MEDIAN PLANTING FOR CONTROL OF HEADLIGHT GLARE IN NEW JERSEY

Robert S. Green, Principal Landscape Engineer
New Jersey State Highway Department

Prior to 1938 median plantings on divided highways were made in connection with Roadside Improvement projects in the State of New Jersey chiefly to improve the appearance of the roadway without seriously considering headlight glare. In many instances, while accomplishing the latter purpose, the center island plantings obscured visibility for those vehicles making turns at the crossovers. It was necessary in the following years to either remove the plantings or keep them cut back to a height so low that the lights from oncoming vehicles were not intercepted. It is still a problem to entirely eliminate headlight glare where median strips are made up of short islands, used to permit turning movements.

In the case of a continuous median strip such as may be found existing on the new 8-lane dual-dual highway, Route 25, U. S. 1, Newark, excellent results have been obtained to reduce headlight glare from opposing traffic. A 550 foot experimental planting, designed to cut off glare at a horizontal angle of 18 degrees or less has reduced headlight glare to a point where it is less hazardous to the motorist. This planting was followed a year later by one 3500 feet in length at a nearby location on this median strip.

To accomplish the desired result there are three major planting designs that may be used.

1. Continuous hedge.
2. Individual shrubs in one row.
3. Angle plantings.

The continuous hedge design is already in use on one of New York State's Westchester County Parkways and though it is composed of deciduous plant material the density of the plants still provide a fair screen in winter. This continuous wall of shrubs, when in leaf, entirely eliminates headlight glare. There are no crossovers and since the Parkway runs through a well developed residential area, the problem of snow drifts usually resulting from a hedge are negligible.

A selection of a hardy evergreen, while more expensive, could be planted as a hedge along the center line of the median, variety depending on locality. California privet planted in a double row probably would be the least expensive. Trimming could be done along with every third or fourth mowing operation. The bed for such a hedge planting should be wide enough to facilitate proper cultivation and at the same time divide the island for one or two mowing swaths on either side.

The principal disadvantage of this type of planting is its formation of a snow fence, causing a drift on the leeward side of the median directly in the path of traffic. Since New Jersey State Route 25 is located in an open area where drifting would be at a maximum, we eliminated the possibilities of using a hedge.

Individual shrubs such as Ilex crenata, Taxus hicksi, Tusga canadensis, or Kalmia latifolia may be used in the second design. Planted on a median strip measur-

ing sixteen feet from curb to curb, the individual shrubs or evergreens, four to five feet in height and two to three feet in diameter, should be spaced on nine foot centers. Mowing operations would be increased but the initial cost of plant material is much less.

A planting of Taxus hicksi four and one-half feet high and approximately two feet wide were planted on a median strip island in Burlington County, Route 25, where the roadway makes a reverse curve. This island between crossovers is 270 feet long and sixteen feet wide. The lawn width is twelve feet. The individual evergreens were spaced twenty-five feet apart to form a complete wall between opposing traffic lanes. The line of planting was made on a diagonal extending across the center line to opposite ends to give more than enough sight for vehicles making turns at the crossovers.

Angle planting, successfully tried out on the Route 25 median thru Newark, required more plant material and consequently more maintenance. These plantings were designed to cut off glare at a horizontal angle of 18 degrees or less from center of headlight beams. The driver tends to keep his eyes focused on the road in front and it was thought, therefore, that glare from a greater angle of oncoming headlights would not be annoying. (See Figures 1 and 1a).

Figure 1.

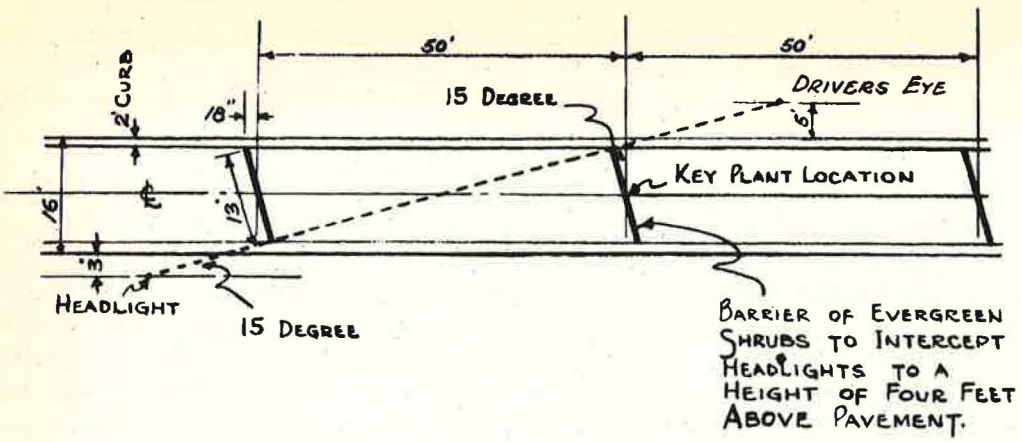

Figure 1a - Angle Planting to Intercept Headlight Glare for a 16 Foot Island.

Test runs in daylight were made at various speeds and it was observed that approaching traffic was visible only at points above the headlights. At night it was found that very little headlight glare reached us as we passed each hedge or plant barrier. In fact the appearance of the individual plant beds was as if a wall separated us from the nearest opposing traffic. By parking the car in the left hand lane next to the median and near the end of one hedge, we obtained further evidence that no glare penetrated. Advancing slowly, we noted the succeeding hedge took up the obstruction of glare where the first hedge left off. This then finally proved that angle plantings can act as a continuous wall and we definitely concluded that this method of planting will eliminate sufficient headlight glare to be practical. After one year, plantings will fill out to make the barrier more effective.

Picture a median twelve feet wide between two foot curbs. At every fifty lineal feet and centered is located the key plant of the hedge or screen. Planted at a 15 degree angle off the perpendicular normal to roadway centerline, in a row through the center of the key plant and extending in the direction of traffic, are located similar plants to make the hedge of five plants from curb to curb. These shrubs measure four and one-half feet in height and approximately two feet in width. This results in a thirteen foot hedge through the key plant from curb to curb and, as before mentioned, extending in the direction of traffic flow. As the headlight glare leaves the forward shrub of one hedge, it is obstructed by the extreme left shrub of the succeeding hedge and so on to carry the effect of a wall throughout the median.

Landscaping on either side of each evergreen shrub hedge is accomplished by six or seven deciduous shrubs such as Viburnum dentatum, Lonicera morrowi, Stephanandra flexuosa, or other many caned varieties to add to the density of the evergreen shrub hedge. When bed centers are fifty feet apart, the planting beds covered approximately 200 square feet, leaving 400 square feet for sod or ground cover plantings. Further study of the test planting showed that the evergreen hedges could be placed sixty feet apart and still eliminate sufficient headlight glare. In this case the intervening area for sod or ground cover would be 520 square feet. At horizontal curves the distance between beds was determined by the sharpness of the curve. The greater the curve, the shorter the distance between beds.

Ampelopsis was used as a ground cover between all planting beds. Three year old field-grown clumps were planted on four foot centers. Vinca minor could be substituted, but the use of common honeysuckle was discarded as being too rank a grower.

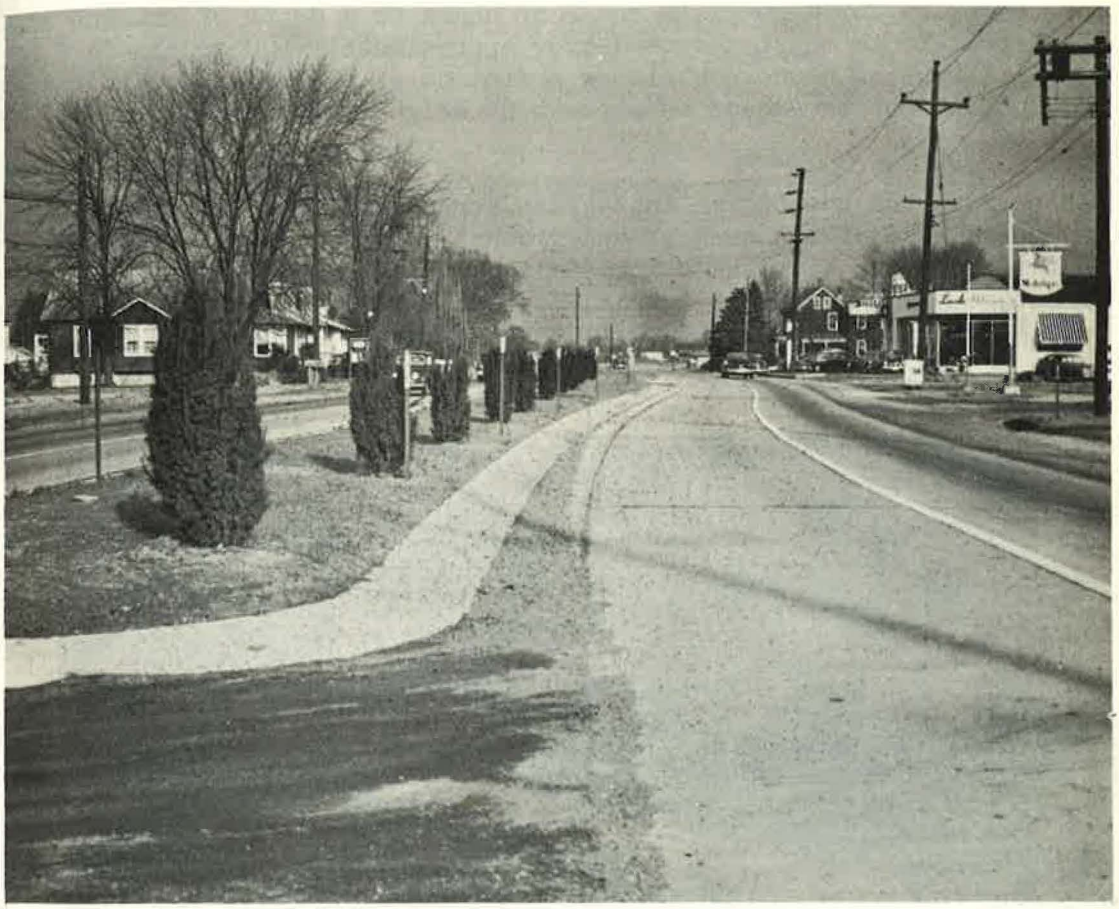

Figure 2.

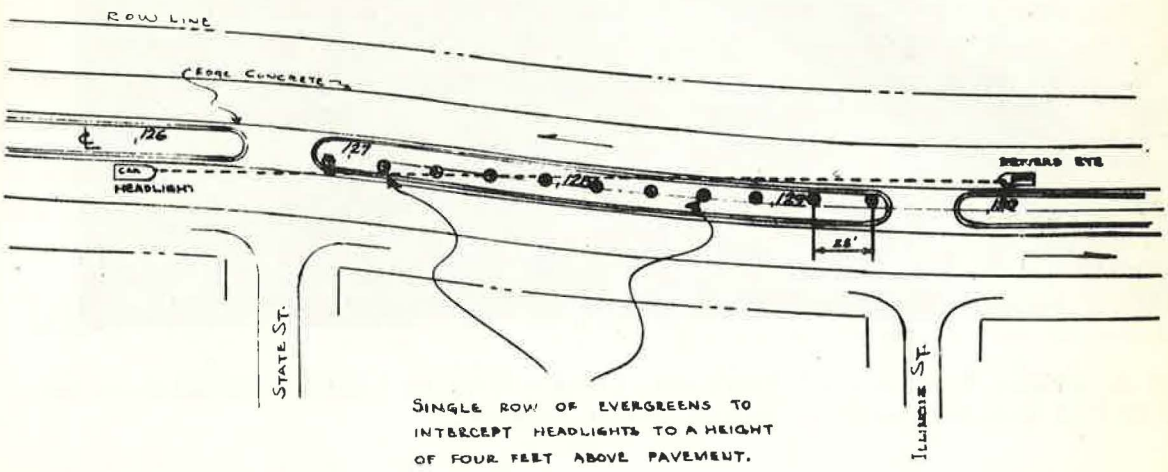

Figure 2a. Individual Shrubs or Evergreens in One Row to Intercept Headlight Glare on a Reverse Curve for a 16 Foot Island.

A prepared finely-ground dry manure was incorporated with the soil in all shrub and vine plantings. Top soil for planting was sufficient since the median construction had called for six inches of top soil.

When planting was completed, the entire area was raked and all debris removed in preparation for a complete cover of humus to a depth of one and one-third inches which represents one ton spread over approximately 500 square feet of planting surface. A type of humus containing a minimum of 80 percent organic matter with water content not to exceed 40 percent by weight when oven-dried, should be specified.

We believe the cost of an anti-glare screen would be both interesting and helpful. In the case of the test planting constructed in April 1947, twelve plant beds were laid out over a distance of 550 lineal feet. This project was performed by our landscape field forces at a total cost of $1211.75. This figures to approximately $2.20 per lineal foot. Only four evergreen shrubs were used in each hedge of the twelve bed plantings required.

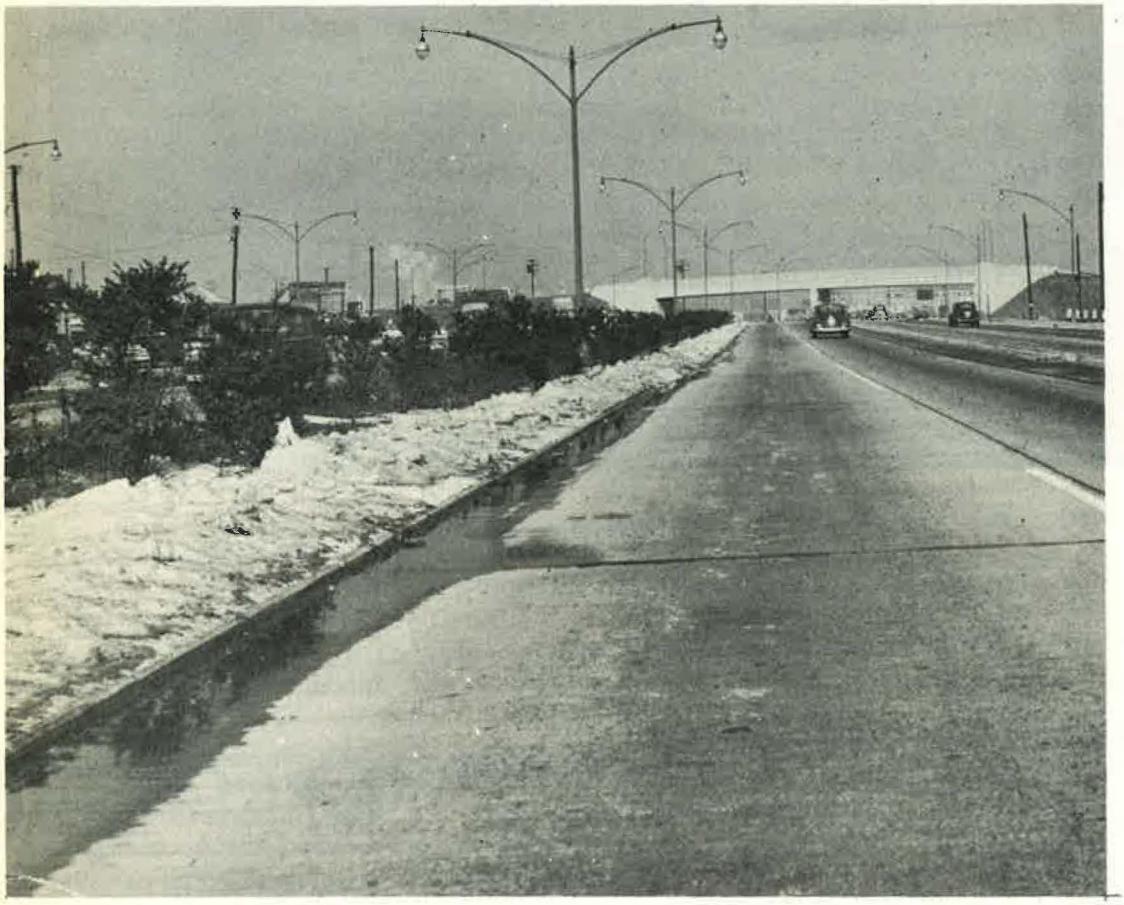

Figure 3. Angle Planting of Evergreen Shrubs Complete With Deciduous Shrub Filler and Interconnecting Ground Cover Between.

After the test planting was found to eliminate sufficient headlight glare, a further planting of 3500 lineal feet was constructed under advertised contract this past spring. Fifty-seven planting beds were installed in this project using five evergreen shrubs instead of four as in the test planting, having found that the five evergreen shrubs provided a much better barrier. The total cost of this contract, including supervision by our forces, was approximately $10,000.00. This figures to about $2.85 per lineal foot. The increased cost in part was the result of adding one evergreen shrub to each barrier hedge in the fifty-seven plant beds.

We have come to the conclusion that angle landscape plantings, as described, are practical where continuous median strips are of such width to make the glare of opposing traffic hazardous to the driver.

COMMENTS

Question:

Is angle planting practicable in medians of divided highways where cross-overs are installed?

Answer: Angle planting permits sight distance at cross-over points. New Jersey medians in divided highways are usually wider than 10 feet. Narrower islands can be planted although materials may not do well in so confined a space. Angle planting largely eliminates snow-drift formation.

Question:

How close to curbs are shrubs placed in this angle planting to stop headlight glare?

Answer: 1½ to 2 feet of curb. (Editor's Note: New Jersey uses the wide type curb, giving the equivalent of 3½ to 4 feet of traffic clearance. This additional width of clearance should be taken into account. Caution is needed.)

COMMENT

Width of medians of divided highways is a most important factor in the elimination of glare. We planted 8 miles of divided highways with a 12-foot median. We found that very few, if any, desirable types of shrubs could be kept trimmed back to a 4-foot height. Maintenance of median planting was found to be costly and hazardous to maintenance crews. The difference between "angle" and "group" planting (as described by Mr. Green) is a little hard to understand.

Answer: Angle planting permits wider spacing of plants, than with the group planting system. No planting is considered advisable in medians narrower than 10 feet.

COMMENT

There are many serious questions as to whether either hedge, group, or angle planting should be done in medians of divided highways. Formation of snow drifts is a chief reason for avoiding hedges particularly. It is suggested that Division I

prepare a series of scale drawings showing design methods of controlling headlight glare. Typical designs should show:

(1) Effects of various widths of median upon headlight glare.
(2) Effects of varying degrees of curvature in alignment on glare.
(3) Effects of variation in grade level on glare.

COMMENT

The trouble is that headlight glare has not been studied as a highway design problem. The median has been designed only as a separation for moving vehicles.

COMMENT

Most of the work of landscape engineers has been concerned with correcting defects in existing highway design. If correction of such defects is costly, as it usually is, we should keep careful records and inform the design engineer of such costs. He can then correct these defects in future new highway design.

REPORT OF PROJECT COMMITTEE ON RIGHT-OF-WAY AND BORDER CONTROL

Nelson M. Wells, Chairman
Director of Landscape Bureau
Department of Public Works, New York State

This report, in advance of committee activities, purports merely to outline the scope and objectives of the committee.

The objectives of the committee are based on a recognition of the fact that there is a desirable integration of a range of factors pertaining to the lands within the highway property bounds and to the lands lying adjacent to the public property which will contribute to desirable roadside development.

These include a consideration of the extents of rights-of-way to be acquired for roadside development; the relationship of various highway elements to adjacent bordering property; the desirable regulation of the right-of-way area for its use by others; and the desirable kinds and limitations of public control on lands bordering the right-of-way, all for the purpose of promoting safety, efficiency and beauty on the roadsides for the designed use of the highway by vehicles and pedestrians.

For a number of years in the past, Division I of the COMMITTEE ON ROADSIDE DEVELOPMENT covering Design, Right-of-Way and Border Control, and the project committee on RIGHT-OF-WAY AND BORDER CONTROL, have collected various data relating to the interests of this project committee. It now appears desirable in furthering these interests to review the findings of the COMMITTEE ON LAND ACQUISITION AND CONTROL OF HIGHWAY ACCESS in order to correlate their findings with independent research on those phases of the subject which affect roadside development.

For example, with respect to the general subject of right-of-way acquisition,