	1,116

Future Waterfront Growth Market

The second unique generator market of the ridership estimate concerns trips generated by the three developments north of Broadway west of "C" Street and Kettner Boulevard and south of Hawthorn Street by the Santa Fe, San Diego County and the Port of San Diego.

The following trip generation and model split assumptions were applied to the Port of San Diego and County proposals to determine their potential to generate trolley ridership.

<u>Land Use</u>	<u>Vehicle Trips/ 1000 square feet</u>	<u>Peak-Hour Percentage</u>	<u>Vehicle Occupancy</u>	<u>Transit Model Split</u>
Office	16	13	1.4	5
Retail	40	11	1.6	5
Restaurant	16	10	1.6	3
Hotel	10/Room	8	1.5	2

By applying these factors to the Harbor Square proposal (San Diego County), 28,500 total daily person trips will be produced.

We assumed the Port of San Diego project would be a 500 room hotel and therefore generate 5,000 daily vehicle trips of 7,500 daily person trips.

Traffic projections generated by the planners for Santa Fe were used to determine the total ridership potential of the Santa Fe site. Of the two site plans being considered, one provides for a major convention center and would generate approximately 48,000 daily vehicle trips. By applying an average occupancy factor of 1.5 the site would produce a total of 72,000 daily person trips.

A two percent model split factor was applied to the total person travel generated by the three projects. This resulted in a total transit potential from the new waterfront developments of 2,160 daily transit trips. Of these about 980 trips were assigned to the airport. Fifteen percent or 320 trips were assigned to other transit services. The remainder of the transit trips are carried by the East Line and South Line. These trip calculations are shown on Table 4.

The assignment of these trips to specific Point Loma extension stations is shown on Table 5.

Table 4
WATERFRONT DEVELOPMENT TROLLEY RIDERSHIP

<u>Site</u>	<u>Total Person Trips</u>	<u>Total Trips</u>	<u>Airport Trips*</u>	<u>Bus Trips</u>	<u>City Center/ E/S Lines</u>
Santa Fe	72,000	1,440	650/429	216	574
San Diego County	28,500	570	258/170	84	228
Port of San Diego	7,500	150	68/45	20	62
		2,160	976/644	320	864

* High versus low airport ridership.

Table 5
STATION ASSIGNMENTS OF TROLLEY TRIPS (Future Waterfront)
 (When included in specific alternative)*

<u>Station</u>	<u>Airport Trips</u> ***	<u>City/S/E Trips</u>	<u>Total Trolley</u>
1. "C" Street	325 (650)**	288 (576) **	613 (1226)**
2. Harbor/Broadway	325	288	613
3. Harbor (Ash to Grape)	326	288	614
5. Pacific (Broadway/Ash)	325	288	613
6. Pacific/Cedar	326	288	614
8. Beech	<u>326</u>	<u>288</u>	<u>614</u>
Maximum Trips	976	864	1,840

* Assumes direct Airport access — Station #12

** Alternatives I-D, I-E, I-F (XXX)

*** Use 67 percent of these values for alternatives using Station II (Harbor-Airport Station).

Naval Training Center

The Naval Training Center near Station #14 (Barnett Avenue and Lytton Street) could provide additional ridership potential. Of the total 8,500 daytime center population there are approximately 4,000 students and 1,000 barracks residents. If the trolley were to operate during evening and late night hours, it is probable some, say 20 percent, of this population would use the trolley to access the various recreational areas near the City Center. Assuming a 50 percent Trolley use factor an additional 1,000 trips to the projections using Alternative 3 could be added with late night Trolley service.

Harbor Island

Using the same factors as applied for the waterfront developments, the 750 hotel rooms within one-quarter mile of Harbor Drive would produce 225 daily transit trips. These potential Trolley trips would be served with Station II in the median of Harbor Drive.

Total Ridership Levels

The trolley ridership estimates produced by each of the above elements were aggregated by station. Table 6 depicts the individual station ridership potentials and line volumes for each segment of the extension.

By summarizing (by station) the ridership estimates discussed above and assigning them to the various Point Loma Alignments, the ridership for each combination of alternative was developed. These projections are summarized in Table 7.

Table 6
POTENTIAL RIDERSHIP AT EXTENSION STATIONS

Station	Pop/Emp Element	Unique Generator Element			Total Riders
		Airport	New Development	Naval Training Center	
1. "C" Street	-	-	613 (1,226)**	-	613 (1,226)**
2.	103	-	613/503*	-	716/606*
3.	229	-	614/504*	-	843/733*
4.	116	-	-	-	116
5.	103	-	613/503*	-	716/606*
6.	229	-	614/504*	-	843/733*
7.	116	-	-	-	116
8.	215	-	614/504*	-	825/719*
9.	233	-	-	-	233
10.	91	-	-	-	91
11.	55	1,116	-	-	1,341
12.	-	1,674	-	-	1,674
13.	450	-	-	-	450
14.	623	-	-	1,000***	1,623

* High versus low ridership potential (Airport Station influence).

** Use 613 at "C" Street under Alternatives I-A, B and C and 1,226 with Alternatives I-D, E and F.

*** Night service to N.T.C.

Table 7
RIDERSHIP POTENTIAL — Total All Sections

<u>Alternative</u>	<u>Ridership</u>
<u>Direct Airport Service</u>	
Harbor Drive (I-A)	4,290
Pacific Highway-Broadway-Harbor (I-B)	4,290
Pacific Highway-Broadway-Laurel (I-C)	4,290
Pacific Highway-Beech-Harbor (I-D)	3,570
Pacific Highway-Beech-Laurel (I-E)	3,570
Santa Fe (I-F)	3,560
<u>Indirect Airport Service</u>	
Harbor Drive (I-A)	3,740
Pacific Highway-Broadway-Harbor (I-B)	3,740
Pacific Highway-Broadway-Laurel (I-C)	3,130
Pacific Highway-Beech-Harbor (I-D)	3,130
Pacific Highway-Beech-Laurel (I-E)	3,130
Santa Fe (I-F)	3,120

* Assumes service to Barnett, subtract 170 trips if extension routed to Point Loma. Also ridership would be increased by 1,000 if late night service is provided to Barnett. Excludes ridership at "C" Street station.