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MEMORANDUM REPORT NUMBER 46

TRAFFIC IMPACT STUDY OF THE INTERCHANGE OF STH 33 AND CTH LL

OZAUKEE COUNTY, WISCONSIN

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TRAFFIC IMPACT STUDY OF THE INTERCHANGE OF STH 33 AND CTH LL

On June 8, 1989, officials of the City of Port Washington and Ozaukee County requested that the Commission staff conduct a study of the need to continue to maintain the existing grade-separated interchange at STH 33 and CTH LL. The study was to consider the advantages and disadvantages of maintaining or modifying the interchange, or of converting the interchange to an at-grade intersection.

The existing interchange was constructed in 1957 when CTH LL was USH 141, and USH 141 was a route heavily used by long-distance, north-south traffic in eastern Wisconsin. Upon the completion of the IH 43 freeway approximately one and one-half miles to the west of CTH LL, the IH 43 freeway became the principal carrier of this long-distance traffic and USH 141 became CTH LL, reflecting its new role of carrying primarily local traffic. Prior to the construction of IH 43, USH 141 at STH 33 carried approximately 7,200 vehicles per average weekday. CTH LL at STH 33 now carries approximately 1,800 vehicles per average weekday.

As shown on Map 1, the on- and off-ramps to CTH LL at STH 33 are located in the southeast and northwest quadrants of the interchange. The Wisconsin Department of Transportation owns and maintains the ramps and the land on which they are located, as well as the overpass structure itself. STH 33 east of the on- and off-ramp terminals in the northwest quadrant of the interchange is a connecting street and, thus, is owned and maintained by the City of Port Washington.

There is a need to establish now whether the interchange should be maintained or converted to an at-grade intersection because urban development is approaching the interchange from both the City of Port Washington on the east and from the Village of Saukville on the west along STH 33. Development of a portion of the parcel immediately east of the interchange ramps in the southeast quadrant is currently underway, with additional development within that parcel being considered. As shown on Map 2, urban development is planned to

EXISTING GRADE-SEPARATED INTERCHANGE OF CTH LL AND STH 33

Map 1





PLANNED YEAR 2000 URBAN AREAS OF THE CITY OF PORT WASHINGTON AND THE VILLAGE OF SAUKVILLE

Map 2



LEGEND

YEAR 2000 URBAN AREA BOUNDARY

CITY OF PORT WASHINGTON

VILLAGE OF SAUKVILLE



surround the interchange by the year 2000, based upon sewer service area plans set forth in SEWRPC Community Assistance Planning Reports No. 90, <u>Sanitary</u> <u>Sewer Service Area for the Village of Saukville</u>, and No. 95, <u>Sanitary Sewer</u> <u>Service Area for the City of Port Washington</u>; plans adopted by the State as well as the local units of government concerned. Whether the interchange should remain or be converted to an at-grade intersection thus needs to be determined so that the planned development, as it occurs over the next decade, and the local street and utility system supporting such development may be designed to accommodate either an interchange or an at-grade intersection.

The principal reason for providing and maintaining grade-separated interchanges along a route is to provide a high speed and high capacity controlled access route to serve large volumes of relatively long distance traffic at a high level of safety. This reason no longer applies to the interchange of CTH LL with STH 33. First, IH 43 now and in the future will provide the principal north-south through route in the area and, therefore, CTH LL need not be maintained to provide such a route. Second, the interchange at CTH LL and STH 33 is the only existing or planned interchange on CT LL or STH 33. Thus, this interchange alone cannot significantly improve the level of service on these two facilities. Approximately 2,000 feet to the south of STH 33, a local street intersects with CTH LL at grade. Approximately 2,300 feet to the north of STH 33, a driveway intersects CTH LL at grade. In addition, as the area around the interchange continues to urbanize, additional at-grade local street intersections with CTH LL are planned, and may be anticipated. Therefore, the existing grade separation does not serve, and may not be expected in the future to serve, as an essential element of access control for a high speed, high capacity north-south arterial route.

The other reason for maintaining the grade separation would be that it provides the safest and most efficient means to accommodate high volumes of intersecting traffic. However, the existing traffic volumes on CTH LL and STH 33, as shown in Figure 1, are very low, particularly on CTH LL. Such traffic volumes may be readily accommodated by an at-grade intersection. Moreover, this potential at-grade intersection would not even warrant traffic signals under current traffic volumes. Forecast year 2010 traffic volumes on CTH LL and STH 33 may be expected to increase by about 100 percent over existing traffic volumes, and potentially require the improvement of STH 33 to a four-



lane, undivided roadway. However, the forecast traffic volumes to the year 2010 may be readily accommodated by an at-grade intersection, although the provision of exclusive turn lanes may be desirable and the installation of traffic signal may be warranted. Therefore, the existing grade separation on CTH LL and STH 33 is not necessary to accommodate either existing or forecast year 2010 traffic volumes.

An analysis was made of the cost of replacement of the existing grade separation with an at-grade intersection and of maintaining the existing grade separation. Specifically, the estimated costs to retain the existing grade separation and interchange ramps were compared to the estimated costs to eliminate the existing grade separation and interchange ramps, and construct an at-grade intersection between CTH LL and STH 33. With respect to the cost of retaining the existing grade separation, it may be assumed based on the service life of a typical structure that the existing bridge deck would need to be replaced and the existing roadways resurfaced in approximately 12 years--or by about the year 2000--at an estimated total cost of \$285,000 in 1989 dollars. It may also be assumed based on the service life of a typical structure that, in approximately 25 years-or by about the year 2015 when the structure will be 58 years old--the structure would have to be replaced and the interchange ramps and the portion of CTH LL between the ramps reconstructed, at an estimated cost of \$1 million in 1989 dollars. The total cost for retention of the existing grade separation may thus be expected to approximate \$1.3 million over a 25-year period. It may be noted that the structure, which is currently 32 years old, appears to be in good condition and its service life may actually extend for 10 or 20 years or more beyond 2015. However, by the year 2010, forecast traffic volumes indicate that the provision of four traffic lanes on STH 33 under the structure may be expected to become necessary. The existing structure would require replacement to accommodate four lanes.

In comparison, it is estimated that removal of the existing structure and onand off-ramps and construction of an at-grade intersection would cost an estimated \$725,000 in 1989 dollars, assuming CTH LL would be reconstructed to a two-lane rural cross-section. In addition, the land in the northwest and southeast quadrants of the interchange would no longer be required to accommodate on- and off-ramps and could be sold for development. Approximately 24

acres--12 acres in each quadrant--could be sold, at an estimated price of \$10,000 per acre based on recent land sales in the area for a total sale price of \$240,000. If the proceeds of the land sale can be utilized to offset the cost of removing the grade separation facilities and constructing an at-grade intersection, the net cost would be approximately \$485,000. However, federal monies were used to acquire the right-of-way for the interchange and the Federal Highway Administration may require repayment of a percentage of the land sale proceeds equal to the percentage of federal participation at the time the interchange right-of-way was acquired. This percentage may approximate 50 percent. Also, it is uncertain as to whether the Wisconsin Department of Transportation would permit any or all of the sale proceeds to be applied to the reconstruction costs.

In summary, in the near term, it may be less costly to maintain the existing grade separation and interchange ramps than to remove the grade separation and construct an at-grade intersection. However, in the long term--that is, at the point in time when the structure needs to be replaced due to deterioration or to accommodate four traffic lanes on STH 33--it would appear to be more cost-effective to remove the grade separation and construct an at-grade intersection. This is true regardless of whether or not the land sale proceeds can be applied to the construction of the at-grade intersection. Failure to move in the short term toward replacing the grade separation with an at-grade intersection, however, may result in land development and a local roadway system in the vicinity of the interchange being built to accommodate the interchange, and not the potential future at-grade intersection. This may result in future resistance and opposition to the then more economical at-grade intersection and poor urban design of surrounding land uses.

It is, accordingly, recommended that the City of Port Washington, Ozaukee County, and the Wisconsin Department of Transportation acknowledge the long-term desirability of replacing the grade separation between CTH LL and STH 33 with an at-grade intersection and potentially consider such replacement in the near-term future. If it is found to be not feasible to work toward short-term replacement of the grade separation with an at-grade intersection, then consideration should be given to reconstructing the interchange in the short term to accommodate potential development in the southeast quadrant of the interchange which is now the location of the northbound CTH LL on- and

Map 3

POTENTIAL INTERIM RECONSTRUCTION ALTERNATIVE OF THE CTH LL AND STH 33 GRADE-SEPARATED INTERCHANGE



off-ramps. The reconstruction, as shown in Map 3, would eliminate the on- and off-ramps in the southeast quadrant of the interchange, and reconstruct the on- and off-ramps in the northwest quadrant to permit all traffic movements to be made between CTH LL and STH 33. The estimated cost of the ramp reconstruction is approximately \$270,000. This estimated cost of ramp reconstruction may be partially offset by the immediate sale of the 12 acres of land in the southeast quadrant.

Given the recommendation to replace the interchange with an at-grade intersection, the City of Port Washington should review and revise its comprehensive plan and consider new recommendations for land use and the planned local street system in the vicinity of the existing interchange, specifically the potential extensions of Lincoln Avenue and Port View road. Potential alternative local street extensions are shown on Map 4. It should be noted that the alternative extensions of Port View Road shown will accommodate a proposed commercial development, but the alternative extensions of Lincoln Avenue shown will require modification of the proposed commercial development.

If the decision is made to proceed in the near term with the "interim" alternative involving elimination of the ramps in the southeast quadrant of the interchange and reconstruction of the ramps in the northwest quadrant to provide for all traffic movements between north- and southbound CTH LL and eastand westbound STH 33, it should be recognized that the northerly alignment alternative of Port View Road extended, as shown on Map 4, would necessitate a 3 percent gradient on CTH LL between Port View Road and STH 33; whereas the southerly alignment alternative would require only a 1 percent gradient.

SUMMARY

On June 8, 1989, officials of the City of Port Washington and Ozaukee County requested that the Commission staff conduct a study on the need to continue to maintain the existing grade-separated interchange at STH 33 and CTH LL. The study was to consider the advantages and disadvantages of maintaining or modifying the interchange, or of converting the interchange to an at-grade intersection.

Map 4

ALTERNATIVE LOCAL STREET SYSTEMS IN THE VICINITY OF THE POTENTIAL FUTURE CTH LL AND STH 33 AT-GRADE INTERSECTION



Map 4 (continued)



Upon its completion, the IH 43 freeway, which is located approximately one and one-half miles to the west of CTH LL, became the route for long-distance north-south traffic in eastern Wisconsin; and USH 141 became CTH LL, reflecting its new role of carrying local traffic. The Wisconsin Department of Transportation owns and maintains the ramps and the lands on which they are located in the interchange of CTH LL and STH 33, as well as the overpass structure itself.

There is a need to establish now whether or not the interchange should be maintained or converted to an at-grade intersection because urban development is approaching the interchange from both the City of Port Washington on the east and the Village of Saukville on the west along STH 33. Development of a portion of the parcel immediately east of the interchange ramps in the southeast quadrant is currently underway. By the year 2000, the interchange may be expected to be surrounded by urban development. Thus, a determination needs to be made now whether the interchange should remain or be converted to an at-grade intersection so that the planned development expected to occur over the next decade and the local streets and utilities supporting such development should be designed to accommodate either an interchange or an at-grade intersection.

One reason for providing and maintaining the interchange is to provide a high speed, high capacity controlled access route to serve large volumes of traffic for relatively long distances at a high level of safety. IH 43 currently provides such a route in the area. Moreover, the interchange at CTH LL and STH 33 is the only existing and planned interchange on CTH LL, and cannot by itself provide such a high speed, high capacity route. Another reason for maintaining the grade separation would be to provide the safest and most efficient means to accommodate high volumes of intersecting traffic. However, both the existing and forecast year 2010 traffic volumes may be readily accommodated by an at-grade intersection, although exclusive turn lanes may be desirable and traffic signal installation may be warranted, particularly in the future. Therefore, the existing grade separation on CTH LL and STH 33 is no longer necessary.

An analysis was made of the costs of replacing the existing grade separation with an at-grade intersection and of maintaining the existing grade 12

separation. Based on that analysis, it was determined that, in the near term, it would be less costly to maintain the existing grade separation and interchange ramps. However, in the long term, it would be more cost-effective to remove the grade separation and construct an at-grade intersection. It should be noted that failure to move in the short term toward replacing the grade separation with an at-grade intersection may result in land development and a local roadway system in the vicinity of the interchange being built to accommodate the interchange and not the potential future at-grade intersection. It is therefore recommended that the City of Port Washington, Ozaukee County, and the Wisconsin Department of Transportation acknowledge the long-term desirability of replacing the grade separation between CTH LL and STH 33 with an at-grade intersection and work toward replacement in the near term future. If short-term replacement of the grade separation with an at-grade intersection is not feasible, then consideration should be given to reconstructing the interchange in the short term to accommodate potential development in the southeast quadrant of the interchange. This reconstruction would eliminate the on- and off-ramps in the southeast quadrant and reconstruct the on- and offramps in the northwest quadrant to permit all traffic movements to be made between CTH LL and STH 33.

Given the recommendation to replace the interchange with an at-grade intersection, the City of Port Washington should review and revise its comprehensive plan and consider new recommendations for land use and the planned local street system in the vicinity of the existing interchange, specifically the potential extensions of Lincoln Avenue and Port View Road.