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July 21, 2014

Mr. Eric A. Nelson
Trumark Homes
450 Newport Center Drive, Suite 300
Newport Beach, CA 92660

LLG Reference: 2.14.3500.1

Subject: **Trip Generation Assessment and Site Access/Internal Circulation Evaluation for the Tentative Tract Map No. 17779 at 1239 Victoria Street**
Costa Mesa, California

Dear Mr. Nelson:

As requested, Linscott, Law, & Greenspan, Engineers (LLG) is pleased to submit this Trip Generation Assessment and Site Access/Internal Circulation Evaluation for Tentative Tract Map No. 17779, a proposed 28-unit single-family detached residential development in the City of Costa Mesa, California. The Project site is located along the south side of Victoria Street, west of Victoria Place/Valley Road at 1239 Victoria Street.

This letter summarizes the traffic generation forecast of the proposed Project and compares the project's tripmaking potential against the existing research and development office building use. Generation factors used in this analysis are based on information found in the 9th Edition of *Trip Generation,* published by the Institute of Transportation Engineers (ITE) [Washington, D.C., 2012].

Our evaluation of the Project's access and on-site circulation was performed using the *Turning Vehicle Templates*, developed by Jack E. Leisch & Associates, and *AutoTURN for AutoCAD* computer software that simulates turning maneuvers for various types of vehicles. Due to the existing horizontal and vertical curvature of Victoria Street along the Project frontage, the safety aspect of the Project's proposed driveways on Victoria Street is based on the intersection sight distance requirements per the California Department of Transportation (Caltrans) in the State's *Highway Design Manual (HDM)*.

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PROJECT DESCRIPTION

Table 1, attached to this letter, presents a development summary of the Project program. The Project site is currently developed with a two-story commercial building with 50,000 square-feet (SF) of research and development (R&D) floor area and 94 parking spaces. Access to the subject property is now provided via two full access unsignalized driveways on Victoria Street; left-turn access is provided via a two-way left-turn lane on Victoria Street.

The proposed Project includes the development of a 28-unit single-family residential community, with 14 units providing a two-car garage and two-car driveway apron and 14 units providing a two-car garage and one-car driveway apron; 14 open guest parking spaces are proposed. ***Exhibit A*** illustrates the proposed site plan for the Project. Access to the subject property is proposed via two (2) full access driveways on Victoria Street. ***Attachment 1***, attached to this letter, presents the Tentative Tract Map for the Project as prepared by Hunsaker & Associates. This plan illustrates the overall access and internal circulation characteristics of the Project, inclusive of the cross-sections of the internal streets.

A review of the Tentative Tract Map as illustrated in *Exhibit A* as well as *Attachment 1* indicates that access and on-site circulation for the Project will be provided via two private streets located along Victoria Avenue (identified as "A Street" and "B" Street Tentative Map). Both these streets have a proposed paved width of 24-feet, except for "U-Section". This section between "A" Street and "B" Street has a proposed paved width of 28-feet, which increases to 30-feet in the area of the two proposed parking spaces.

TRAFFIC ANALYSIS

Project Traffic Generation Forecast

Traffic generation is expressed in vehicle trip ends, defined as one-way vehicular movements, either entering or exiting the generating land use. Generation equations and/or rates used in the traffic forecasting procedure are found in the 9th Edition of *Trip Generation*, published by the Institute of Transportation Engineers (ITE) [Washington D.C., 2012].

Table 2 summarizes the trip generation rates used in forecasting the vehicular trips generated by the existing development and the proposed Project. As shown in the upper portion of *Table 2*, trips generated by the proposed Project were estimated using ITE

Land Use Code 210: Single-Family Detached Housing trip rates. For the existing land use, ITE Land Use Code 760: Research and Development Center trip rates were utilized.

As shown in lower half of ***Table 2***, the proposed Project is forecast to generate 267 daily trips on a typical weekday, of which 21 trips (5 inbound, 16 outbound) are expected to occur during the AM peak hour, and 28 trips (18 inbound, 10 outbound) could be generated during the PM peak hour.

For the existing land use, a review of lower portion of *Table 2* shows the existing trip generation potential of the 50,000 SF commercial building totals 406 daily trips, with 61 trips (51 inbound, 10 outbound) produced in the AM peak hour and 54 trips (8 inbound, 46 outbound) produced in the PM peak hour.

When the proposed Project is compared to the existing land use, the Project is forecast to result in 139 fewer daily trips, 40 fewer AM peak hour trips and 26 fewer PM peak hour trips. From a "trip budgeting" point of view, the AM and PM peak hours typically govern as traffic studies focus the potential impact of a development project during the weekday AM peak hour and PM peak hour. While daily traffic is of interest, it is not the basis of peak hour service level calculations that are conducted during the preparation of traffic studies.

Given the results of the trip generation forecast comparison, we conclude that the proposed Project will have a lesser impact on the surrounding street system than the existing land use during the critical weekday AM peak hour and PM peak hour.

Sight Distance Evaluation for Project Driveways

At public driveways, a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the driveway and the driver of an approaching vehicle. Adequate time must be provided for the waiting vehicle to either cross all lanes of through traffic, cross the near lanes and turn left, or turn right, without requiring through traffic to radically alter their speed. Due to both the horizontal and vertical curvature of Victoria Street bordering the Project site, a line of sight assessment has been prepared. The Sight Distance Evaluation prepared for Project Driveway No. 1 (identified as "B" Street in the Tentative Map) and Project Driveway No. 2 (identified as "A" Street in the Tentative Map) was based on the criteria and procedures set forth by the California Department of Transportation (Caltrans) in the State's *Highway Design Manual (HDM)* for "Public Road Intersections".

The Caltrans HDM, in Section 405.1(2)(b), page 400-22, indicates that for Public Road Intersections, "corner sight distance values given in Table 405.1A should be provided". Where conditions may exist, the minimum corner sight distance shall be equal to the stopping sight distance as summarized in Table 201.1.

It is noted that for private driveways, similar to the proposed Project, the Caltrans HDM, in Section 405.1(2)(c), page 400-17, indicates that for Private Road Intersections, "The minimum corner sight distance shall be equal to the stopping sight distance as given in Table 201.1...",

The Caltrans HDM indicates that stopping sight distance is defined as the distance required by the driver of a vehicle, traveling at a given speed, to bring his vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eyes, which are assumed to be 3.5 feet above the pavement surface, to an object 0.5-foot high on the roadway. Corner sight distance is defined in the Caltrans HDM to be the distance required by the driver of a vehicle, traveling at a given speed, to maneuver their vehicle and avoid an object without radically altering their speed. Line of sight for corner sight distance is to be determined from a 3½ foot height at the location of the driver of a vehicle on a minor road to a 4¼ foot object height in the center of the approaching lane of the major road.

The speed used in determining stopping sight distance is defined as the "critical speed" or 85th percentile speed which is the speed at which 85% of the vehicles are traveling at or less. The critical speed is the single most important factor in determining stopping sight distance. Table 201.1 in the HDM is used in determining stopping sight distance based on the critical speed of vehicles on the affected roadway, whereas Table 405.1A - Corner Sight Distance (7½ Second Criteria) of the Caltrans HDM is used to determine corner sight distance requirements.

For this analysis, the posted speed limit of 40 miles per hour (mph) for Victoria Street was utilized. Using Table 201.1, titled *Sight Distance Standards*, in the Caltrans HDM for stopping, a minimum stopping sight distance of 300 feet would apply. Based on the criteria set forth in Table 405.1A - Corner Sight Distance (7½ Second Criteria) of the Caltrans HDM and a design speed of 40 mph, a corner sight distance of 440 feet is required (see ***Table 3***, with reference to *Table 201.1* and *405.1A* of the Caltrans HDM.)

Figures 1 and ***2*** present schematics of the sight distance evaluation performed at both Project Driveway No. 1 and No. 2 respectively based on application of the corner sight distance criteria. ***Figures 3*** and ***4*** present the results of the sight distance evaluation for the study intersection based on the stopping sight distance criteria at

Driveway No. 1 and No. 2 respectively. Please note that the vertical profile for Victoria Street, as presented in these figures, were developed based on the existing street improvement plans for Victoria Street, between Canyon Drive and the Santa Ana River (AHFP Project No. 870), dated June 1977.

As shown on each figure, adequate sight distance is provided for a motorist at each driveway assuming obstructions (hardscape or landscaping) within the "limited use area" are eliminated (restricted). Further, the results of the sight distance assessment for the vertical curve on Victoria Street indicate that there are no obstructions to the line of sight at either driveway. Curbside parking is not a factor with the parking restrictions implemented along Victoria Street.

In addition to the evaluations illustrated on *Figures 1, 2, 3* and *4*, a field investigation was completed to conduct a line of sight assessment in the approximate locations of the proposed Project driveways. The assessment involved positioning oneself at the approximate location of the proposed driveway and verifying the adequacy of sight lines at the minimum distances as outlined in the HDM. Photo images of each test are shown on *Figures 1, 2, 3* and *4*. Based on the field investigation, it was determined that there are no obstructions to the line of sight based on the corner and stopping sight distance requirements.

Internal Circulation Evaluation

Based on our review of the Tentative Map, as shown in Exhibit A and *Attachment 1*, we conclude that on-site circulation layout for the proposed Project is adequate to accommodate the access and turning requirements of service/delivery trucks, trash trucks and fire trucks.

Our evaluation of the on-site circulation was performed using the *Turning Vehicle Templates*, developed by Jack E. Leisch & Associates and *AutoTURN for AutoCAD* computer software that simulates turning maneuvers for various types of vehicles. The turning templates were utilized to ensure that full-sized, large trucks as well as fire trucks could properly access and circulate through the internal roadway. A WB-40 large truck and Fire Truck turning template was utilized in this evaluation.

A review of ***Figure 5*** and ***Figure 6*** shows that site access to and from Victoria Street at each driveway for a WB-40 is adequate. ***Figure 7*** and ***Figure 8*** show that the site also accommodates ingress and egress movements of a Fire Truck. Both design vehicles can access the site from Victoria Street, circulate internally on "A" Street and "B" Street, and return to the Victoria Street to exit the site. As such, we conclude

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that the internal roadway layout is adequate for service/delivery trucks, trash trucks and fire/emergency access.

We appreciate the opportunity to provide assessment for Trumark Homes and the City of Costa Mesa. Should you have any questions, please call me at 949.825.6175.

Sincerely,

Linscott, Law & Greenspan, Engineers

Richard E. Barretto, P.E.
Principal

Attachment

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TABLE 1

PROJECT DEVELOPMENT SUMMARY[1]

TENTATIVE TRACT MAP NO. 17779 AT 1239 VICTORIA STREET, COSTA MESA

Land Use / Project Description	Project Development Totals
Existing Development	
☐ Research & Development Office Building	50,000 SF
Tentative Tract No. 17717 Project	
☐ Single Family Detached Homes	28 Units
Parking Supply	
☐ 14 Units w/2-car Garage & 2 driveway spaces	56 spaces
☐ 14 Units w/2-car Garage, 1 driveway space & 1 On-Street	56 spaces
Total Parking Supply:	112 spaces

[1] Source: Trumark Homes/Hunsaker & Associates.

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TABLE 2

PROJECT TRIP GENERATION FORECAST[2]

TENTATIVE TRACT MAP NO. 17779 AT 1239 VICTORIA STREET, COSTA MESA

ITE Land Use Code / Project Description	Daily 2-Way	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Generation Rates:							
▪ 210: Single-Family Detached Housing (TE/DU)	9.52	0.19	0.56	0.75	0.63	0.37	1.00
▪ ITE 760: Research and Development (TE/TSF)	8.11	1.0t	0.21	1.22	0.16	0.91	1.07
Generation Forecasts:							
Proposed Project							
▪ Tentative Tract No. 17779 (28 DU)	267	5	16	21	18	10	28
Existing Land Use							
▪ Research & Development Office (50,000 SF)	406	51	10	61	8	46	54
Net Difference Trip Generation Forecast Proposed Project vs. Existing Land Use	**-139**	**-46**	**+6**	**-40**	**+10**	**-36**	**-26**

Notes:
TE/DU = Trip end per dwelling unit
TE/TSF = Trip end per 1,000 square feet

[2] Source: *Trip Generation, 9th Edition, Institute of Transportation Engineers (ITE), Washington, D.C. (2012).*

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TABLE 3

TABLE 201.1 SIGHT DISTANCE AND

TABLE 405.1A CORNER SIGHT DISTANCE (7½ SECOND CRITERIA) STANDARDS

Design Speed (mph)	Stopping Sight Distance (feet)	Corner Sight Distance (feet)
25	150	275
30	200	330
35	250	385
40	*300*	*440*
45	360	495
50	430	550
55	500	605
60	580	660
65	660	715
70	750	770

SOURCE: HUNSAKER & ASSOC.

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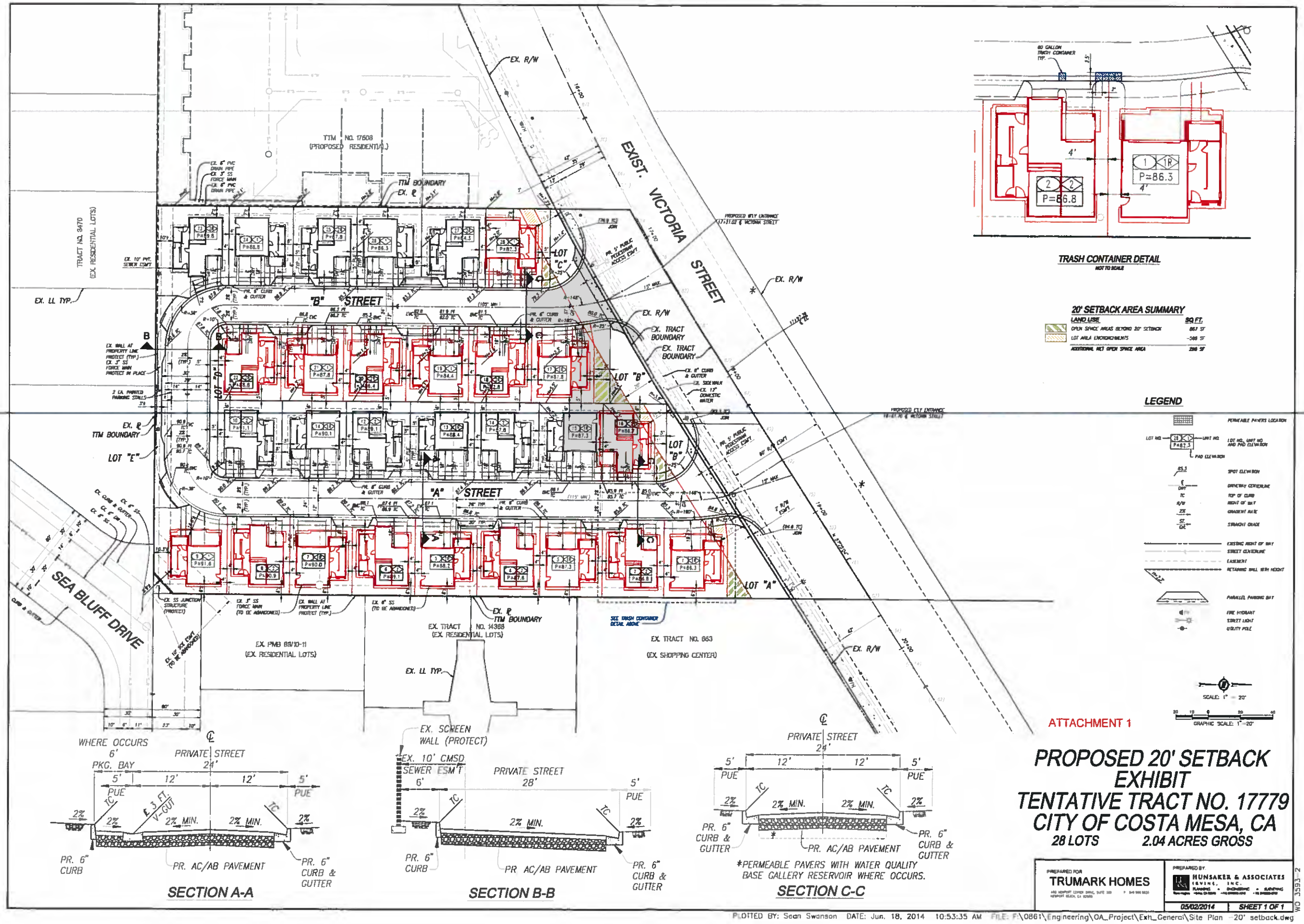
N NO SCALE

EXHIBIT A

PROPOSED SITE PLAN

1239 VICTORIA STREET, COSTA MESA



ATTACHMENT 1

PROPOSED 20' SETBACK EXHIBIT
TENTATIVE TRACT NO. 17779
CITY OF COSTA MESA, CA

28 LOTS **2.04 ACRES GROSS**

PREPARED FOR
TRUMARK HOMES

PREPARED BY:
HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING

05/02/2014 | SHEET 1 OF 1

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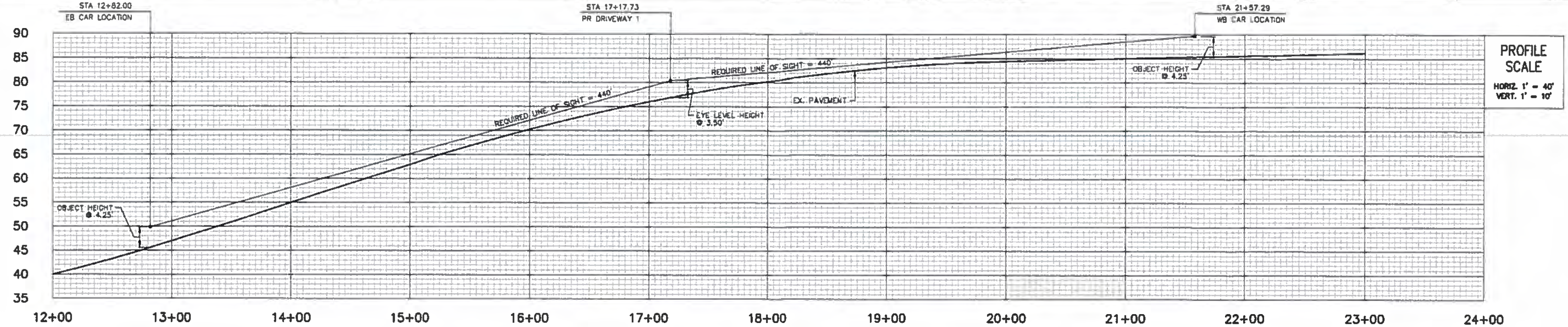
PLOTTED BY: Sean Swanson DATE: Jun. 18, 2014 10:53:35 AM FILE: F:\0861\Engineering\OA_Project\Exh_General\Site Plan -20' setback.dwg




EB VEHICLE CORNER SIGHT DISTANCE @ 440'


WB VEHICLE CORNER SIGHT DISTANCE @ 440'

CORNER SIGHT DISTANCE	
DESIGN SPEED LIMIT:	40 MPH
REQUIRED CORNER SIGHT DISTANCE:	440 FEET

LEGEND

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FIGURE 1

CORNER SIGHT DISTANCE EVALUATION DWY NO. 1 AT VICTORIA STREET

CITY OF COSTA MESA

PROJECT No. 051573

Drawn by: KP
Designed by: KP
Checked by: MP

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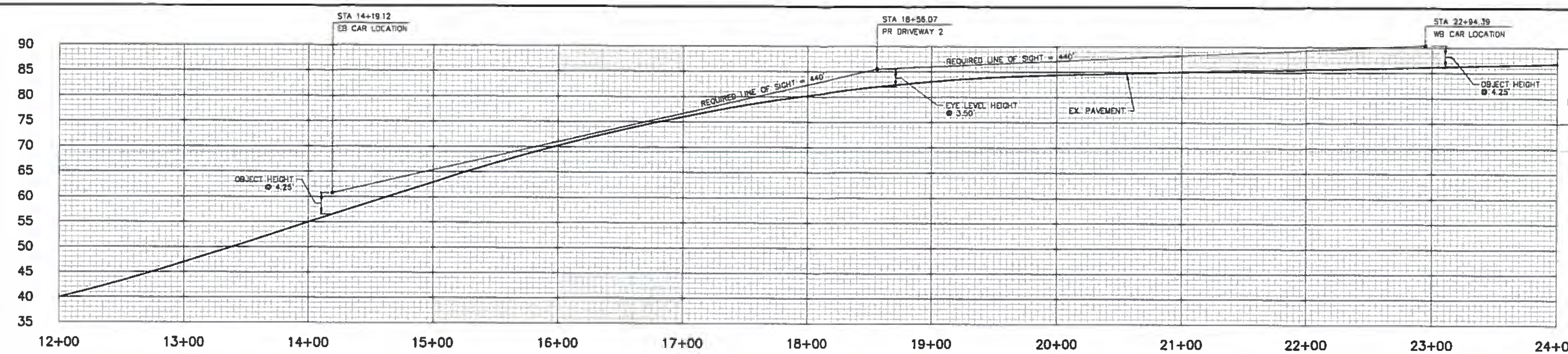
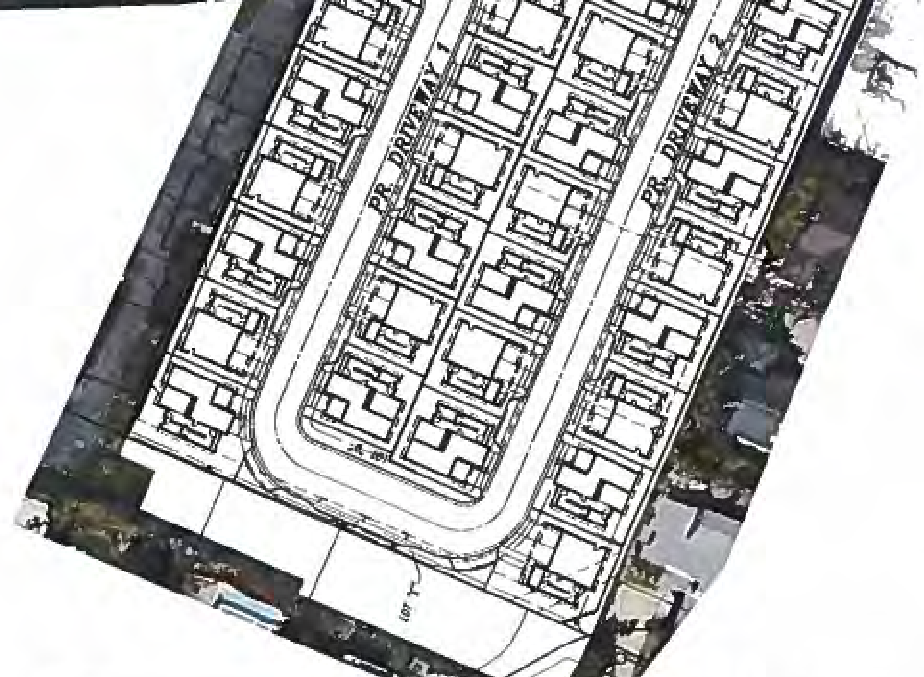


PROFILE SCALE
HORIZ. 1" = 40'
VERT. 1" = 10'



EB VEHICLE CORNER SIGHT DISTANCE @ 440'

WB VEHICLE CORNER SIGHT DISTANCE @ 440'

CORNER SIGHT DISTANCE

DESIGN SPEED LIMIT:	40 MPH
REQUIRED CORNER SIGHT DISTANCE:	440 FEET

LEGEND

LIMITED USE AREA: TO ENSURE ADEQUATE SIGHT DISTANCE, HARDSCAPE AND/OR LANDSCAPE SHALL NOT BE HIGHER THAN 30 INCHES. NO FENCES OR WALLS IN LIMITED USE AREA.

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FIGURE 2

CORNER SIGHT DISTANCE EVALUATION
DWY NO. 2
AT VICTORIA STREET

CITY OF COSTA MESA

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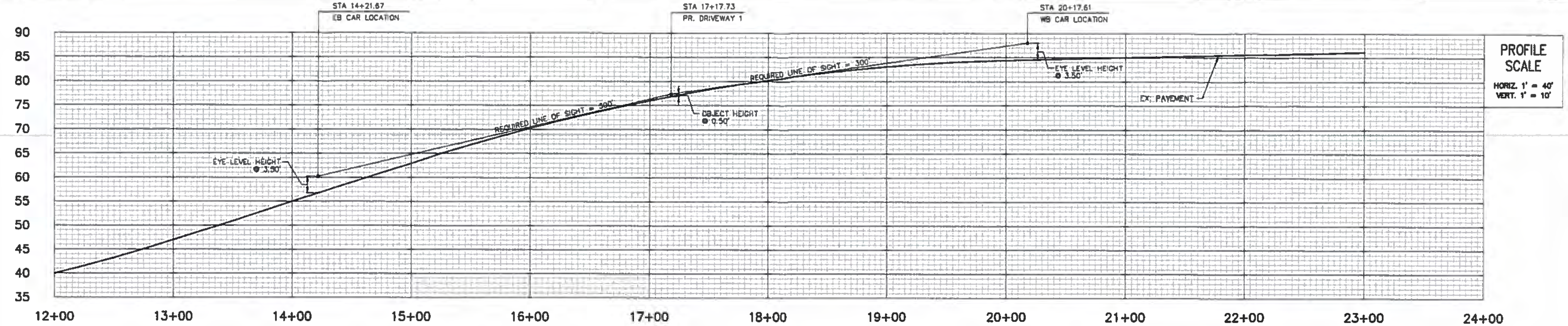

EB VEHICLE STOPPING SIGHT DISTANCE @ 300'

WB VEHICLE STOPPING SIGHT DISTANCE @ 300'

CORNER SIGHT DISTANCE

DESIGN SPEED LIMIT:	40 MPH
REQUIRED STOPPING SIGHT DISTANCE:	300 FEET

LEGEND

LIMITED USE AREA: TO ENSURE ADEQUATE SIGHT DISTANCE, HARDSCAPE AND/OR LANDSCAPE SHALL NOT BE HIGHER THAN 30 INCHES. NO FENCES OR WALLS IN LIMITED USE AREA.

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FIGURE 3

STOPPING SIGHT DISTANCE EVALUATION
DWY NO. 1
AT VICTORIA STREET

CITY OF COSTA MESA

PROJECT No. 051573
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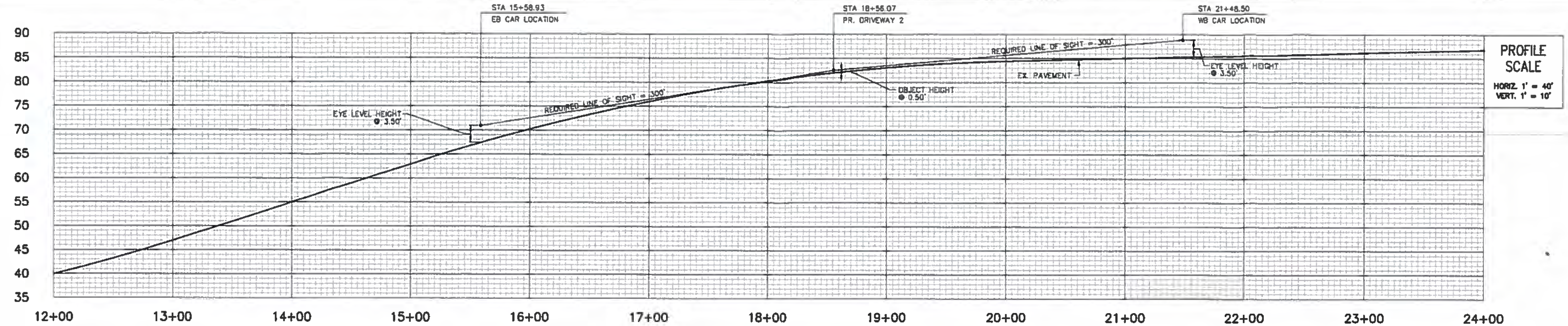

EB VEHICLE STOPPING SIGHT DISTANCE @ 300'

WB VEHICLE STOPPING SIGHT DISTANCE @ 300'

CORNER SIGHT DISTANCE

DESIGN SPEED LIMIT:	40 MPH
REQUIRED STOPPING SIGHT DISTANCE:	300 FEET

LEGEND

LIMITED USE AREA: TO ENSURE ADEQUATE SIGHT DISTANCE, HARDSCAPE AND/OR LANDSCAPE SHALL NOT BE HIGHER THAN 30 INCHES. NO FENCES OR WALLS IN LIMITED USE AREA.

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FIGURE 4

STOPPING SIGHT DISTANCE EVALUATION
DWY NO. 2
AT VICTORIA STREET

CITY OF COSTA MESA

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FIGURE 5

SITE ACCESS EVALUATION
WB-40 TURNING MOVEMENT
DWY NO. 1

CITY OF COSTA MESA

PROJECT No. 051573
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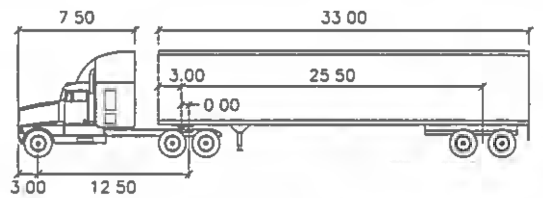

WB-40

	feet		
Tractor Width	8.00	Lock to Lock Time	6.0
Trailer Width	8.00	Steering Angle	20.3
Tractor Track	8.00	Articulating Angle	70.0
Trailer Track	8.00		

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FIGURE 6

SITE ACCESS EVALUATION
WB-40 TURNING MOVEMENT
DWY NO. 2

CITY OF COSTA MESA

PROJECT No. 061573

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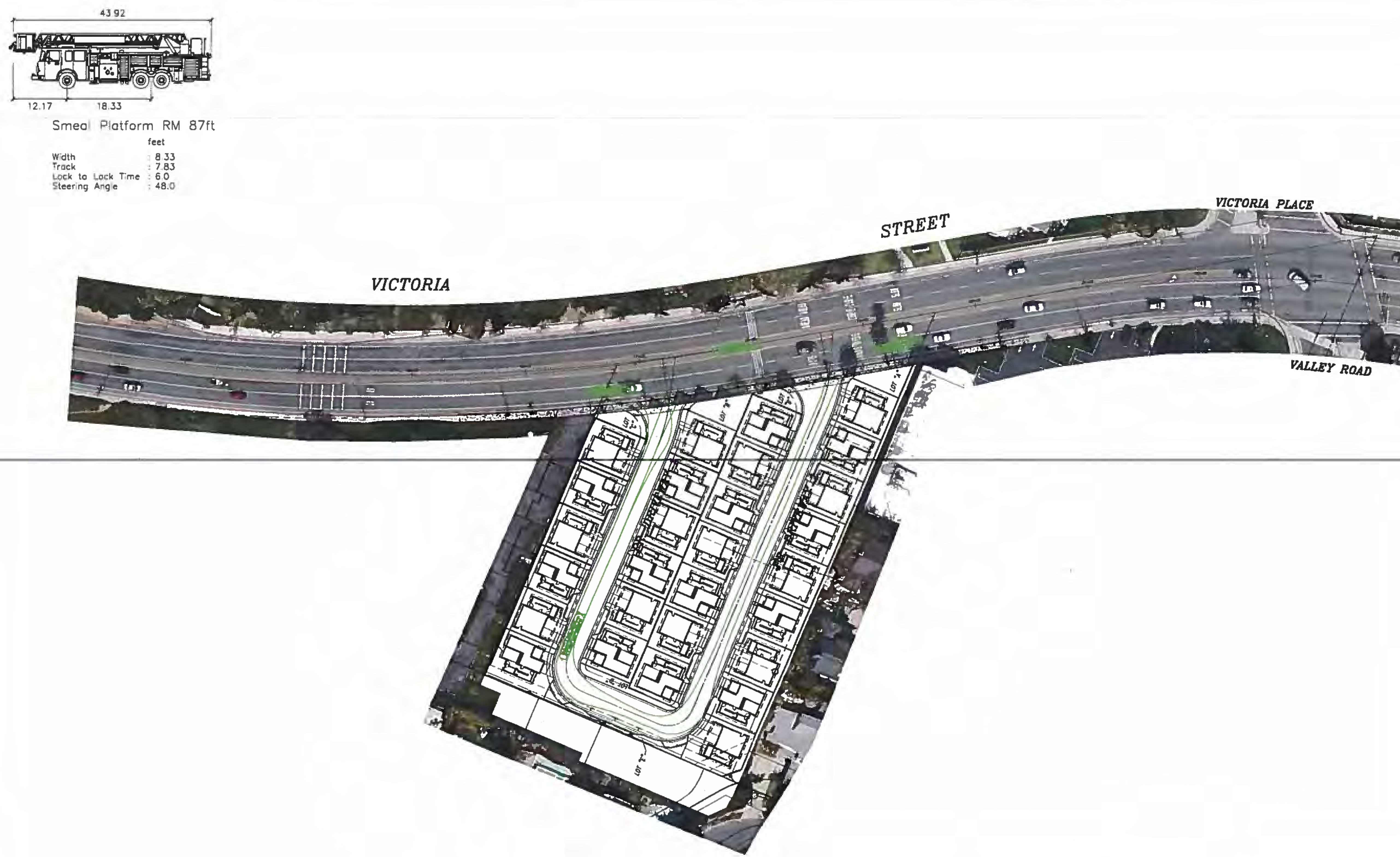

FIGURE 7

SITE ACCESS EVALUATION
FIR TRUCK TURNING MOVEMENT
DWY NO. 1

CITY OF COSTA MESA

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PREPARED UNDER THE SUPERVISION OF:

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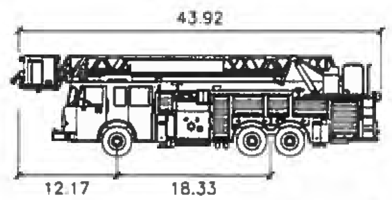

Smeal Platform RM 87ft

	feet
Width	: 8.33
Track	: 7.83
Lock to Lock Time	: 6.0
Steering Angle	: 48.0

FIGURE 8

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SITE ACCESS EVALUATION
FIR TRUCK TURNING MOVEMENT
DWY NO. 2

CITY OF COSTA MESA

PROJECT No. 051573

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