

CITY OF DANA POINT



*RESIDENTIAL NEIGHBORHOOD
TRAFFIC MANAGEMENT PLAN*

SEPTEMBER 2005



City of Dana Point
Residential Neighborhood
Traffic Management Plan

Prepared by:

Christopher H. Nguyen, P.E.
Linscott, Law & Greenspan, Engineers
1580 Corporate Drive, Suite 122
Costa Mesa, California 92626
(714) 641-1587

Contributors:

Brad Fowler, P.E., Director of Public Works
Matthew Sinacori, P.E., City Engineer
City of Dana Point
33282 Street of the Golden Lantern
Dana Point, California 92629
(949) 248-3554





Table of Contents

Section	Page No.
1.0 Introduction.....	1
2.0 Goals and Strategies	3
3.0 Policies	4
4.0 Criteria	6
5.0 Procedures.....	8
6.0 Funding Considerations	11
7.0 Traffic Calming Devices ("Toolbox").....	12
8.0 References	58





1.0 Introduction

The City of Dana Point continually strives to strengthen and protect its constituents by improving the quality of life in residential neighborhoods. Traffic conditions on residential streets can greatly affect neighborhood livability. Given that residential streets are an important component to a community's living environment, it is essential to promote safe and pleasant conditions for motorists, bicyclists, pedestrians, and residents along neighborhood streets.

Traffic calming is one measure available to the City of Dana Point to address undesirable traffic characteristics within residential neighborhoods. The term "traffic calming" is typically defined as:

"...the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users." Adopted by Institute of Transportation Engineers (ITE).

The City of Dana Point expands this definition to also include consideration of non-physical measures, such as educational programs and enhanced traffic law enforcement.

In an effort to improve the livability, vitality, and character of residential streets, the Public Works Department has developed this Neighborhood Traffic Management Plan.

This plan provides a framework for the consideration, selection, and implementation of traffic calming measures in the City of Dana Point. This document is primarily intended to be used by City staff and neighborhood residents for implementing traffic calming measures in an effective and consistent manner while recognizing cost constraints. This traffic management plan has been developed in recognition of proven positive experiences and practices of other communities, and reflects the best practices of traffic engineering.

Under this plan, the City will work with residents to identify traffic problems and seek appropriate solutions. Citizen participation is an important part of all traffic calming projects. Experience in other cities has shown that traffic calming projects that are implemented without involving the neighborhood are frequently unsuccessful, often resulting in the subsequent removal of well intended but unaccepted traffic calming measures. It is the intent of this plan to provide residents the opportunity to become actively involved in the planning and decision making process.

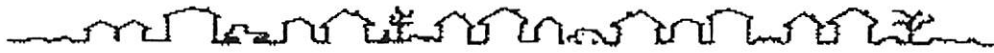




1.0 Introduction (Continued)

It is important to note that the City will generally take unilateral action to resolve issues of traffic safety where warrants dictate established safety standards must be met. However, traffic calming efforts that are the primary subject of this plan are more subjective or perceptive by nature. Therefore, traffic calming measures may be desirable to some and not to others, balancing reduced speed with traffic conveyance, infrastructure aesthetics or parking needs. Decisions may be reached through participative means and funding may not be available for traffic calming infrastructure as traffic calming effects are more qualitative than proscribed.





2.0 Goals and Strategies

The City's Neighborhood Traffic Management Plan is a comprehensive process for reducing and managing traffic speeds, traffic volumes, and traffic-collision events, as well as improving pedestrian/bicyclist safety conditions on local streets. The goals of this plan are:

1. To improve neighborhood livability by reducing adverse impacts of traffic in residential neighborhoods, by promoting safe and pleasant conditions for all users of local streets.
2. To provide a plan that City officials and the general public are confident in as an effective and fair tool in evaluating traffic issues and allocating limited taxpayer resources.
3. To provide a standard format for dealing with traffic issues in an effective, cost conscious, reasonable, and consistent manner.
4. To encourage appropriate public involvement in the traffic calming process.

These goals can be achieved through a combination of several parallel strategies, known collectively as the "Three E's":

1. **E**ducation – Residents receive the information and tools necessary to become active participants in addressing their neighborhood traffic concerns;
2. **E**ngineering – Engineering principles are used to develop traffic calming strategies that effectively address community-identified traffic issues; and
3. **E**nforcement – Targeted police enforcement supports the traffic calming plan developed by Public Works staff and residents.

The role of these strategies in supporting the goals is to articulate the method by which actions are considered and selected for use in meeting the goals.





3.0 Policies

The following guidelines are recommended to guide City staff, the community, the Traffic Improvement Subcommittee, and the City Council in selecting appropriate measures for each individual case:

1. The City should encourage the use of the Arterial Street System as designated within the City's Circulation Element by completing and improving the system to the requirements designated in the City's General Plan.
2. A combination of education, engineering, and enforcement strategies should be employed as the initial phase of any traffic calming/management strategy. Subsequent actions should be planned and designed in keeping with proven sound engineering and planning practices. The City Traffic Engineer shall direct the investigation, analysis, and installation of devices as needed to accomplish a project, in compliance with Federal, State, and Local standards, and acceptable professional traffic engineering practices.
3. Emergency vehicle access should be accommodated consistent with response standards. If current emergency vehicle access does not meet the existing response standard, traffic calming efforts should not further degrade the response time. However, traffic calming actions which affect response on streets that meet existing response standards may be considered with resident knowledge and consent.
4. Transit service and school bus access, safety, and scheduling should not be significantly impacted by traffic calming/management measures.
5. Reasonable automobile access should be maintained. Pedestrian, bicycle, and transit access should be encouraged and enhanced wherever possible.
6. Parking removal is to be considered on a project-by-project basis. Parking needs of residents should be balanced with the important functions of traffic, emergency vehicle access, transit, bicycle, and pedestrian movement. However, it should be acknowledged that the implementation of many of the traffic calming measures would require elimination of on-street parking spaces.
7. Application of this Neighborhood Traffic Management Plan is limited to those neighborhood streets that are primarily residential.

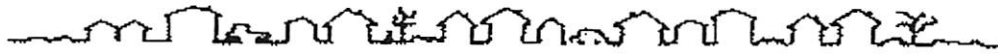




3.0 Policies (Continued)

8. Traffic can be re-routed from one local street to another as a result of a traffic calming project. The acceptable traffic diversion should be defined on a project-by-project basis and those impacted so advised and included in the decision making process.
9. To implement the Residential Neighborhood Traffic Management Plan, consistent procedures should be followed by City staff in processing traffic calming requests in accordance with applicable codes and related policies. At a minimum, the procedures defined in the following sections of this plan shall provide for submittal of project proposals, project evaluation and selection, citizen participation, and for Traffic Improvement Subcommittee and City Council review and approval where appropriate.
10. The potential increased liability (if any) to the City associated with the installation of traffic calming devices, should be assessed by the City Attorney, if necessary, on a project-by-project basis and considered before installation.
11. It is recognized that the City has limited resources and will have to prioritize projects for funding. Cost sharing options between the City and the area residents may be considered for the implementation of the recommended measures, especially for any unfunded projects.





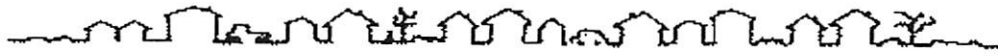
4.0 Criteria

In an effort to maximize the benefits of this plan through effective allocation of personnel and financial resources fairly city-wide, a "candidate" street must meet specific criteria before a traffic calming/management study is undertaken.

Candidate street(s) shall meet all of the following requirements:

1. Street must not provide more than one lane in each direction.
2. Street must not be wider than 42 feet (curb-to-curb).
3. Street must provide access to residential developments or have primarily residential homes fronting the street.
4. Street must not provide primary access to a fire station or medical facility served by ambulances or other paramedic-type vehicles.
5. For major traffic calming projects:
 - a. An 85th percentile speed in excess of 34 mph or 10 mph over the speed limit. The speed surveys are to be collected by machine road tubes for a minimum period of 24 consecutive hours with a minimum sampling of 50 vehicles per direction.
 - i. If two or more reported accidents of types susceptible to correction by speed reduction measures have occurred within a recent twelve month period, the 85th percentile speed threshold may be reduced to 30 mph for consideration of a project.
 - b. A street or street segment shall have a minimum length of 800 feet uninterrupted by a traffic signal, stop sign, yield sign, or other traffic control.
 - c. A minimum average daily traffic volume of 1,000 vehicles per day, total of both directions.
6. Minor traffic calming projects including warranted stop signs or speed humps may be considered on streets with 85th percentile speeds of 30 mph to 34 mph and traffic volumes of 500 vehicles per day, but must still be at least 800 feet uninterrupted in length.





4.0 Criteria (Continued)

7. For a traffic volume mitigation project, the average daily traffic volume must be in excess of 2,500 vehicles per day, total of both directions, and the daily traffic volume must be 10% greater than that expected per current ITE *Trip Generation*. The traffic volume surveys are to be collected by machine road tubes for three days (weekend day may be included).

It should be noted that street projects meeting the criteria (above) are dependent upon available funding and other traffic safety project priorities (detailed in Section 6.0 of this report). Potential traffic calming projects will be prioritized will be based on existing speeds, accident history data, and traffic volumes.

It should also be noted that existing horizontal and vertical traffic conditions might prohibit the implementation of some traffic calming projects. For example, speed humps may not be installed on streets with vertical grades greater than 6.0%. Installation criteria are detailed in Section 7.0 (Traffic Calming Devices) of this report.

It is recognized that slower traffic speeds on residential streets are generally desirable. It is also recognized that California speed laws generally set in 5 mph increments based upon 85th percentile speeds, the underlying premise being that drivers will travel at a speed they believe is safe on average and that speed limits and enforcement should be accommodated on that basis. Cities are generally prevented from arbitrarily posting speed limit signs at speeds greater than 5 mph below the 85th percentile speed. It is typically the case that 85th percentile speeds are normally in excess of the speed limit by up to 4 mph (e.g., a 25 mph street will typically exhibit 85th percentile speeds of 26 mph to 29 mph, in normal circumstances). Therefore, streets exhibiting speeds within this range should not be considered for projects but may need other minor traffic calming actions listed later herein.





5.0 Procedures

The procedures specified in this section are the City's policy for processing requests for the implementation of Traffic Calming measures. Any special cases or requests not foreseen in these procedures will be determined administratively by the City Traffic Engineer. These procedures complement the City's Municipal Code, Ordinances and Council Resolutions and do not supersede them. In the case of any apparent conflict, those shall prevail over this document.

1. Interested parties will obtain a copy of the City's Neighborhood Traffic Management Plan. If the applicant wishes to proceed, he/she will submit a written request that explains his/her specific traffic concerns and identifies a recommended traffic calming project device, if any (traffic calming devices or "toolbox" are detailed at the rear of this plan).
 - a. If an issue had previously been evaluated in the prior 24-month period, then the resident will be informed of the results of the previous evaluation and action. No further evaluation will be performed until additional time elapses (i.e., 24 months after the initial traffic evaluation or action) or the City Traffic Engineer determines a need has arisen (changes in traffic conditions) or the City Council so directs.
 - b. An evaluation of traffic calming measures may also be initiated if directed by the City Council or Traffic Improvement Subcommittee, or if City staff observes a potential traffic safety issue.
2. The City Traffic Engineer will collect traffic data (i.e., vehicular speed data, traffic volume data, traffic collision history, street characteristics, etc.).
3. The City Traffic Engineer shall evaluate the request with respect to the Neighborhood Traffic Management Plan criteria (detailed above). If these requirements are not met, the applicant shall be so advised.
4. If traffic data does not satisfy the requirements for a major traffic calming project recommendation, then minor improvements may be implemented as determined by the City Traffic Engineer as follows (listed in no particular order):
 - Submit request to the Chief of Police for increased police enforcement
 - Placement of radar speed trailer
 - Letters sent out to residents within the neighborhood discussing the speeding concerns and request to slow down (education)





5.0 Procedures (Continued)

- Installation of speed limit signs (e.g., 25 mph)
 - Installation of speed limit pavement markings (e.g., 25 mph)
 - Installation of "Radar Enforced" signs (to supplement speed limit signs)
 - Installation of appropriate Warning signs
 - Installation of V-Calm device (e.g., electronic speed sign) for a temporary period of time
 - Paint Edgelines
 - Paint Centerlines
 - Other minor traffic control devices as approved in the Manual on Uniform Traffic Control Devices (MUTCD)
5. If all sections of the Neighborhood Traffic Management Plan criteria are satisfied, then the following actions are taken:
- a. Implement minor improvements indicated in Item 4 (above).
 - b. After a period of four (4) months, the City Traffic Engineer will collect new traffic data – if the issue is "solved" (i.e., traffic speeds and/or volumes decrease to acceptable levels), then no further action is required. If not, then the following major or minor traffic improvements project evaluation will occur:
 - i. City Traffic Engineer will investigate other potential solutions (i.e., Traffic Calming "toolbox") and estimate associated costs (design and construction).
 - ii. Potential solutions are provided to Fire Authority and Police Department for review and comment.
 - iii. City Traffic Engineer will prepare a preferred solution and neighborhood contact will be made to help develop a preferred solution (solutions presented to the residents will only include those reviewed first by the Fire Authority and Police Department).
 - iv. Advisory survey will be sent to all impacted residents as determined by City staff and a 67% approval rate will be required for further action.





5.0 Procedures (Continued)

- v. If a traffic calming device receives a 67% (minimum) approval rate, the issue will be taken to the Traffic Improvement Subcommittee to discuss the project proposal, findings and prioritization. The traffic Improvement Subcommittee will make a recommendation to the City Council.
 - vi. City Council will determine appropriate action.
6. If traffic data does not satisfy the requirements for a major traffic calming project recommendation, but the 85th percentile speed data is found to exceed the speed limit by 5 mph to 9 mph, then the City Traffic Engineer may recommend and implement project solutions following steps 5i-iv (without needing 5v-vi) if so directed by the City Engineer. However, traffic calming improvements for such cases will be limited to those that are relatively inexpensive and do not require major infrastructure improvements (i.e., speed humps, turn restrictions, basket weave stop signs, Yield signs, etc.)





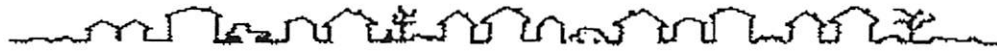
6.0 Funding Considerations

Funding for the implementation of a traffic calming project should be considered throughout the plan development process. If funding limitations will impact the range of options available, this needs to be identified early in the process and the variety of appropriate devices should reflect these limitations. It should be noted that some traffic calming improvement measures are expensive (i.e., chokers, diverters, street closures, mini-roundabouts, curvilinear reconstruction, etc.) and may not have adequate funding for that fiscal year. The City's Residential Neighborhood Traffic Management Plan operates on a limited budget, which is approved annually by the City Council.

The annual City budget allocated to traffic calming projects is typically developed for minor traffic calming improvement projects, including speed humps. As such, traffic calming projects should be prioritized based on existing speeds, accident history data, and traffic volumes. The prioritization of projects should be recommended by the Traffic Improvement Subcommittee and ultimately approved by the City Council.

If a neighborhood requests to implement a more extensive project than what City staff believes is appropriate to resolve an identified problem(s), then the City Council may need to approve the project with additional funds and/or the neighborhood may request to participate in funding all or a part of the project. Projects for which a 100% funding commitment by the neighborhood is received will be moved forward to implementation by the City upon completion of the design process.





7.0 Traffic Calming Project Devices (“Toolbox”)

The following pages are representative examples of traffic calming devices that may be recommended and used as part of this plan. Other traffic calming improvement measures not detailed in this section may be implemented if approved by the City Traffic Engineer.



Toolbox

	Volume Reduction	Speed Reduction	Safety Improvement	Access Restriction	Emergency Access Restriction	Maintenance Problems	Cost
7.1 All Way Stop	*	**	**	*	*	*	*
7.2 Basket Weaving Stop Signs	*	**	***	*	*	*	*
7.3 Chicanes / Curvilinear Reconstruction	**	**	**	*	*	*	***
7.4 Chokers	**	*	**	*	*	*	***
7.5 Crossing Islands	*	*	**	*	*	*	**
7.6 Curb Extensions / Bulb-Outs	**	**	**	*	*	*	***
7.7 Deflections / Diverters	**	**	**	***	***	*	***
7.8 Gateways	*	**	*	*	*	*	**
7.9 Increased Police Enforcement	*	***	**	*	*	*	**
7.10 Mini-Roundabouts	*	**	**	*	*	**	***
7.11 Pavement Markings - Edgelines	*	*	*	*	*	*	*
7.12 Paving Materials	*	*	**	*	*	*	**
7.13 Raised Crosswalks	**	***	**	*	**	**	**
7.14 Raised Intersections	**	***	**	*	**	**	***
7.15 Rumble Strips	*	*	**	*	*	*	*
7.16 Speed Humps	**	***	*	*	**	**	**
7.17 Speed Watch	*	***	**	*	*	*	*
7.18 Street Closure	**	***	**	***	***	*	***
7.19 Variable Speed Display	*	***	**	*	*	*	*

Key

- * Low, Unlikely, No
- ** Mid, Moderate, Possible
- *** High, Likely, Yes

n:\2600\2042609\dwg\2609 7-0-o.dwg LDP 09:39:12 09-12-2005 equilar



NO SCALE

FIGURE 7.0.A

TRAFFIC CALMING TOOLBOX
NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.1 All Way Stop

The *Manual On Uniform Traffic Control Devices (MUTCD)* has established specific warrants for the installation of all-way stops. These warrants were developed to assist in determining whether or not all way stop signs could help assign right-of-way at higher volume intersections, reduce accident problems, mitigate sight distance issues, or fill-in as an interim measure until traffic signals could be installed.

Purpose

To designate vehicular right-of-way and potentially reduce accidents.

Consideration

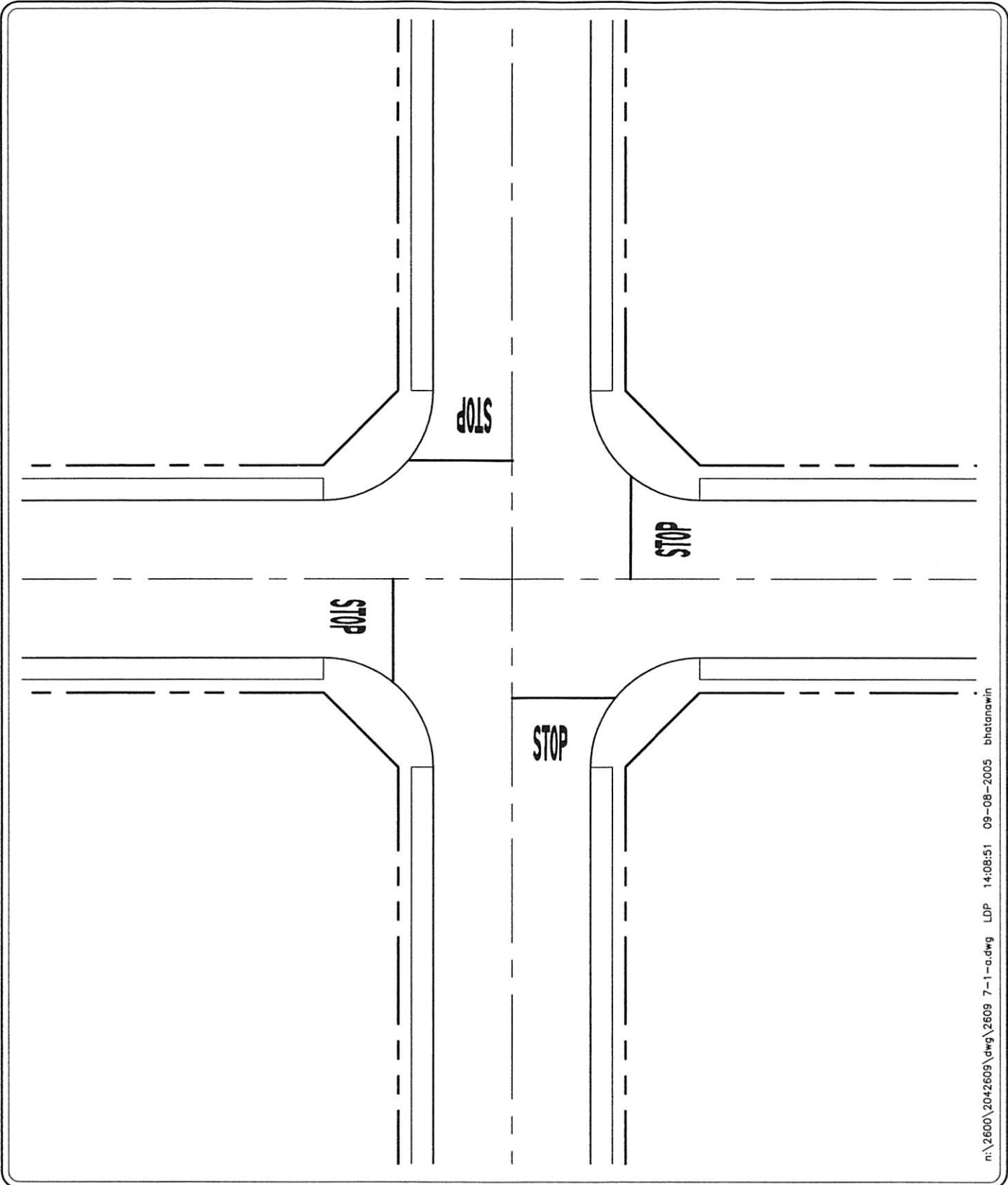
Studies have shown that all way stop signs may generally not be an effective technique for controlling speeds and should not be used to reduce traffic volumes. It should be noted that stop signs constitute one of the most significant means of separating and controlling traffic movements and should be carefully considered.

In some cases, accidents actually can increase, possibly due to the stop signs being unexpected or deemed unnecessary. In addition, speeds may increase in the mid-block areas. Additional stops may also increase noise and air pollution.

Estimate Cost

\$2,000 per intersection, including the stop signs, advance warning signs, and pavement markings.





n:\2600\2042609\dwg\2609 7-1-a.dwg LDP 14:08:51 09-08-2005 bhatnawin



NO SCALE

FIGURE 7.1.A

ALL-WAY STOP

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.2 *Basket Weaving Stop Signs*

The use of alternating two-way stop control within an area of local residential streets can reduce accidents. The stop control is alternated every other block creating a "basket-weave" effect of traffic control. Traffic can proceed through one intersection, but must then stop at the next. For roadway segments that do not have the right-of-way, speeds may be reduced within 200 feet of the intersection.

Purpose

Reduce speeds but only if the intersections are close to each other.

Consideration

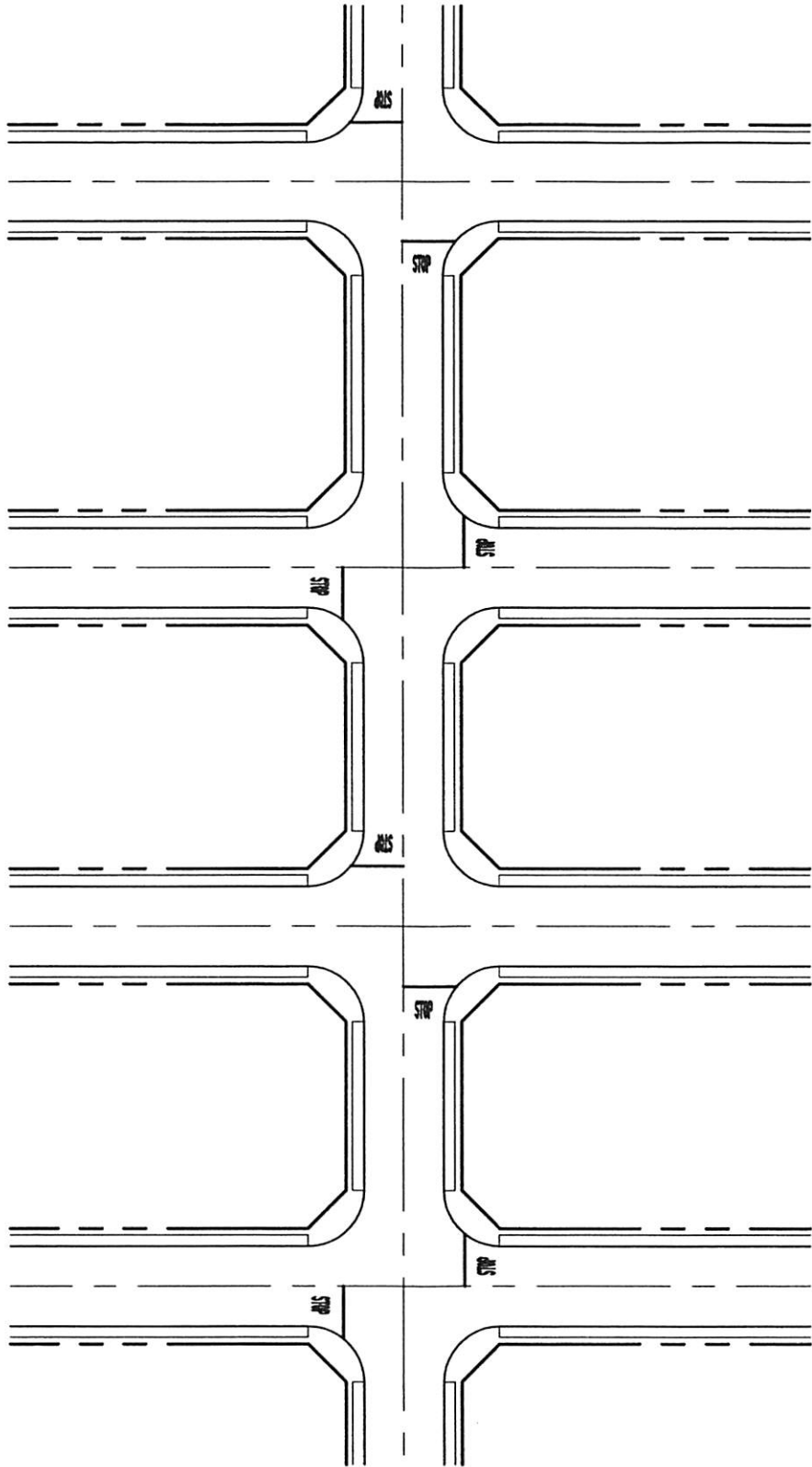
On the portions of roadway which have the right-of-way, there is a potential increase in speed, especially when fairly long stretches of uninterrupted roadway are on either side of the intersection. The increase in speed frequently leads to requests for all-way stop control.

At two-way stop controlled intersections, the stops are typically installed on the minor approach legs (i.e., intersection legs with less traffic volumes). Careful consideration should be given when stopping the major approach legs, given that these stops may be ignored. There is some possibility of creating a disrespect for all stop signs and traffic control in general because the drivers frequently do not encounter another vehicle, view the control as unnecessary, and "run" the stop sign.

Estimate Cost

\$2,000 per intersection, including the stop signs, advance warning signs, pavement markings, and removal of stop signs or pavement markings.





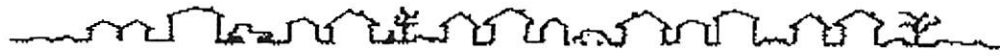
n:\2600\2042609\dwg\2609 7-2-a.dwg LDP 14:09:22 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.2.A

BASKET WEAVE STOP SIGNS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.3 Chicanes / Curvilinear Reconstruction

Chicanes or curvilinear reconstruction projects create a horizontal curvature on previously straight alignment streets. Shifting a travel lane has an effect on speeds as long as the taper is not so gradual that motorists can maintain speeds. Shifts in travelways can be created by shifting parking from one side to the other (if there is only space for one side of parking) or by building landscaped islands (islands can also effectively supplement the parking shift).

Purpose

- Reduce vehicle speeds.
- May potentially add more landscaping to a street.

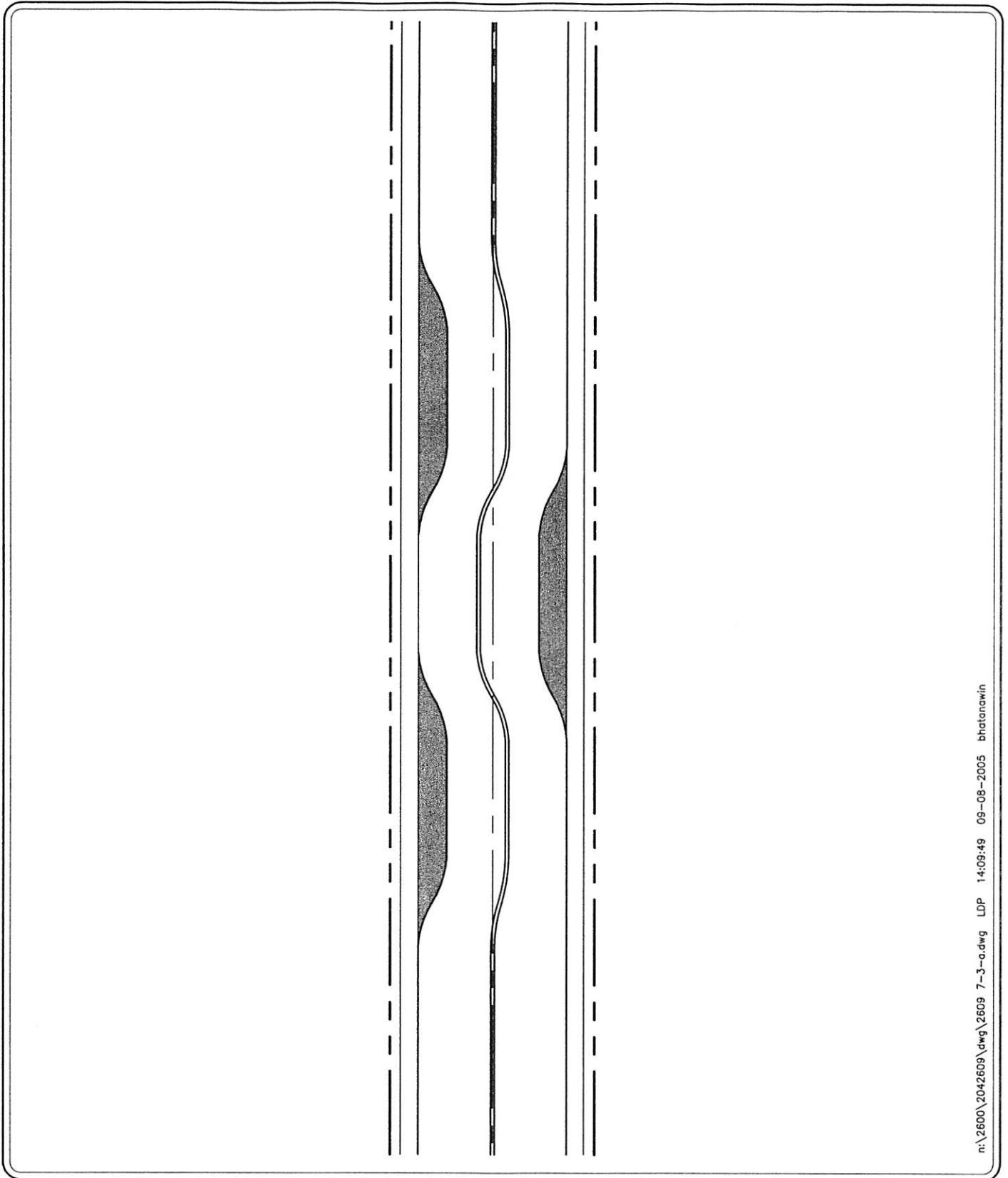
Consideration

- Chicanes may reduce on-street parking.
- Maintain good visibility by planting only low shrubs or trees with high canopies.
- Ensure that bicyclist safety and mobility are not diminished.

Estimate Cost

Costs for landscaped chicanes are approximately \$15,000 to \$30,000 (for a set of three chicanes). Drainage and utility relocation often represent the most significant cost consideration.





n:\2600\2042609\dwg\2609 7-3-o.dwg LDP 14:09:49 09-08-2005 bhatnawin

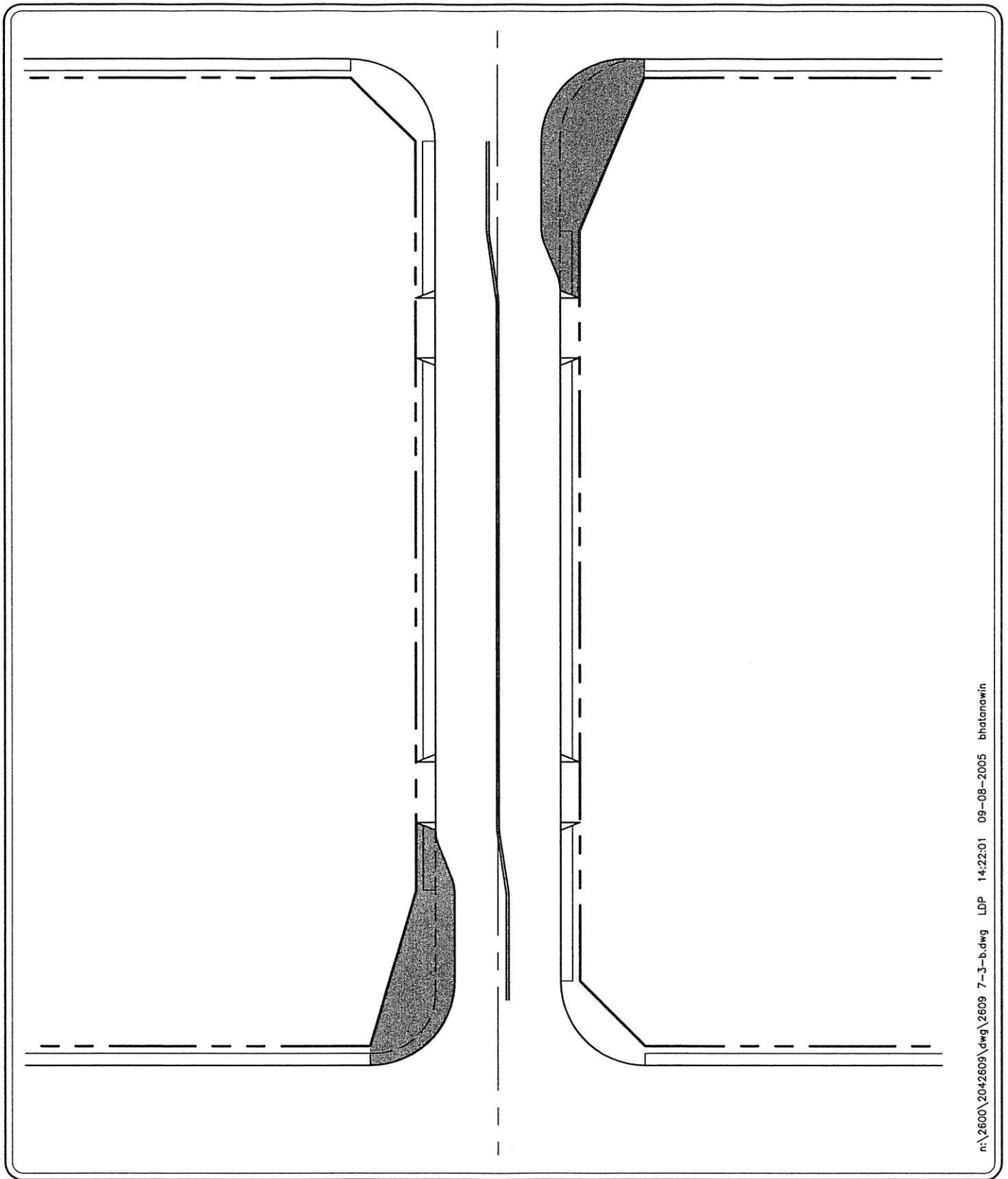


NO SCALE

FIGURE 7.3.A

CHICANES / CURVILINEAR
RECONSTRUCTION (MID-BLOCK)

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



n:\2600\2042609\dwg\2609 7-3-b.dwg LDP 14:22:01 09-08-2005 bhatanwin



NO SCALE

FIGURE 7.3.B

CHICANES / CURVILINEAR
RECONSTRUCTION (INTERSECTION)

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.4 Chokers

Chokers are curb extensions that narrow a street by widening the sidewalks or planting strips, effectively creating a pinch point along the street. Chokers can be created by bringing both curbs in, or they can be done by more dramatically widening one side at a mid-block location. They can also be used at intersections, creating a gateway effect when entering a street.

Chokers can have a dramatic effect by reducing a two-lane street to one lane at the choker point (or two narrow lanes), requiring motorists to yield to each other or slow down. In order for this to function effectively, the width of the travelway cannot be wide enough for two cars to pass – 16 ft is generally effective (and will allow emergency vehicles to pass unimpeded). This kind of design is usually only appropriate for low-volume, low-speed streets.

Purpose

- Slow vehicles at a mid-point along the street.
- Create a clear transition between a commercial and a residential area.
- Narrow overly wide intersections and mid-block areas of streets.
- Add room along the sidewalk or planting strip for landscaping or street furniture.
- Chokers may reduce on-street parking.

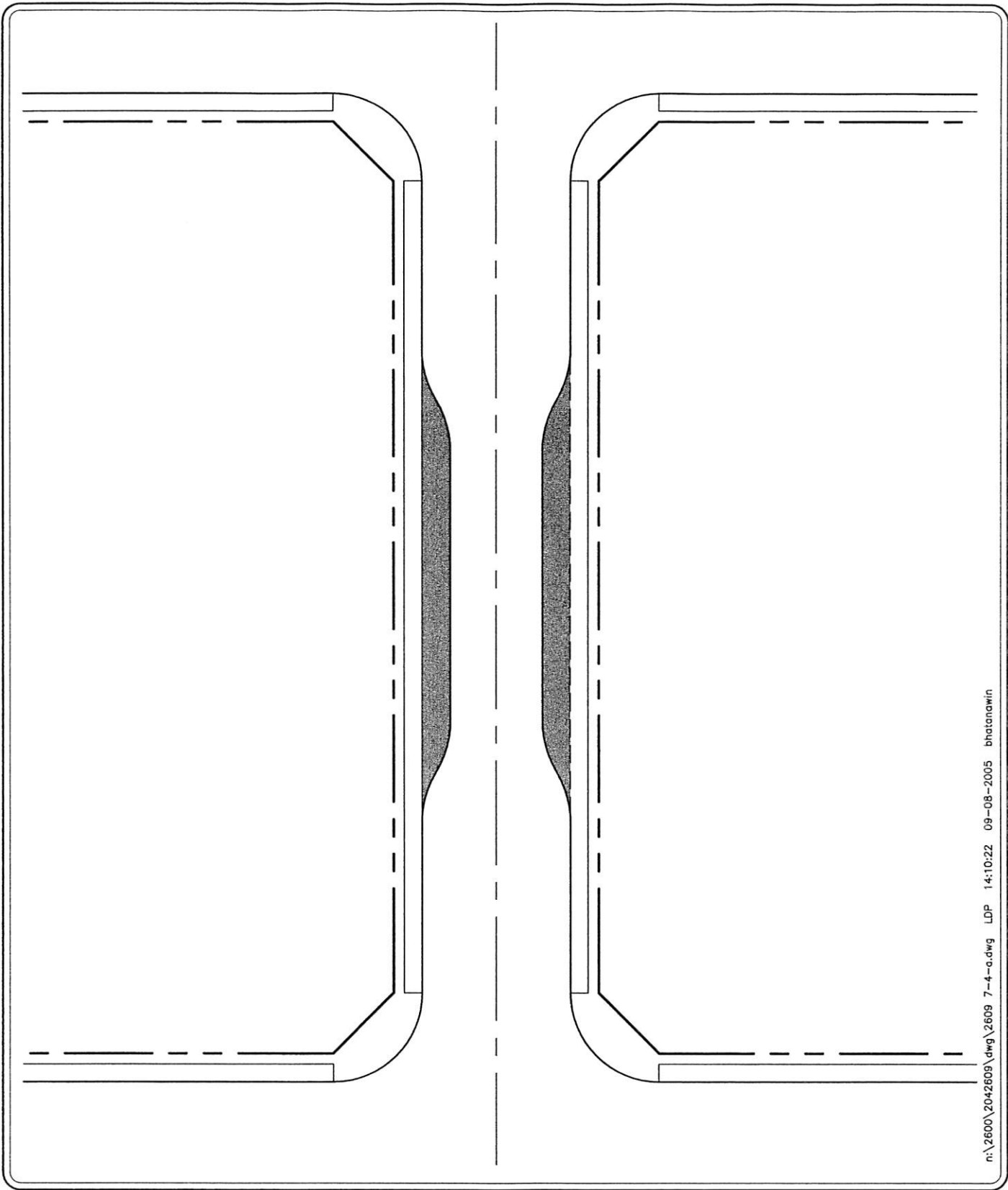
Consideration

- If two travel lanes are maintained on a two-way street and/or the travel-lane widths are unchanged (at the location of the choker), it will have a minimal effect on speed.
- Ensure that bicyclist safety and mobility are not diminished.

Estimate Cost

\$5,000 to \$20,000 depending on site conditions and landscaping. Drainage may represent a significant cost.





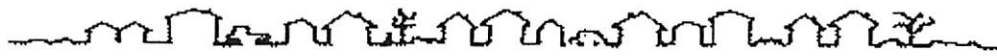
n:\2600\2042609\dwg\2609 7-4-a.dwg LDP 14:10:22 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.4.A

CHOKERS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.5 Crossing Islands

Crossing islands (also known as center islands, refuge islands, pedestrian islands, or median slow points) are raised islands placed in the center of the street at intersections or mid-block to help protect crossing pedestrians from motor vehicles. Center crossing islands allow pedestrians to deal with only one direction of traffic at a time, and they enable them to stop partway across the street and wait for an adequate gap in traffic before crossing the second half of the street. Where mid-block or intersection crosswalks are installed at uncontrolled locations (i.e., where no traffic signals or stop signs exist), crossing islands should be considered as a supplement to the crosswalk.

This kind of facility has been demonstrated to significantly decrease the percentage of pedestrian collisions. The factors contributing to pedestrian safety include reduced conflicts, reduced vehicle speeds approaching the island (the approach can be designed to force a greater slowing of cars, depending on how dramatic the curvature is), greater attention called to the existence of a pedestrian crossing, opportunities for additional signs in the middle of the road, and reduced exposure time for pedestrians.

Curb extensions may be built in conjunction with center crossing islands where there is on-street parking. Care should be taken to maintain bicycle access.

Purpose

- Enhance pedestrian crossings, particularly at uncontrolled crossing points.
- Reduce vehicle speeds approaching pedestrian crossings.
- May reduce on-street parking.

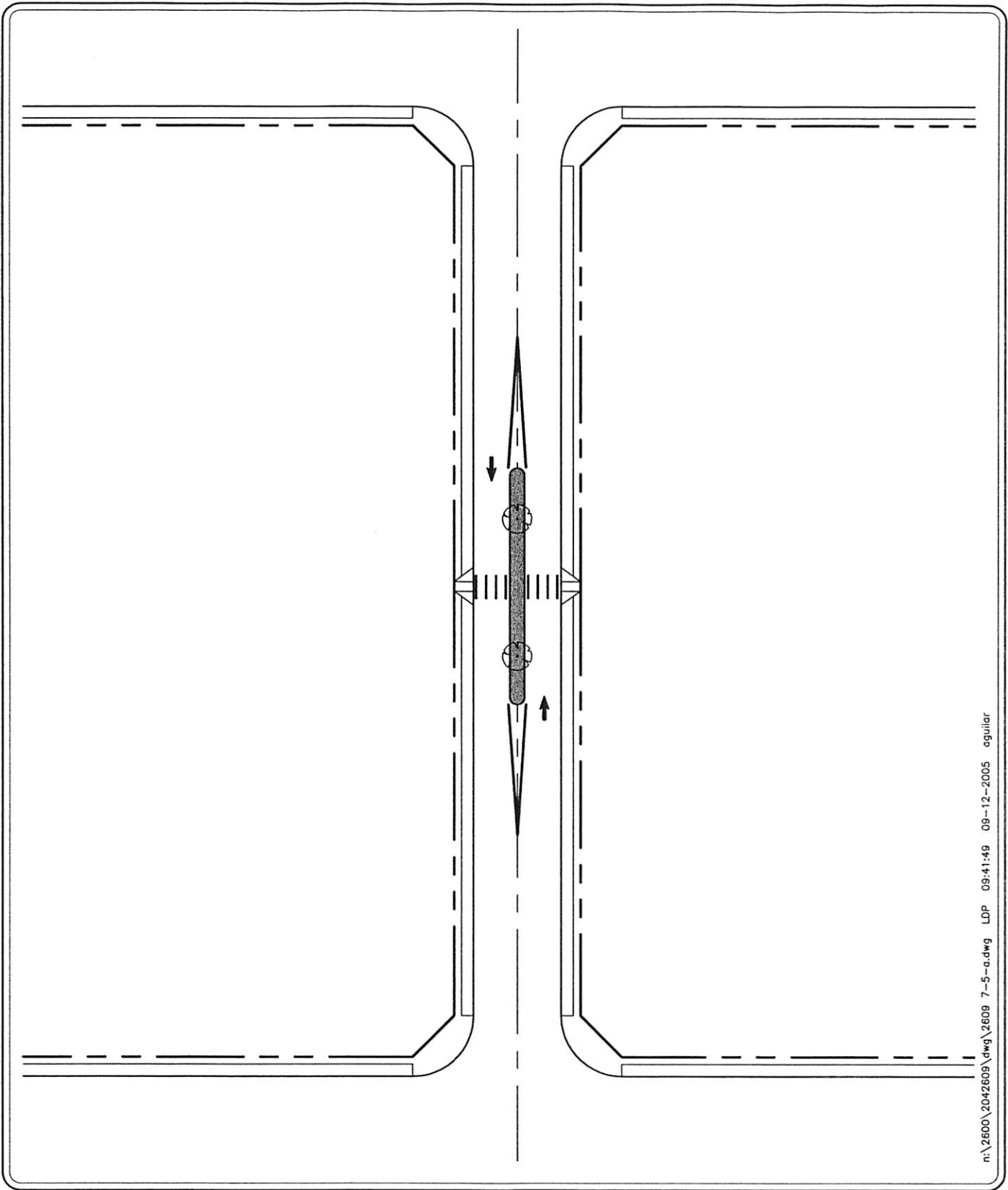
Consideration

- Design islands to accommodate pedestrians in wheelchairs. A cut-through design must include detectable warnings.
- Crossing islands at intersections or near driveways may affect left-turn access.

Estimate Cost

Costs range from \$5,000 to \$30,000 for crossing islands that are 100 feet in length or shorter. Landscaping may add to the costs.





n:\2600\2042609\dwg\2609 7-5-a.dwg LDP 09:41:49 09-12-2005 agular



FIGURE 7.5.A

CROSSING ISLANDS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.6 Curb Extensions / Bulb-Outs

Curb extensions (also known as bulb-outs or neckdowns) extend the sidewalk or curb line out into the parking lane, which reduces the effective street width. Curb extensions significantly improve pedestrian crossings by reducing the pedestrian crossing distance, visually and physically narrowing the roadway, improving the ability of pedestrians and motorists to see each other, and reducing the time that pedestrians are in the street.

Motorists are encouraged to travel more slowly at intersections or mid-block locations with curb extensions, as the restricted street width sends a visual cue to motorists.

Purpose

- Improve safety for pedestrians at intersections by shortening the crossing distance.
- Increase visibility and reduces the speed of turning vehicles.
- Encourage pedestrians to cross at designated locations.
- Prevent motor vehicles from parking at corners.

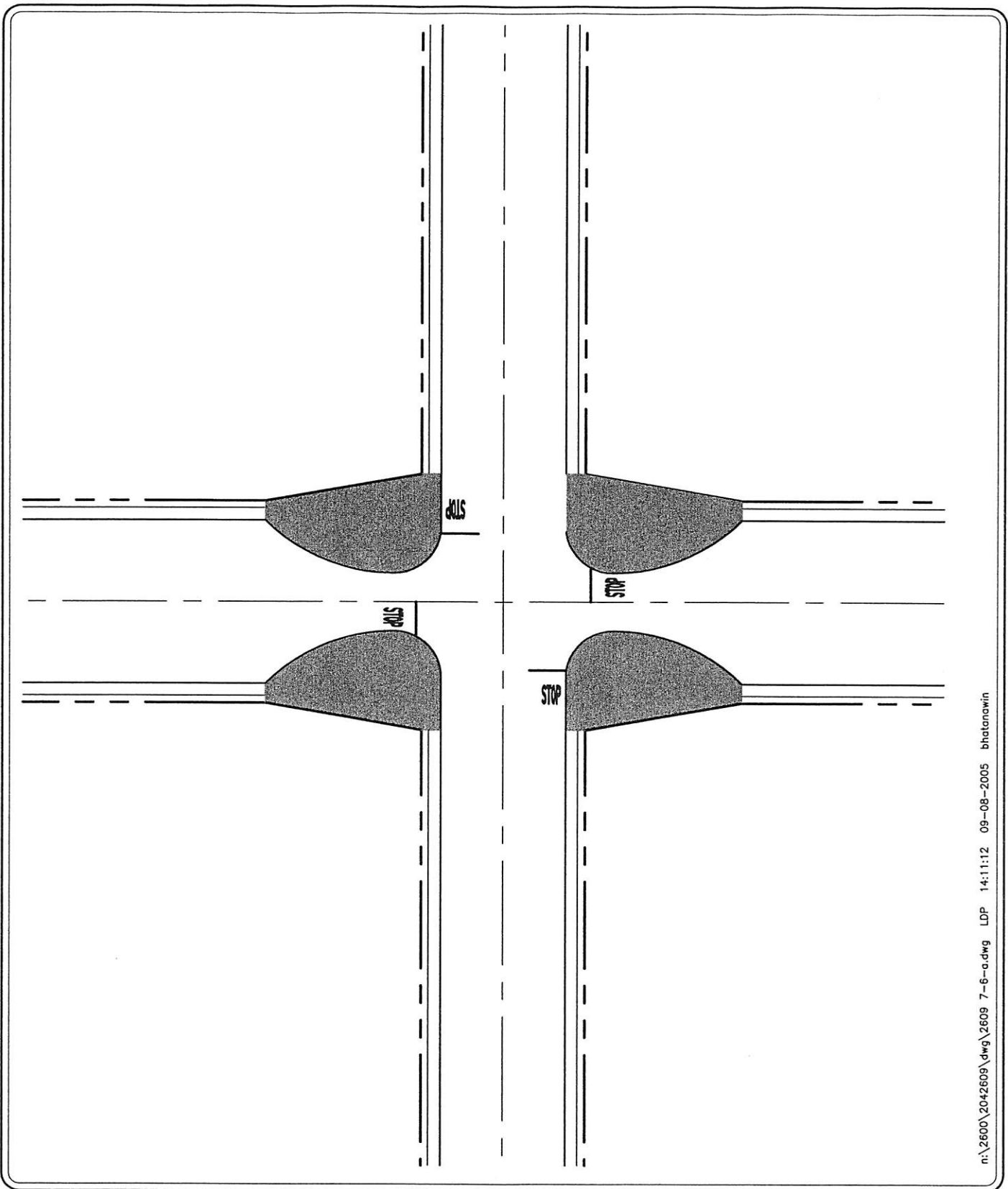
Consideration

- Curb extensions should only be used where there is a parking lane.
- Mid-block extensions provide an opportunity to enhance mid-block crossings..
- The turning needs of larger vehicles, such as school buses, need to be considered in curb extension design.
- Ensure that curb extension design facilitates adequate drainage.

Estimate Cost

Curb extensions cost from \$5,000 to \$25,000 per corner, depending on design and site conditions. Drainage is usually the most significant determinant of cost. If the curb extension area is large and special pavement and street furnishings and planting are included, costs would also be higher. Costs can go up significantly if something major, such as a utility pole or controller box, is moved.





n:\2600\2042609\dwg\2609 7-6-a.dwg LDP 14:11:12 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.6.A

CURB EXTENSIONS / BULB-OUTS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.7 Deflections / Diverters

Deflections refer to the physical means for preventing a lane movement. This often times involves a barrier to deflect the traffic into a specific movement. This barrier is placed at the intersection with the specific intent to channelize turning movements. The primary use is to shift and re-route vehicles in the cases of excessive "cut-through" traffic.

Purpose

To reduce traffic flow onto a local street by forcing traffic onto a collector street. Reduces traffic noise on local streets.

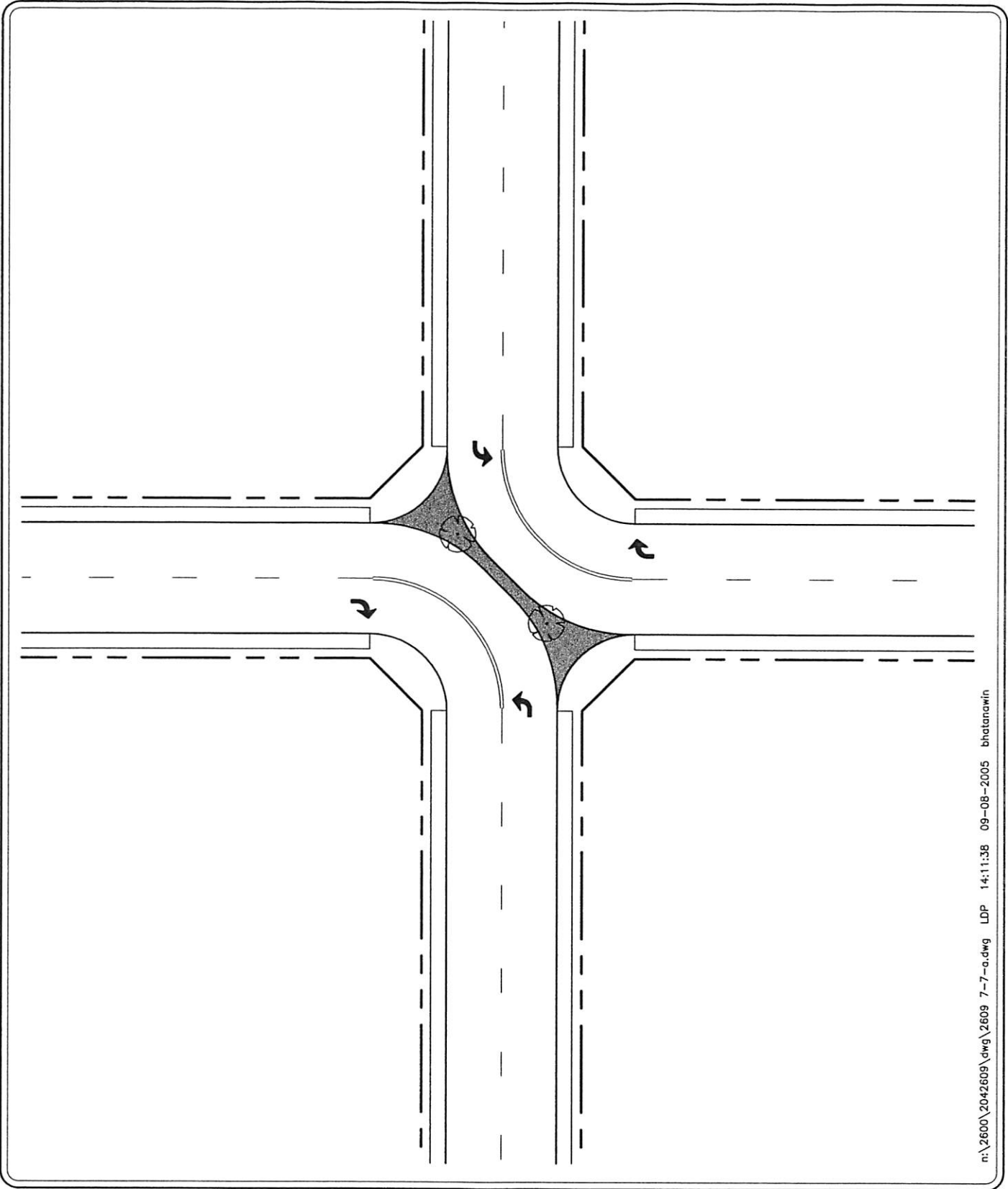
Consideration

This will increase traffic flow in the diverted direction, which needs to be accounted for. The barriers are very restrictive forms of traffic management and have significant impacts on area wide traffic patterns. Their placement should only be considered after a comprehensive traffic study and through active community participation and public hearings.

Estimate Cost

\$5,000 to \$35,000 depending on site conditions and landscaping. Drainage may represent a significant cost.





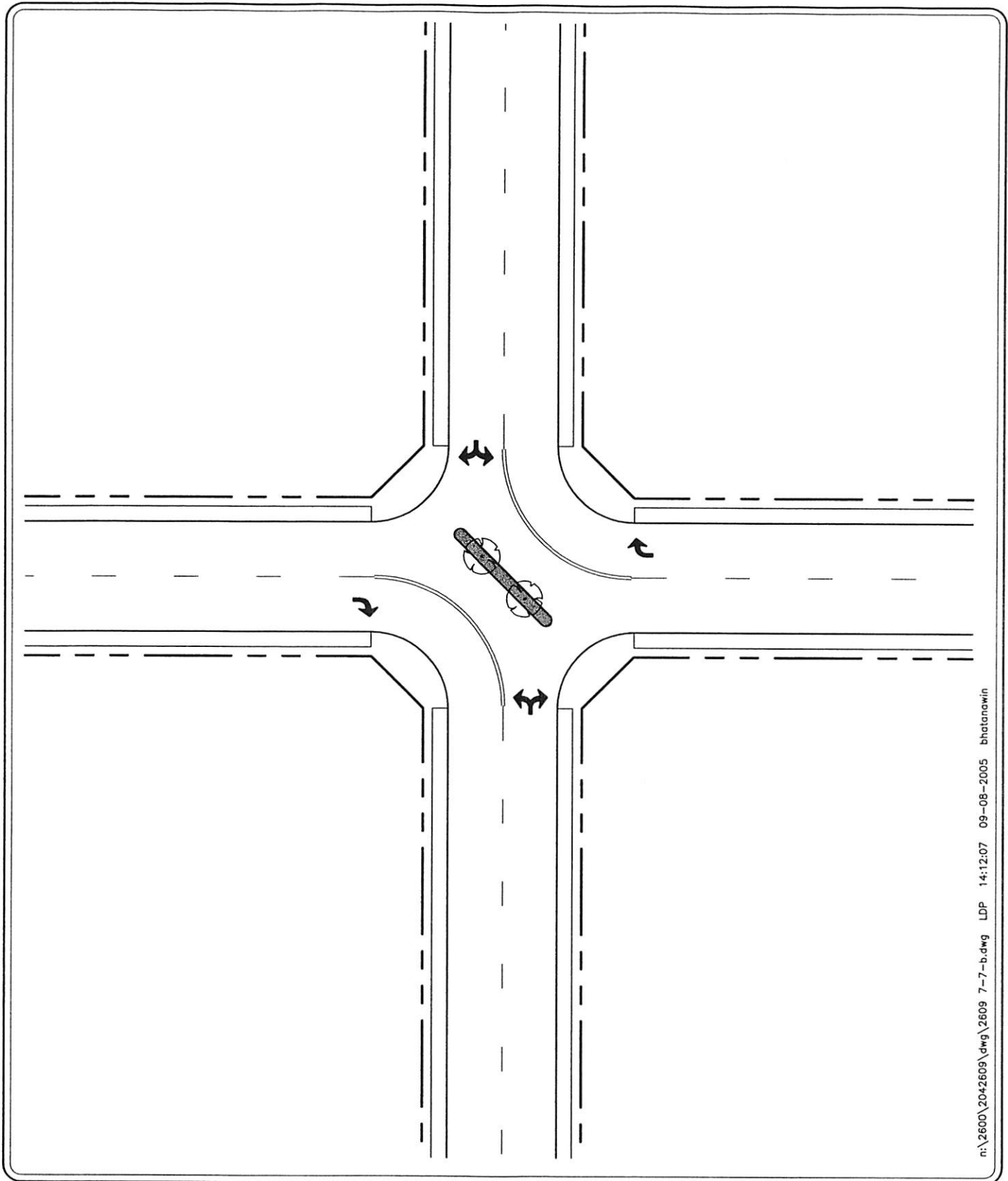
n:\2600\2042609\dwg\2609 7-7-a.dwg LDP 14:11:38 09-08-2005 bhatacwin



NO SCALE

FIGURE 7.7.A

DEFLECTIONS / DIVERTERS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



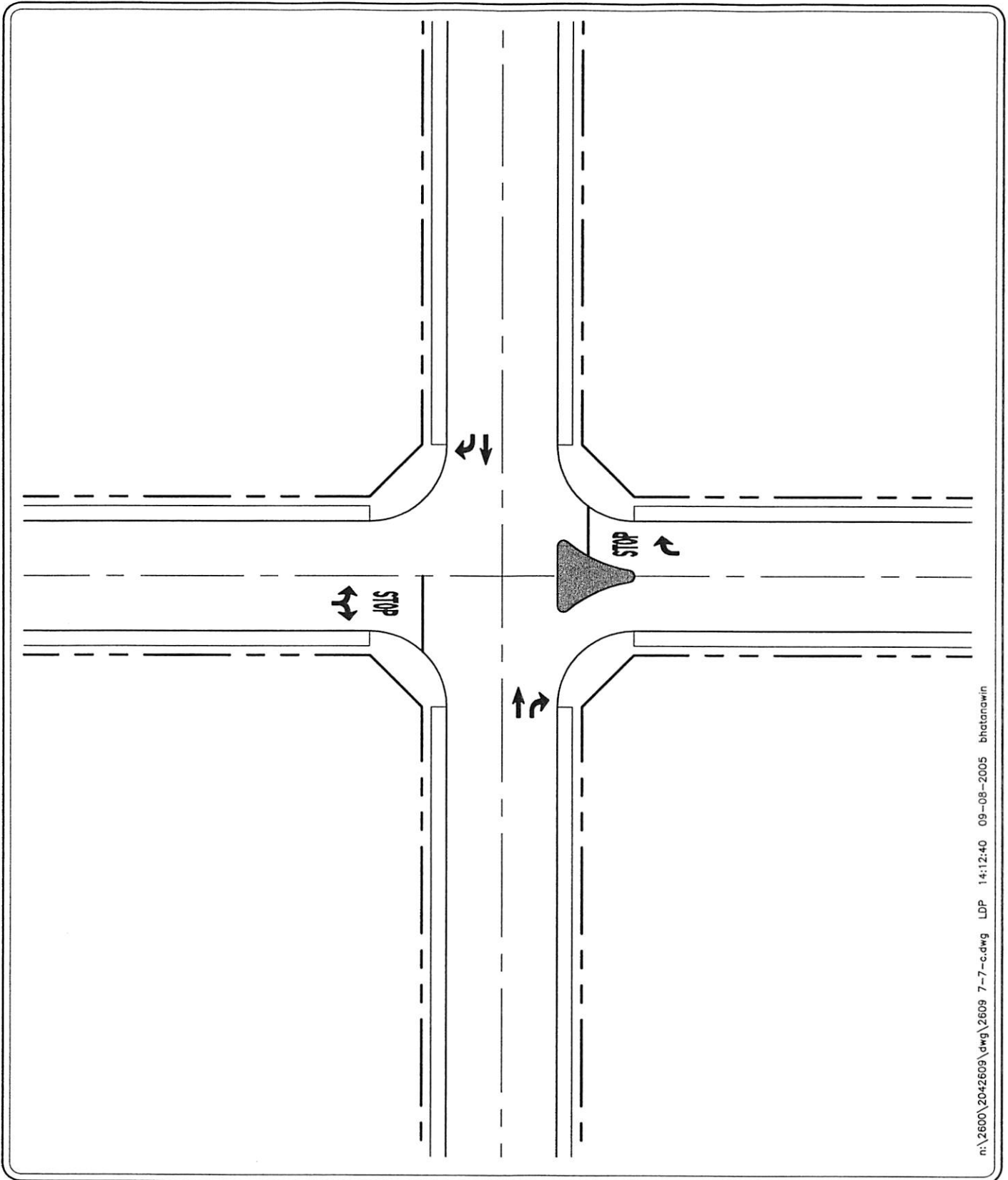
n:\2600\2042609\dwg\2609 7-7-b.dwg LDP 14:12:07 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.7.B

DEFLECTIONS / DIVERTERS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



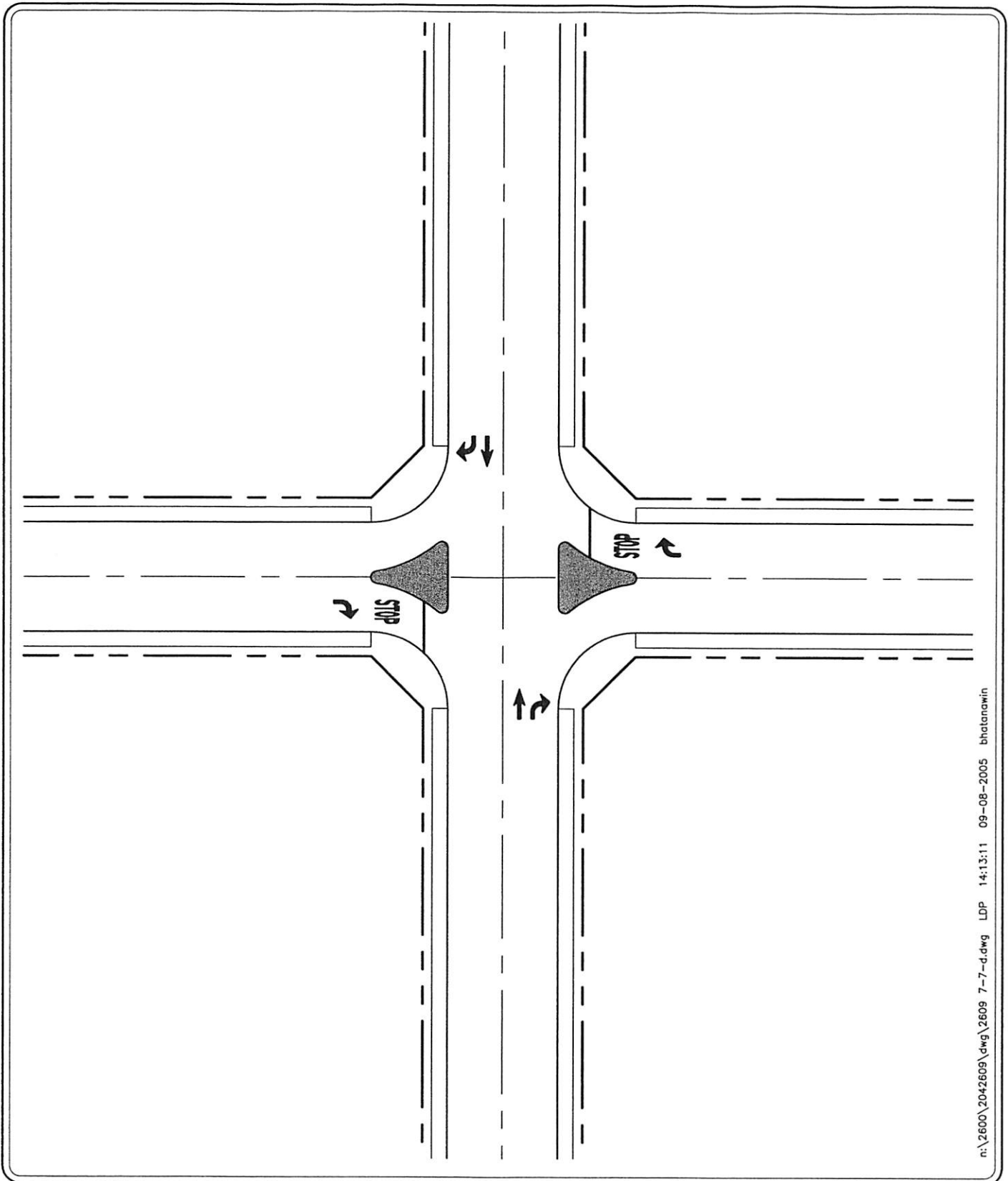
n:\2600\2042609\dwg\2609 7-7-c.dwg LDP 14:12:40 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.7.C

DEFLECTIONS / DIVERTERS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



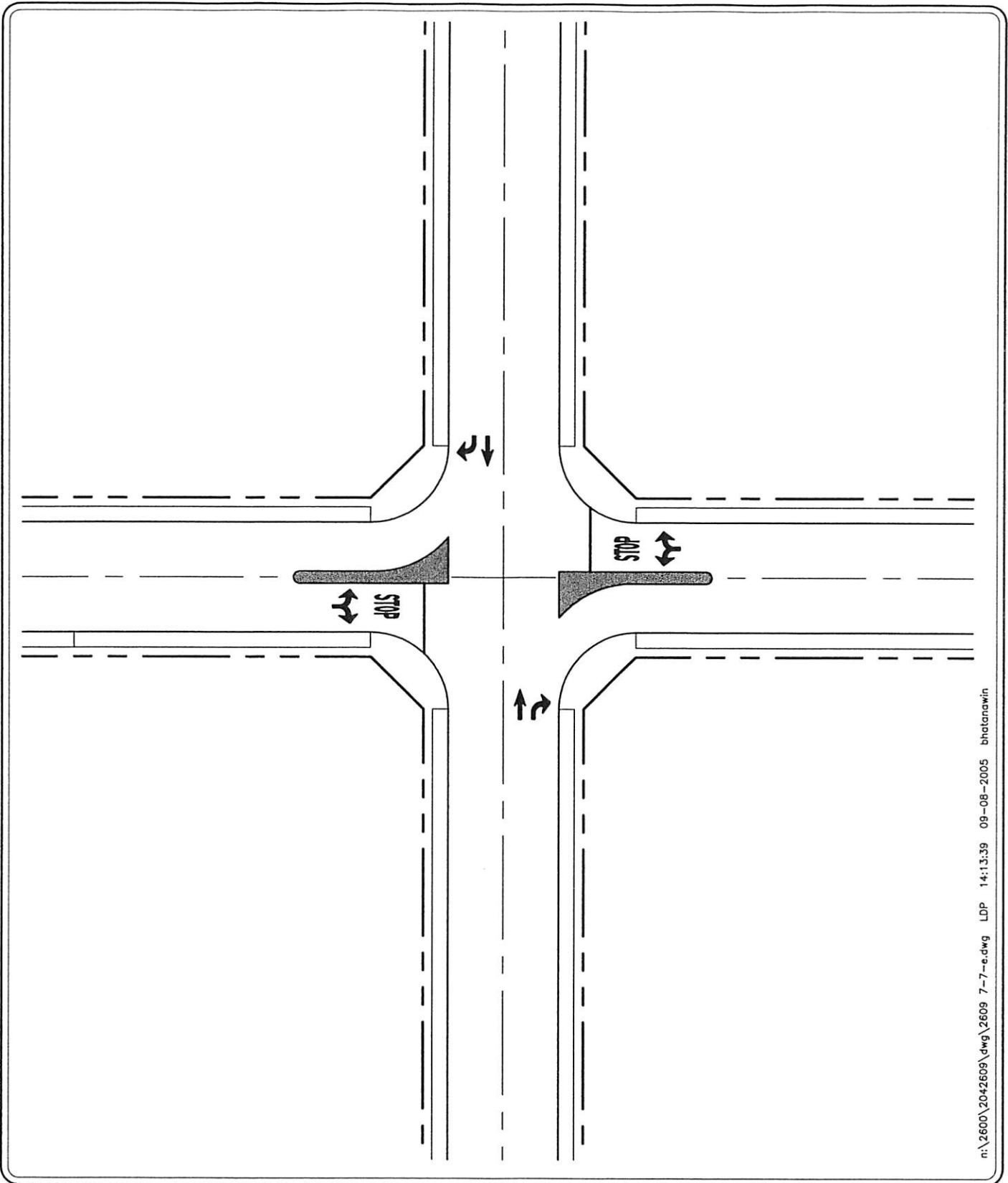
n:\2600\2042609\dwg\2609 7-7-d.dwg LDP 14:13:11 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.7.D

DEFLECTIONS / DIVERTERS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



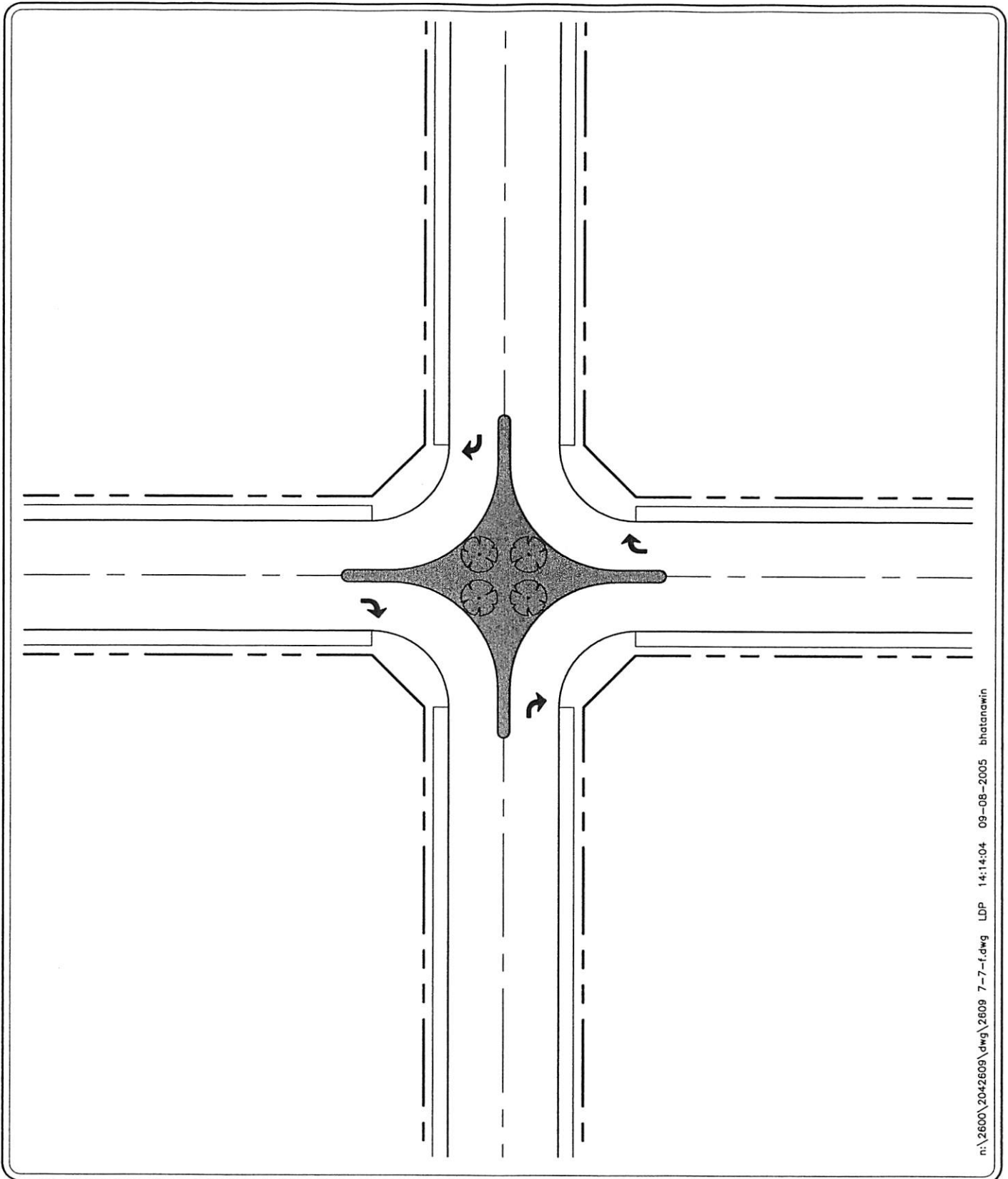
n:\2600\2042609\dwg\2609 7-7-e.dwg LDP 14:13:39 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.7.E

DEFLECTIONS / DIVERTERS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



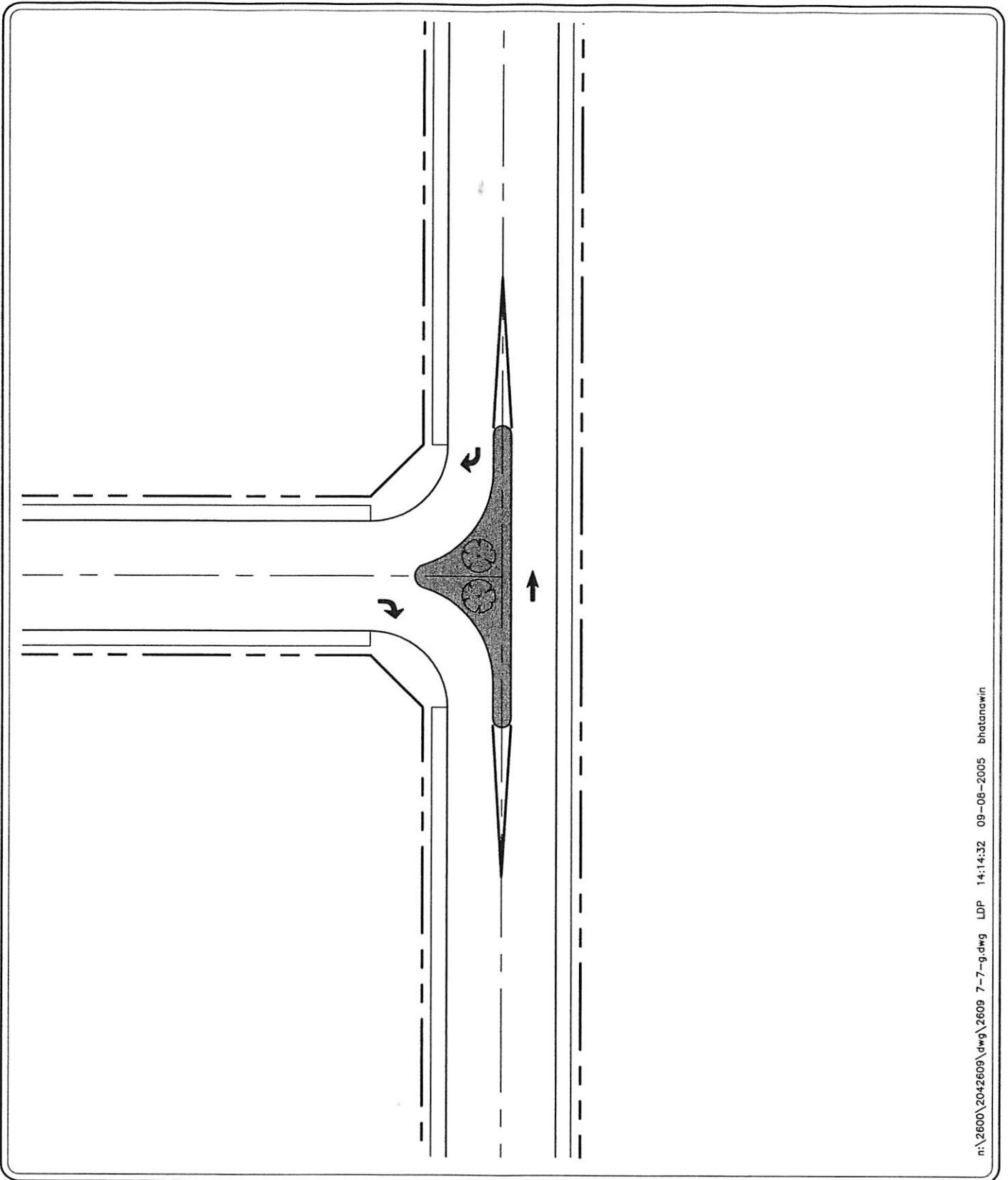
n:\2600\2042609\dwg\2609 7-7-f.dwg LDP 14:14:04 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.7.F

DEFLECTIONS / DIVERTERS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



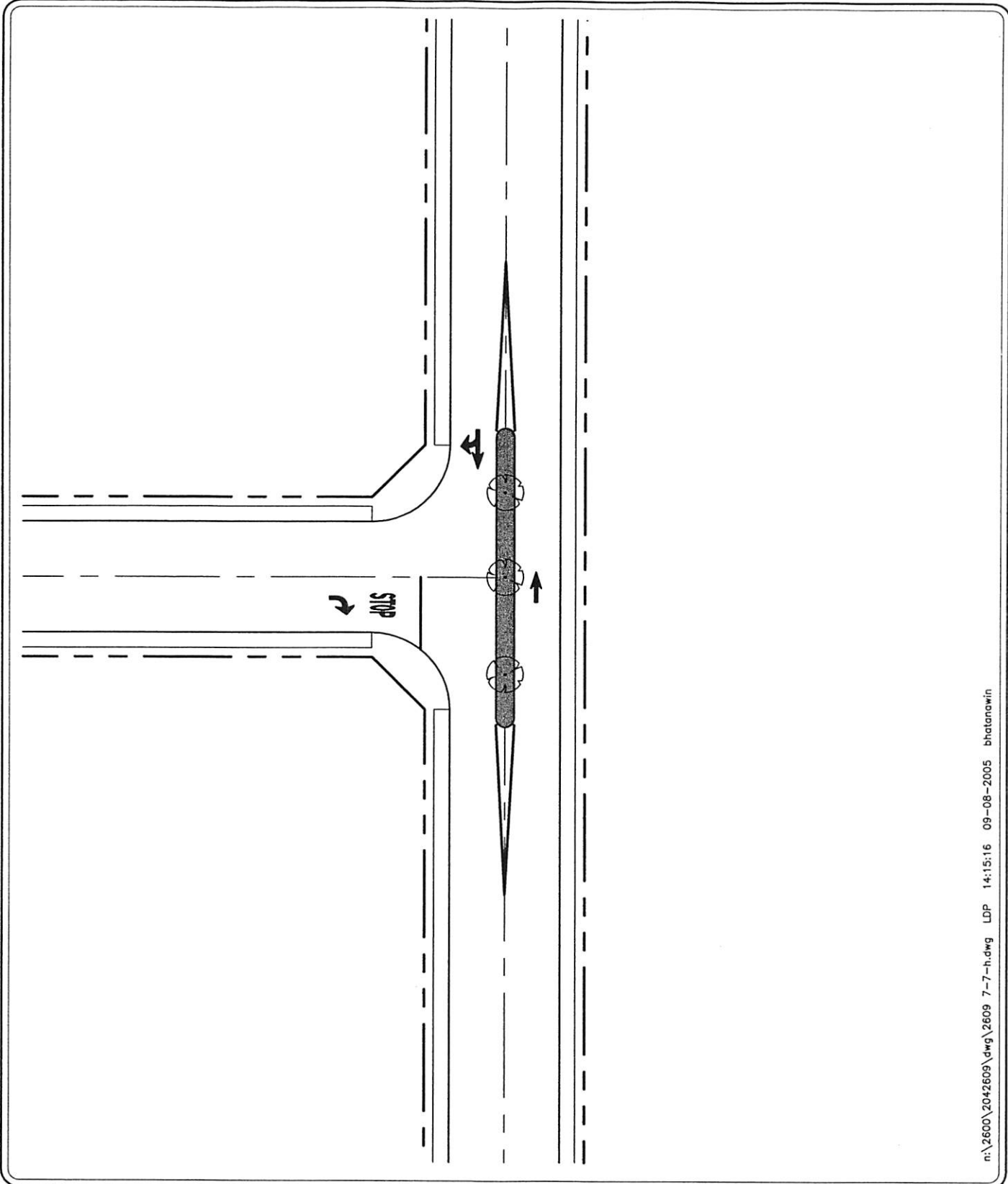
n:\2600\2042609\dwg\2609 7-7-g.dwg LDP 14:14:32 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.7.G

DEFLECTIONS / DIVERTERS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



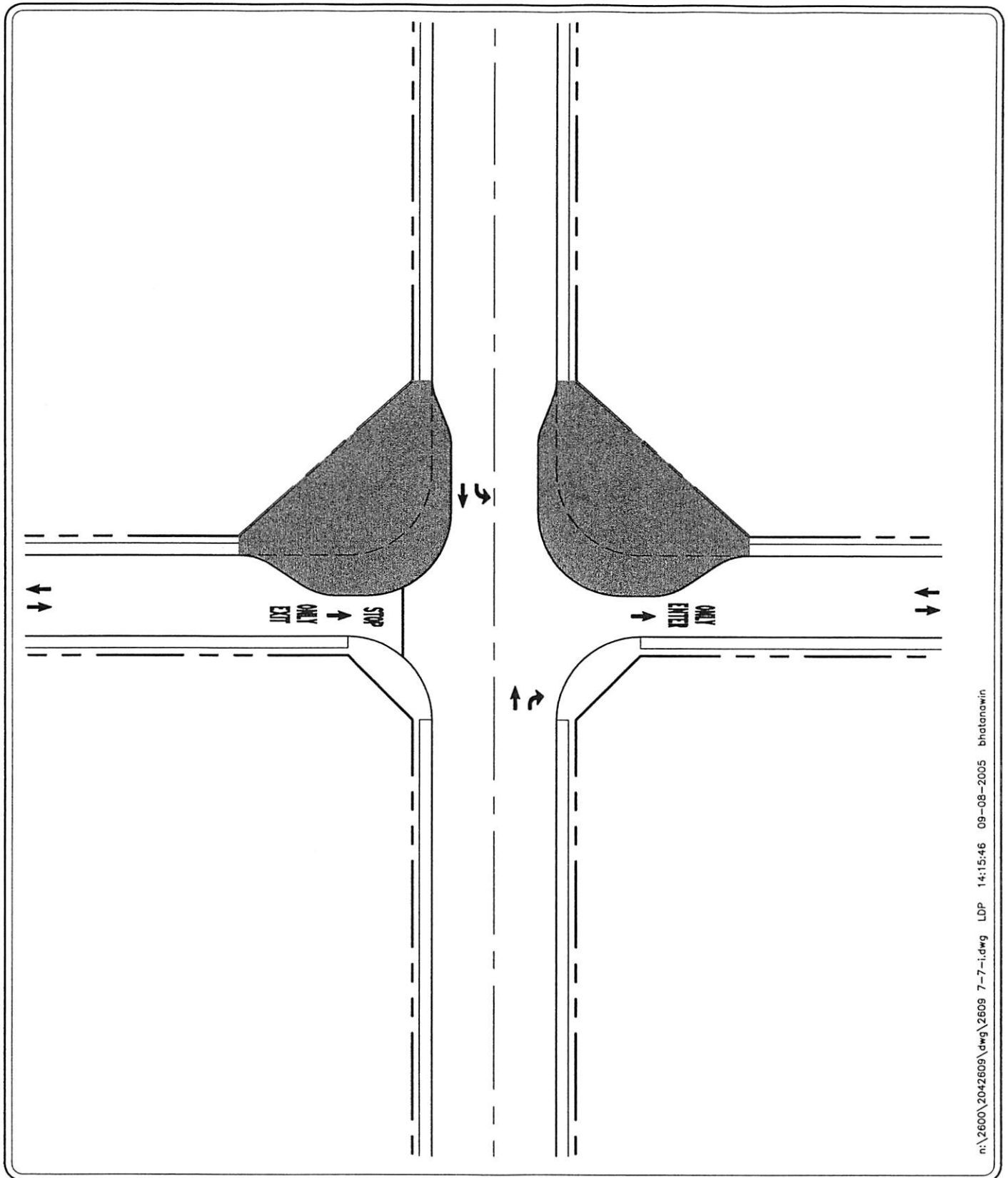
n:\2600\2042609\dwg\2609 7-7-h.dwg LDP 14:15:16 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.7.H

DEFLECTIONS / DIVERTERS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



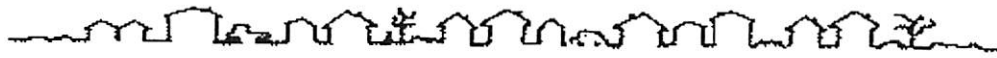
n:\2600\2042609\dwg\2609 7-7-1.dwg LDP 14:15:46 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.7.I

DEFLECTIONS / DIVERTERS
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.8 Gateways

A gateway is a physical or geometric landmark that indicates a change in environment from a higher speed arterial or collector road to a lower speed residential neighborhood. They often place a higher emphasis on aesthetics and are frequently used to identify neighborhood and commercial areas within a larger urban setting. Gateways may be a combination of street narrowing, medians, signing, archways, roundabouts, or other identifiable feature.

Gateways should send a clear message to motorists that they have reached a specific place and must reduce speeds. This can help achieve the goal of meeting expectations and preparing motorists for a different driving environment. Gateways are only an introduction and slower speeds are not likely to be maintained unless the entire area has been redesigned or other traffic-calming features are used.

Purpose

- Create an expectation for motorists to drive more slowly and watch for pedestrians when entering a commercial, business, or residential district from a higher speed roadway.
- Create a unique image for an area.

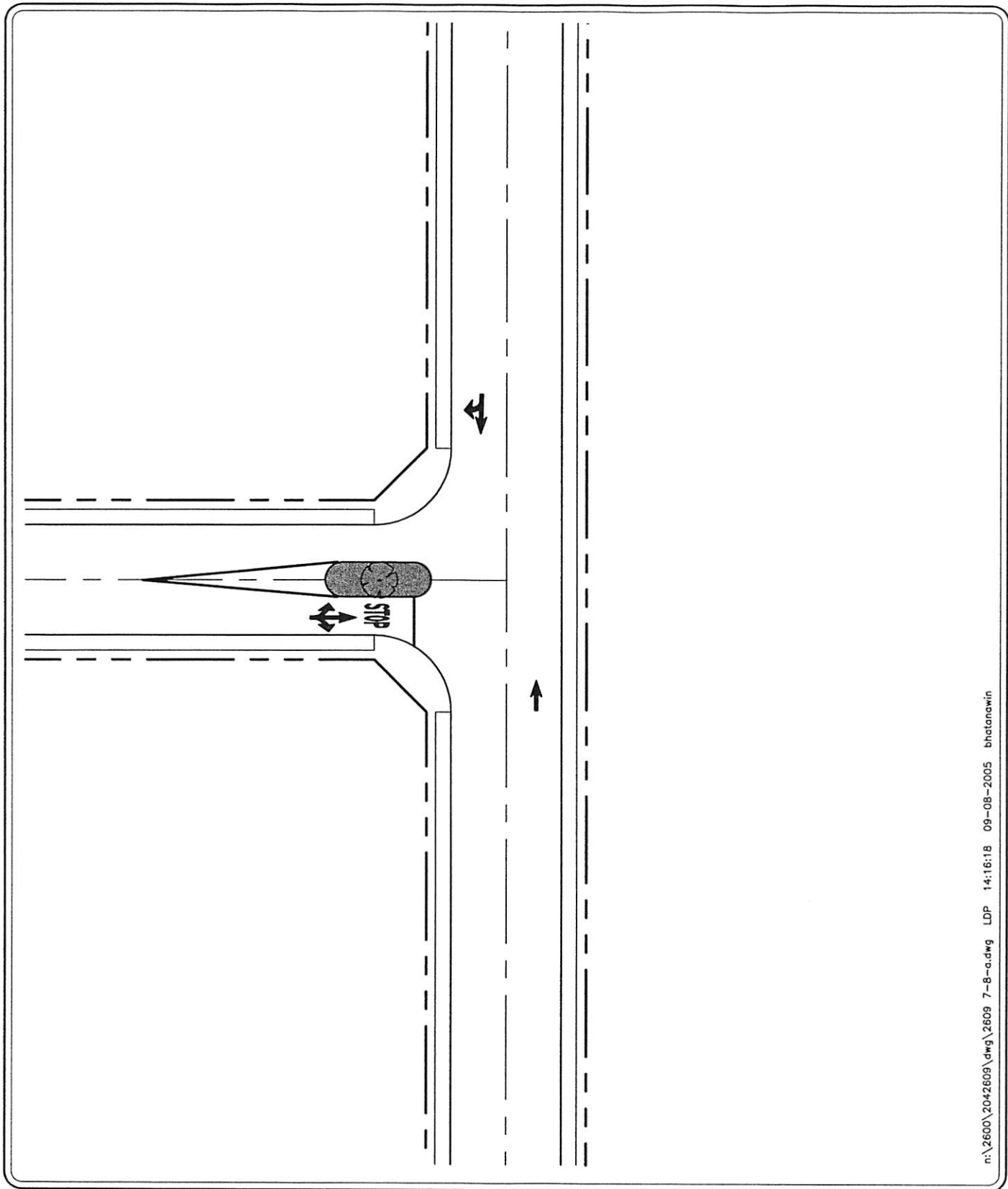
Consideration

- Traffic-slowing effects will depend upon the device chosen and the overall traffic-calming plan for the area.
- May reduce on-street parking.

Estimate Cost

Varies widely depending on the measures chosen.





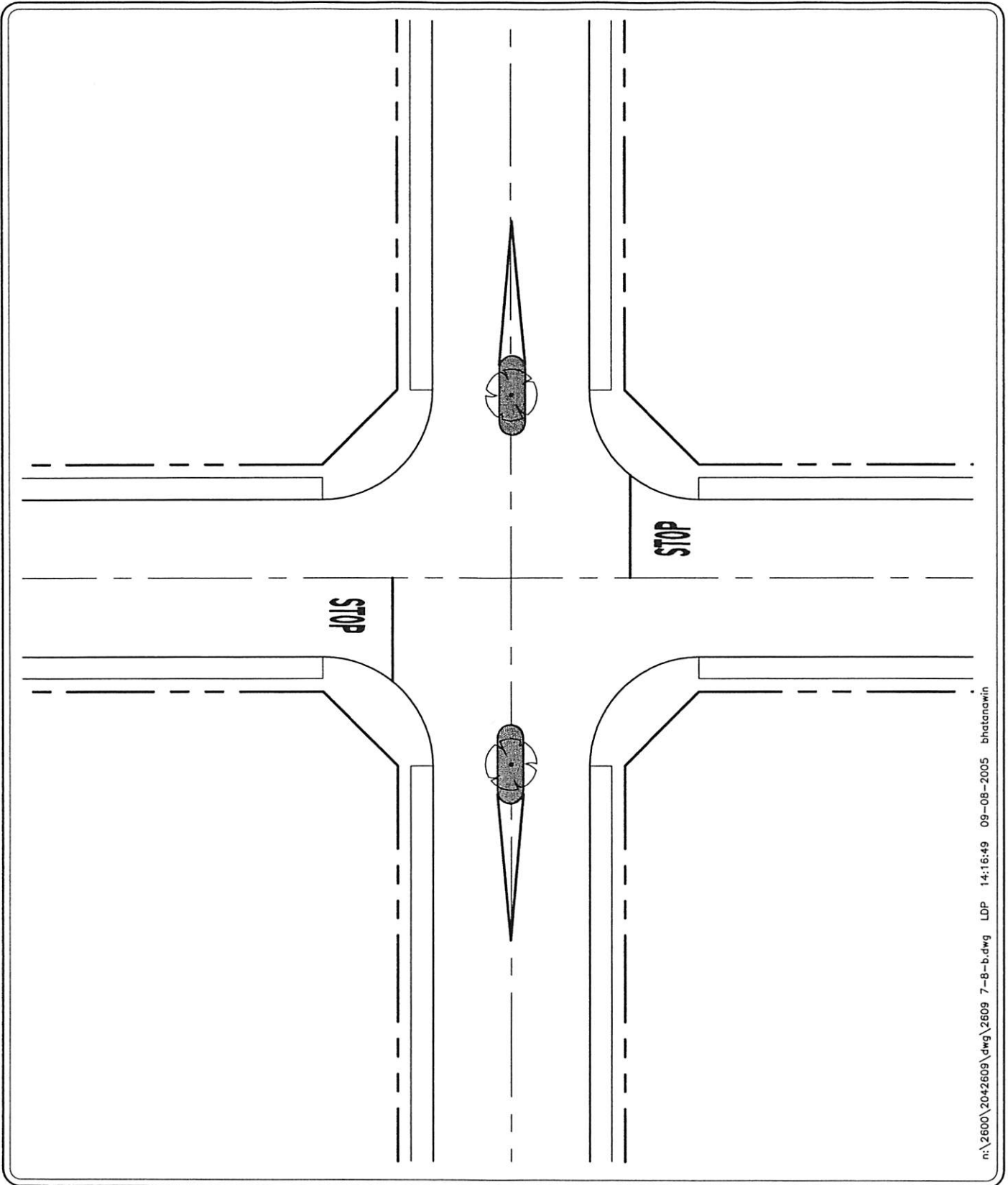
n:\2600\2042609\dwg\2609 7-8-a.dwg LDP 14:16:18 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.8.A

GATEWAY
NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



n:\2600\2042609\dwg\2609 7-8-b.dwg LDP 14:16:49 09-08-2005 bhatanawin

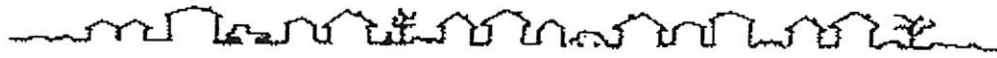


NO SCALE

FIGURE 7.8.B

GATEWAY

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.9 *Increased Police Enforcement*

Increased Police Enforcement involves the effective use of public safety / police personnel to encourage reduced speeds in residential areas. The enforcement procedure usually involves the use of radar to identify speeders and subsequent ticketing of speed violators. Studies have shown that enforcement operations result in appreciable speed reductions. However, speeds are usually reduced only as long as the enforcement is maintained. The number of accidents is generally reduced and overall safety is improved while speeds are reduced. May have significant impact if sustained enforcement is presented.

Purpose

Reduce speeds and improve traffic safety.

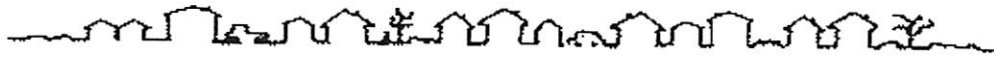
Consideration

Impacts of enforcement can have a longer lasting effect when enforcement is repetitive on a non-routine basis. Budget and manpower play a large role in the ability to even consider increased enforcement.

Estimate Cost

Varies depending on the manpower.





7.10 *Mini-Roundabouts*

Mini-roundabouts are raised circular islands constructed in the center of a residential street intersection (generally not intended for use where one or both streets are arterial streets). They reduce vehicle speeds by forcing motorists to maneuver around them. Motorists entering the mini-roundabout are directed to the right, such that all motorists inside the mini-roundabout travel in a counter-clockwise manner.

Mini-roundabouts are commonly landscaped (bushes, flowers, or grass). In locations where landscaping is not feasible, traffic circles can be enhanced through specific pavement materials.

Mini-roundabouts can improve the beautification aesthetics and acts as a traffic-calming device. They can take the place of a two-way or four-way stop sign.

Purpose

- Reduce vehicle speeds at the intersection.
- Manage traffic at intersections where volumes do not warrant a stop sign.
- Reduce crash problems at the intersection of two local streets.

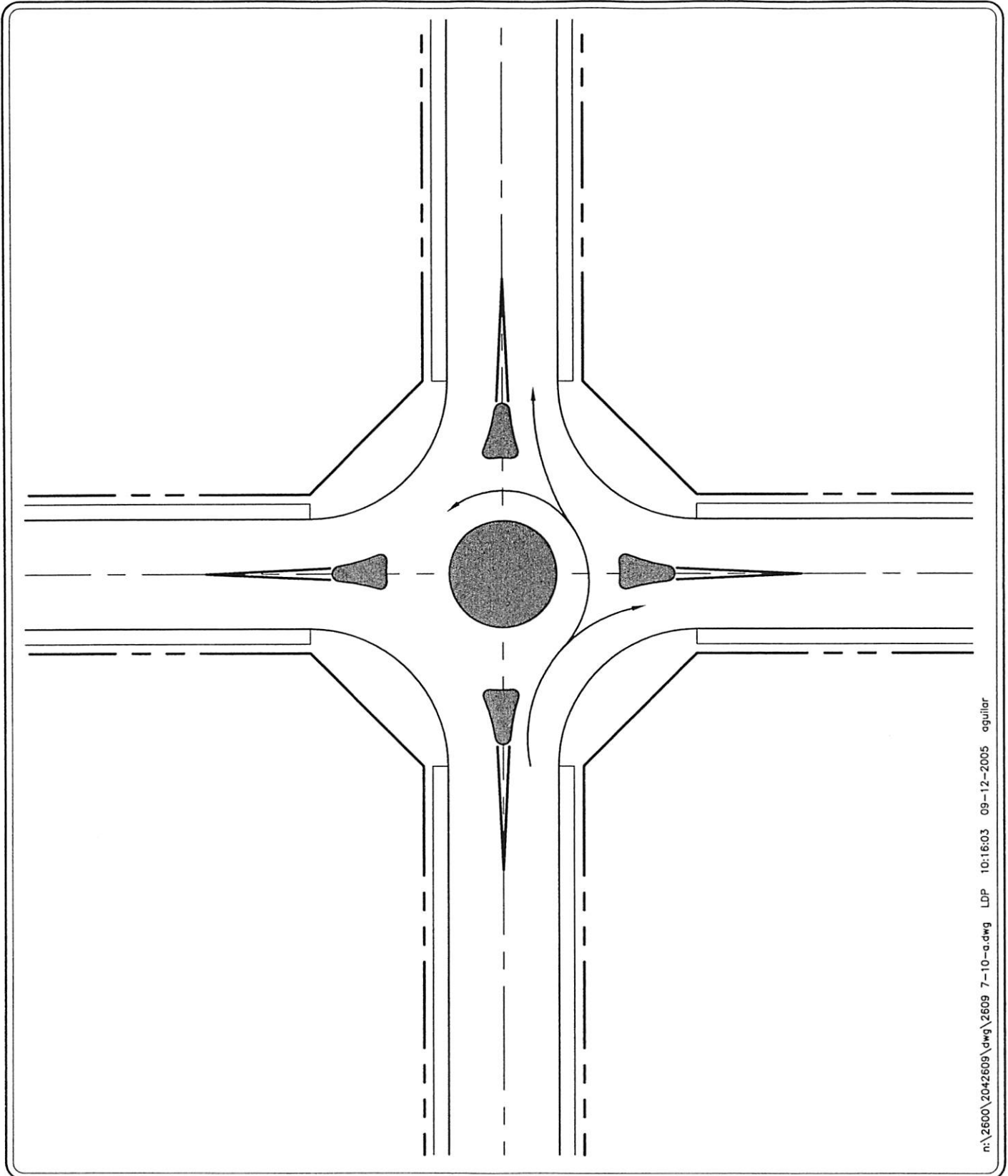
Consideration

- Mini-roundabout landscaping should not impede the sight distance.
- Treat a series of intersections along a local street as part of a neighborhood traffic improvement program.
- On-street parking may be reduced.

Estimate Cost

The cost is approximately \$8,000 to \$30,000. Landscaping and/or drainage may add to this cost estimate.





n:\2600\2042609\dwg\2609 7-10-a.dwg LDP 10:16:03 09-12-2005 oguljar



NO SCALE

FIGURE 7.10.A

MINI-ROUNDAABOUT

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.11 *Pavement Markings* - Edgelines

Pavement markings are a low cost use of painted lane markings, which attempt to change the pattern of driver behavior. This concept utilizes the painted lane line to develop a parking reservoir and/or bike lane, which creates the impression of a narrowed travelway, even if parked vehicles are not present.

Purpose

To create the impression of a narrow travel lane, causing the driver to reduce their speed. Studies have shown that painted edgelines reduce speeds by 1 mph to 3 mph.

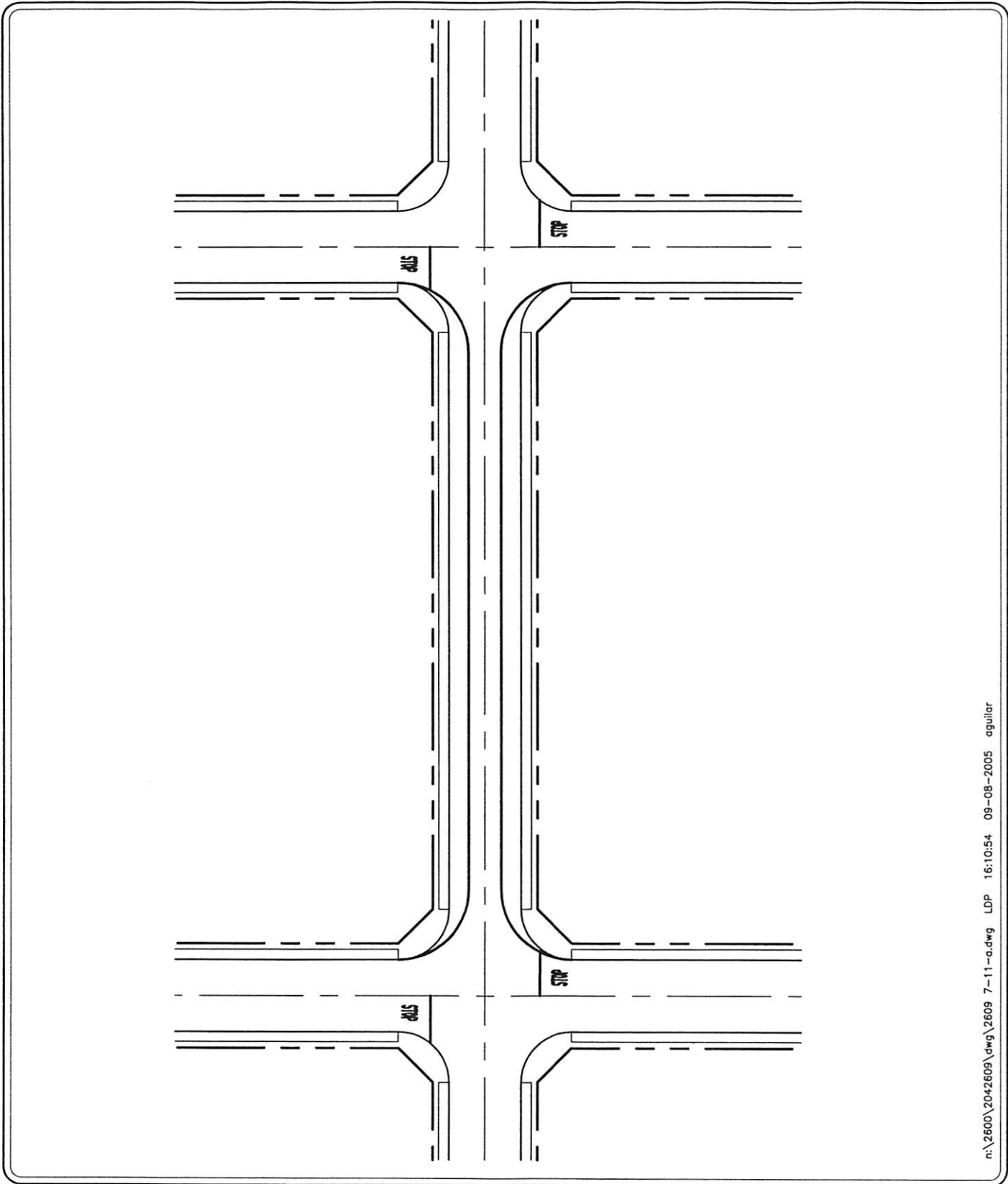
Consideration

- Edgelines delineate on-street parking areas, which may improve safety conditions.
- Use of edgelines may denote an arterial street.

Estimate Cost

The cost is approximately \$2 to \$3 per linear foot.





n:\2600\2042609\dwg\2609 7-11-a.dwg LDP 16:10:54 09-08-2005 agular



NO SCALE

FIGURE 7.11.A

PAVEMENT MARKINGS – EDGELINES
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.12 *Paving Materials*

Paving materials are important to the function and look of a street. Occasionally, paving materials in and of themselves act as a traffic-calming device (e.g., when the street is paved in brick or cobblestone). However, some of these materials may be noisy and unfriendly to bicyclists, pedestrians, or wheelchairs.

Concrete is the preferred walking surface. A different look can be achieved by using stamped concrete or concrete pavers, which are available in a variety of colors and shapes; however, jointed surfaces may induce vibration, which can be painful to some pedestrians.

Colored paving can often enhance the function of portions of the roadway, such as a colored bicycle lane. This can create the perception of street narrowing, in addition to enhancing the travel facility for bicyclists.

Purpose

- Send a visual cue about the function of a street.
- Create an aesthetic enhancement of a street.
- Delineate separate space for pedestrians or bicyclists.

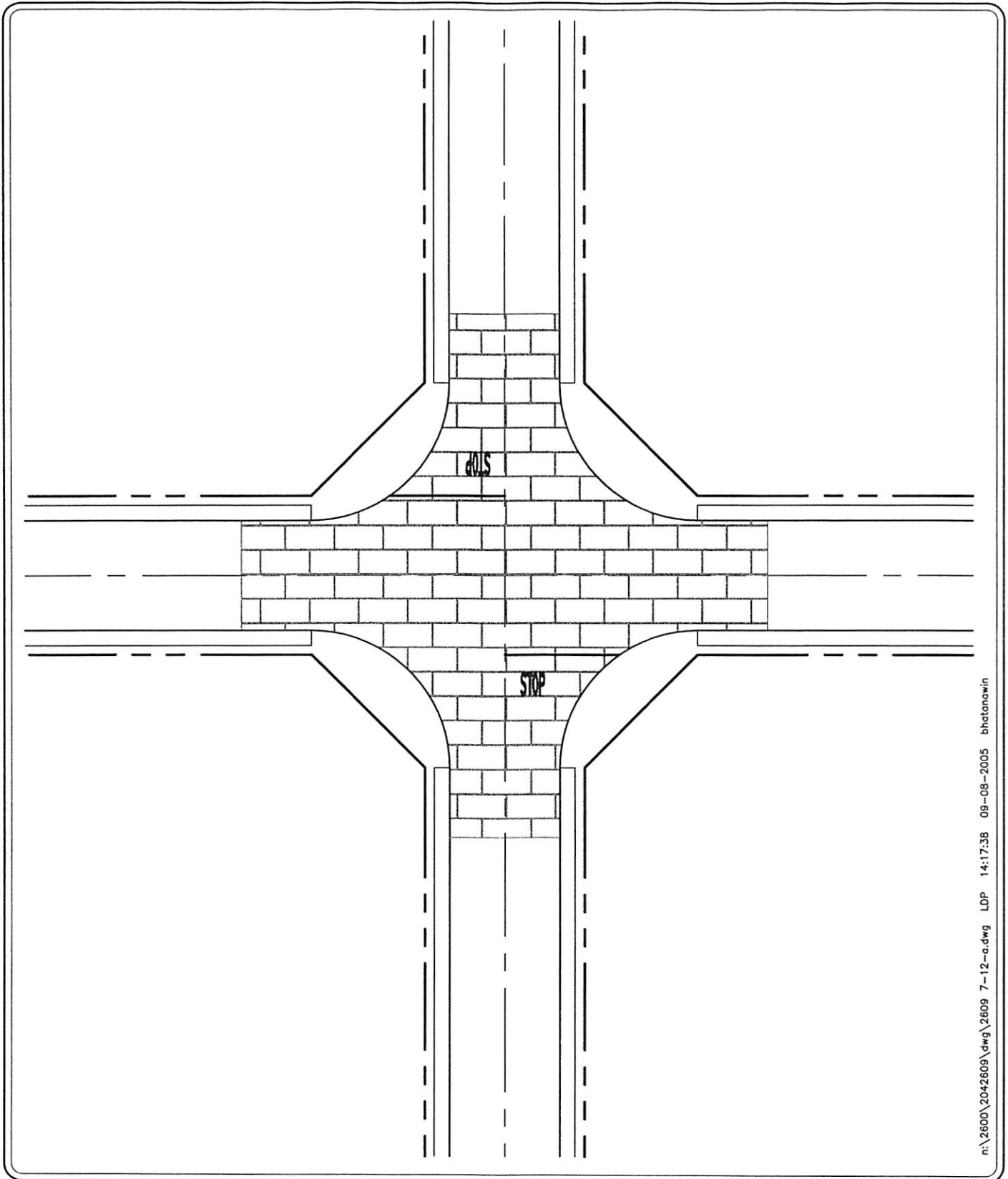
Consideration

- The pedestrian walkway material should be firm, planar, and slip-resistant.
- Uneven surfaces, such as cobblestones and brick, should not be used in the primary pedestrian or bicycle travel paths.
- Design and maintenance must ensure crosswalk visibility over time.
- Using materials such as bricks and cobblestones may increase the cost of construction and maintenance.

Estimate Cost

Variable; materials requiring hand labor (cobblestones or pavers) have a higher cost.





n:\2600\2042609\dwg\2609 7-12-a.dwg LDP 14:17:38 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.12.A

PAVING MATERIAL

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.13 *Raised Crosswalks*

Raised crosswalks are Speed Tables outfitted with crosswalk markings and signage to channelize pedestrian crossings, providing pedestrians with a level street crossing. Also, by raising the level of the crossing, pedestrians are more visible to approaching motorists.

Raised crosswalks are good for locations where pedestrian crossings occur at haphazard locations and vehicle speeds are excessive.

Purpose

- May reduce vehicle speeds.
- Enhance the pedestrian environment at the crossings.

Consideration

- Raised Crosswalks improve safety for both pedestrians and vehicles.
- They may be effective in reducing speeds.
- Textured materials, if used, can be expensive.
- Their impacts on drainage needs to be considered.
- They may increase noise and air pollution.

Estimate Cost

The cost for each raised crosswalk is approximately \$4,000.





7.14 *Raised Intersections*

A raised intersection is essentially a speed hump for the entire intersection. Construction involves providing ramps on each vehicle approach, which elevates the entire intersection to the level of the sidewalk. They can be built with a variety of materials, including asphalt, concrete, stamped concrete, or pavers. The crosswalks on each approach are also elevated as part of the treatment to enable pedestrians to cross the road at the same level as the sidewalk, eliminating the need for curb ramps. Use detectable warnings to mark the boundary between the sidewalk and the street.

Purpose

- Reduce vehicle speeds.
- Enhance the pedestrian environment at the crossings.

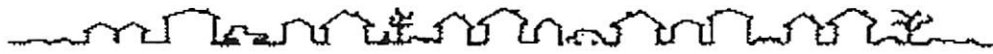
Consideration

- Don't use if on a sharp curve or if the street is on a steep grade.
- Speed humps and raised crosswalks and intersections can be an urban design element through the use of special paving materials.
- Detectable warning strips at edges enable pedestrians with vision impairments to detect the crossing.
- Care must be taken to manage drainage.

Estimate Cost

Raised crosswalks are approximately \$6,000 to \$25,000, depending on drainage conditions and material used.





7.15 Rumble Strips

A rumble strip is a patterned section of street created with treated pavement, raised pavement markers or ground grooves in the pavement surface. Normal application is to call attention to other traffic control devices such as "curve" or speed limit signs.

Purpose

- To be used as a warning device.

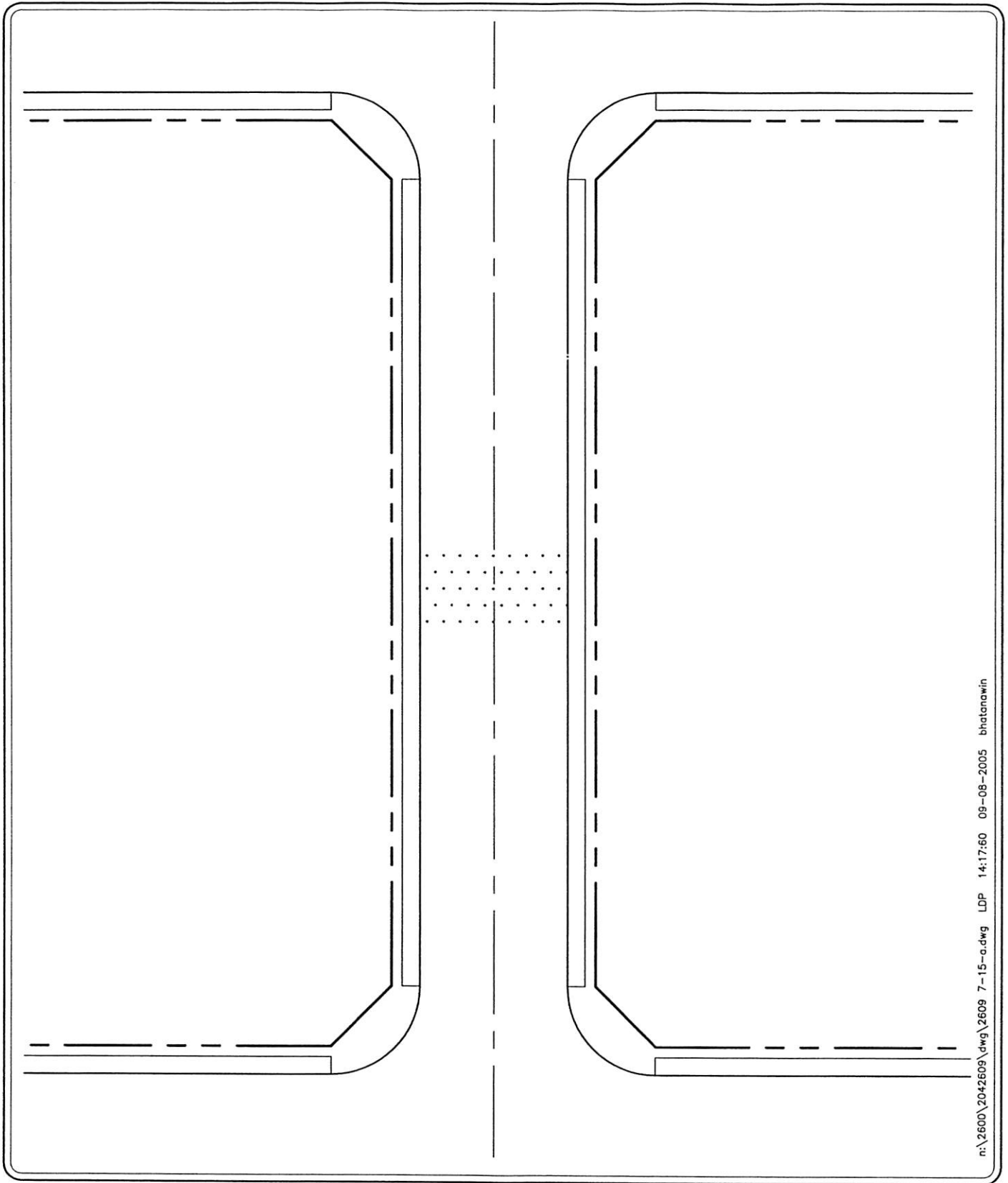
Consideration

Does not typically decrease speed or traffic volume. It causes extreme noise in residential environments. Rumble strips are not normally used as a stand-alone device.

Estimate Cost

Approximately \$500 per installation.





n:\2600\2042609\dwg\2609 7-15-a.dwg LDP 14:17:60 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.15.A

RUMBLE STRIP

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.16 Speed Humps

Speed humps, similar to raised crosswalks and raised intersections are paved (usually asphalt) and approximately 3 to 4 inches high at their center, and extend the full width of the street with height tapering near the drain gutter to allow unimpeded bicycle travel. Speed humps should not be confused with the speed “bump” that is often found in parking lots. There are several designs for speed humps. The traditional 12-foot hump has a design speed of 15 to 22 mph.

Purpose

- Reduce vehicle speeds. Raised measures tend to have the most predictable speed reduction impacts.
- Enhance the pedestrian environment at pedestrian crossings.

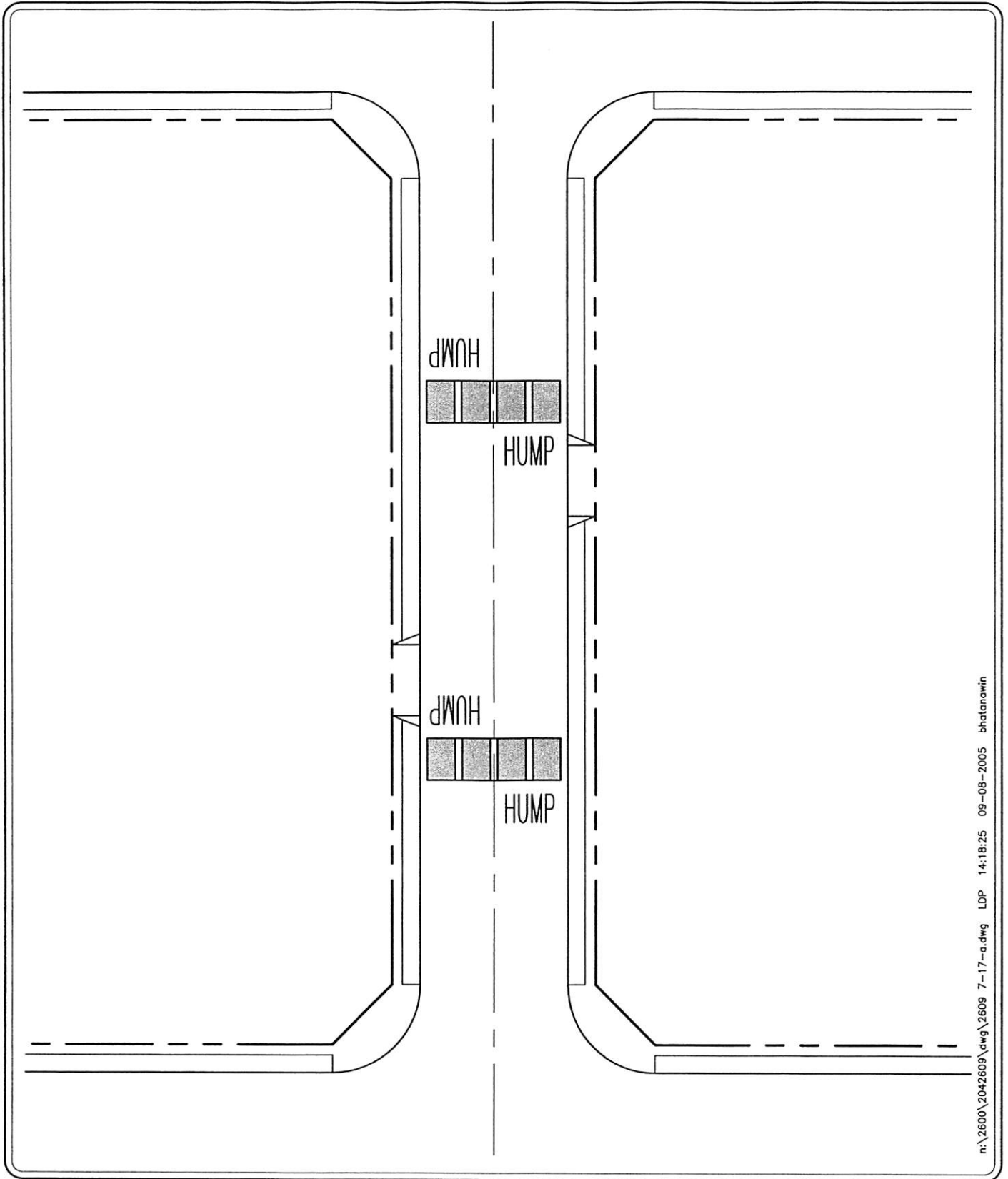
Consideration

- Do not use if on a sharp curve or on vertical grades greater than 6.0%.
- If the street is a bus route or primary emergency route, the design must be coordinated with operators. Usually, some devices are acceptable if used prudently — one device may be appropriate and may serve the primary need (e.g., if there is a particular location along a street that is most in need of slowing traffic and improving pedestrian conditions).
- Noise may increase.
- May create drainage problems on some streets.

Estimate Cost

The cost for each speed hump is approximately \$4,000.





n:\2600\2042609\dwg\2609 7-17-a.dwg LDP 14:18:25 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.17.A

SPEED HUMPS

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.17 *Speed Watch*

Speed Watch Programs use people in the community who are trained with the use of a radar gun. In this program, often times it takes two people, one person manning the radar gun and the other person taking note of the speeder observed. Speeders are sent letters by the Traffic or Police Department pointing out the inconsistent speeds relative to standards adopted by their friends and neighbors. In many cases, the speeders turn out to be local residents. When neighborhood residents run the unit, they learn first hand about the problem or lack thereof. This technique could be a part of a low cost initial phase attempt to slow speeders. This has been found to drastically reduce speeds in small neighborhoods.

Purpose

Reduce speeds and create a neighborhood atmosphere.

Consideration

Since people that live in the community are working the machines, they get a first hand look at who is a multiple offender. This can lead to conflict between citizens and even vigilantism.

Estimate Cost

The cost for a radar speed gun is approximately \$500 to \$1,000.





7.18 *Street Closure*

Street Closure is accomplished by closing a street at either end or at the mid-block, which causes a cul-de-sac to be formed. This causes traffic on the street to be from local use only. The closures can have a great affect on the community since the closure can be surrounded by plant life to help the aesthetic beauty of the neighborhood. The impact of traffic volume can be drastic, reducing traffic flow to that which is generated by the land use on the abutting properties.

Purpose

To reduce traffic volumes and potentially traffic speeds. This also improves the aesthetical look of the street.

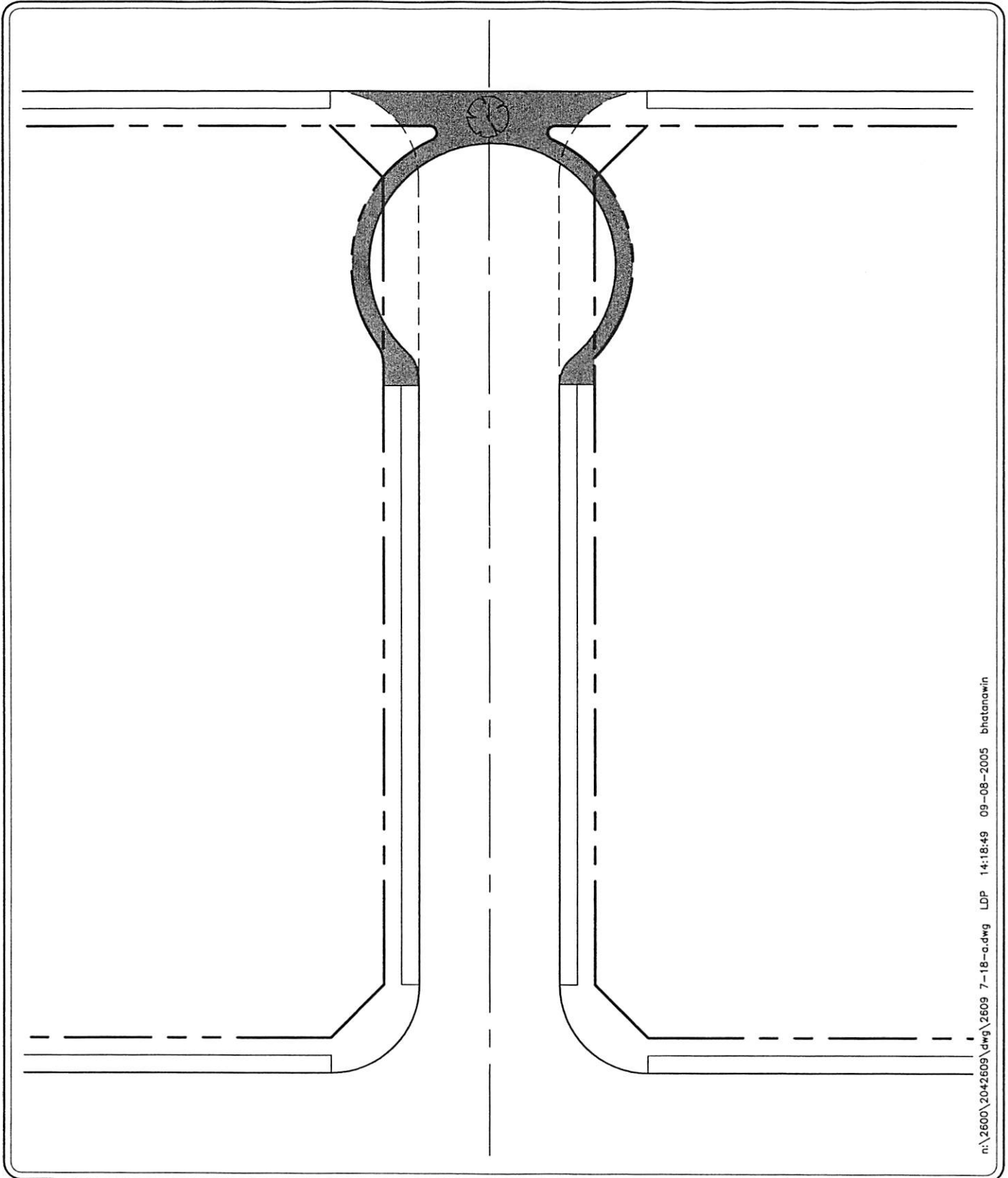
Consideration

A "dead-end" sign should be placed at the entrance to the street, in order to keep unknowing drivers out.

Estimate Cost

Will vary depending on the project, but most often in excess of \$30,000.





n:\2600\2042609\dwg\2609 7-18-a.dwg LDP 14:18:49 09-08-2005 bhatanwin

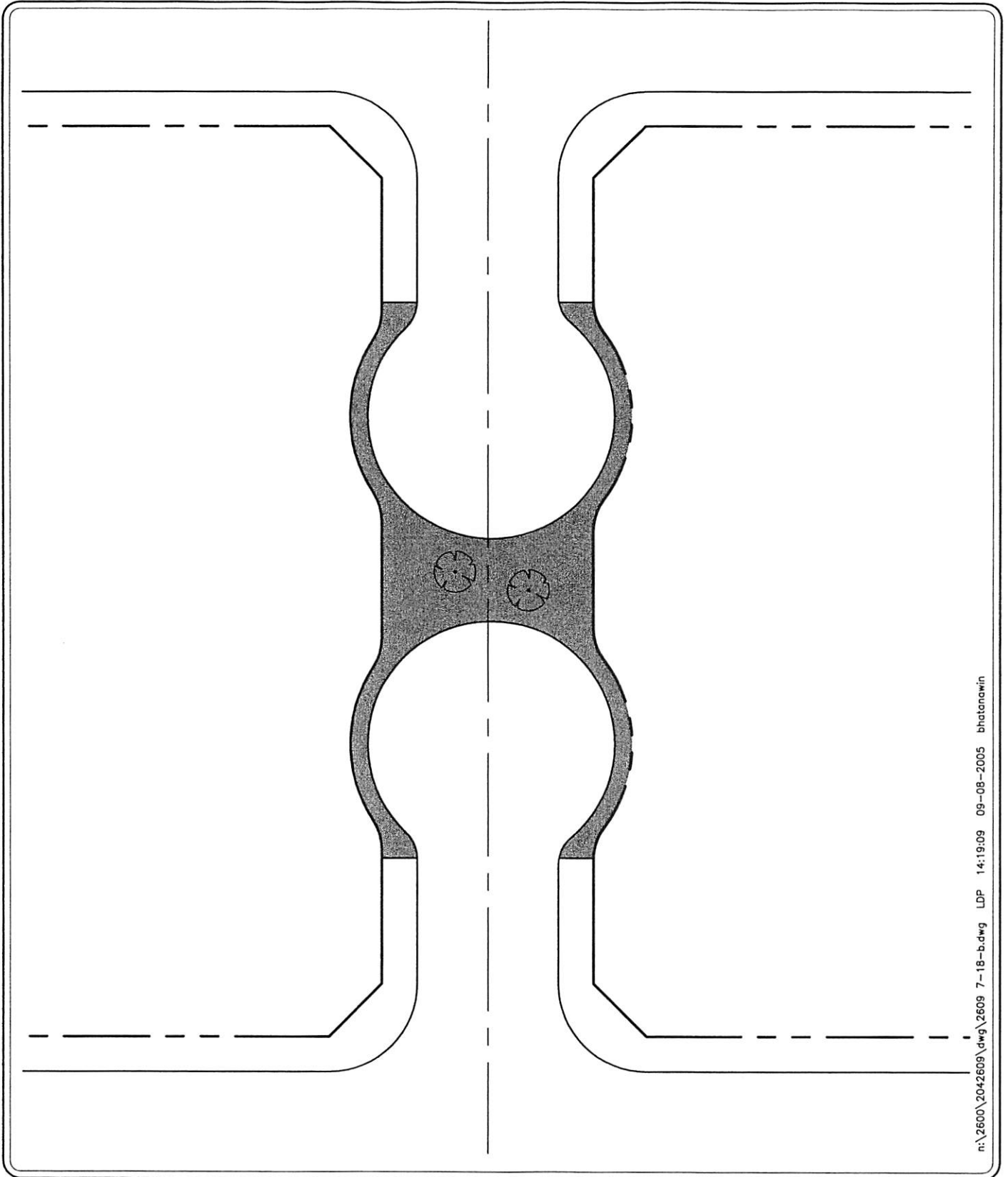


NO SCALE

FIGURE 7.18.A

STREET CLOSURE

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



n:\2600\2042609\dwg\2609 7-18-b.dwg LDP 14:19:09 09-08-2005 bhatanawin



NO SCALE

FIGURE 7.18.B

STREET CLOSURE (BACK TO BACK)
 NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN, DANA POINT



7.19 *Variable Speed Display*

A portable speed display board wired to a radar unit is aimed at passing motorists. It may be mounted on a trailer or be designed to stand-alone. It displays the driver's travel speed as well as the speed limit. It can also be used to target times of the day when enforcement is needed as well as to educate the public as to whether there is or is not a speeding problem.

Purpose

To notify motorists the speed at which they are traveling, which may encourage them to slow down. V-Calm devices may also be used to find specific times that enforcement may be needed.

Consideration

This is a relatively low cost approach to reducing speeds.

Estimate Cost

The City currently owns one (1) portable radar trailer and two (2) V-Calm devices. Costs associated with the relocation of a V-Calm device is approximately \$2,000.





8.0 References

1. Sohrweide, T., Becker, T., Brink, S., Calebaugh, G., Gerdes, D., Rossman, D. & Sobania, D. (1994). *Neighborhood Traffic Control*. Washington, DC: Institute of Transportation Engineers.
2. Burden, Dan. (2000). *Streets and Sidewalks, People and Cars, The Citizens' Guide To Traffic Calming*.
3. Kulash, Walter. (2001). *Residential Streets, Third Edition*. Washington, DC: ULI-the Urban Land Institute.
4. Pat Noyes & Associates. (1998). *Traffic Calming Primer*. Boulder, CO.
5. Department of Public Works. (2001) *Residential Neighborhood Traffic Management Program*. Orange, CA.
6. Department of Public Works. (2005) *Procedure for Neighborhood Traffic Management Plans*. Santa Ana, CA.
7. Department of Public Works. (2001) *Traffic Calming Policy A Procedural Guide to Neighborhood Traffic Management*. Whittier, CA.
8. Department of Public Works. *Residential Neighborhood Traffic Management Program*. Yorba Linda, CA.
9. Department of Transportation. (2004) *Neighborhood Traffic Management Program Community Handbook*. Pasadena, CA.
10. Department of Public Works. (2002) *Neighborhood Traffic Calming Policy*. Palm Springs, CA.
11. Department of Public Works. *Residential Streets Management Policy*. Laguna Hills, CA.
12. Department of Public Works. *City of Sacramento Traffic Calming Guidelines*. Sacramento, CA.
13. <http://www.TrafficCalming.org>, Fehr & Peers Transportation Consultants (2005).
14. <http://www.WalkingInfo.org>, Pedestrian and Bicycle Information Center (2005).

