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grade separation feasibility study

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OHIO, Department of Energy

GRADE SEPARATION FEASIBILITY STUDY

Prepared For:

SANDUSKY CITY PLANNING COMMISSION
CITY HALL
222 Meigs Street
Sandusky, Ohio 44870

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TABLE OF CONTENTS

| <u>SECTION</u> | <u>PAGE</u> |
|---|-------------|
| I. INTRODUCTION | 1 |
| A. Status of Development Image of the Westside Neighborhoods in Relationship to the Rest of the City. | 1 |
| B. Prior Planning and Development Activities Within the Westside Neighborhoods. | 2 |
| II. EVALUATION OF EXISTING CONDITIONS | 4 |
| A. Site A and Vicinity | 4 |
| B. Site B and Vicinity | 5 |
| C. Site C and Vicinity | 7 |
| III. EVALUATION OF PROPOSED ALIGNMENTS | 8 |
| A. Venice Road Alignment, Alternative A | 8 |
| B. Edgewater Avenue Alignment, Alternative B | 8 |
| C. Perkins Avenue Alignment, Alternative C | 9 |
| D. Alignment Changes, Related Traffic Control, and Probable Effect on Traffic Flow | 10 |
| IV. RECOMMENDED ALIGNMENT AND EVALUATION OF DEVELOPMENT IMPACT | 14 |
| A. Selection Criteria and Recommended Alignment | 14 |
| B. Impact of the Grade Separation on Development within the Westside Neighborhoods | 15 |
| C. Consideration of Intangible Benefits | 19 |
| D. Summary of Financing Alternatives | 19 |

I. INTRODUCTION

The purpose of this Grade Separation Feasibility Study is to evaluate the appropriateness and effectiveness of constructing a grade separated rail-crossing within the Westside Neighborhoods, at one of three different locations. The Westside Neighborhoods, although an important part of the Sandusky economy, has become cut-off from the balance of the City due to the presence of the Norfolk and Western, and Conrail railroad tracks, both of which carry significant volumes of rail traffic.

This Grade Separation Feasibility Study is intended to identify and evaluate alternative access improvements into and out of the Westside Neighborhoods for residents who live in the area, for emergency vehicles serving the neighborhoods, and for employees who commute to the industries on the west side of Sandusky.

A. Status of Development Image of the Westside Neighborhoods In Relationship to the Rest of the City

Present development in the Westside Neighborhoods has, to date, been minimal. According to the Westside Neighborhood Development Plan - and Program (1980), over seventy percent (70%) of the land is currently either underdeveloped or devoted to various transportation uses such as highways, streets and alleys, rail rights-of-way, and railroad yards and junctions. Approximately fifteen percent (15%) of the Westside Neighborhoods' land use is residential, ten percent (10%) commercial/industrial or public lands, and the remaining five percent (5%) comprises community and neighborhood parkland. There is a considerable amount of potential for development in the Westside Neighborhoods. Residential and industrial land, which has been slow to develop due to the isolated image of the Westside Neighborhoods, offers future growth opportunities for the area if adequate access is provided.

Accessibility to the developable land in the Westside Neighborhoods is severely limited by the configuration of the area's thoroughfare pattern relative to the presence of several at-grade railroad crossings. These cause travel time delays and hinder direct access into and out of the Westside Neighborhoods due to the almost continuous train traffic along the east/west Conrail tracks, and the heavy traffic along the Norfolk and Western railroad line. The availability of a grade-separated crossing with the railroad tracks would begin to alleviate the two "separate" sides of Sandusky, and serve to overcome what is currently perceived to be a major obstacle to development within the Westside Neighborhoods.

B. Prior Planning and Development Activities within the Westside Neighborhoods

The Sandusky Comprehensive Development Plan (1971) provided a City-wide framework for future land use policies, the development of the Sandusky transportation network, and capital budgeting recommendations. The 1971 Plan recognized the potential for industrial development in the corridor between Tiffin Avenue and the Norfolk and Western railway, and also along the Lake front. The Plan also recommended the western extension of Perkins Avenue to connect with Ferndale Drive, alleviating some of the accessibility problems evident within the Westside Neighborhoods.

In early 1980, the Westside Neighborhood Development Plan and Program was developed for the City of Sandusky. This Plan identified opportunities for industrial and commercial development primarily on the eastern half, with residential development occurring primarily on the western half of the Westside Neighborhoods. The Westside Neighborhood Development Plan and Program also indicates a proposed thoroughfare and collector network for the Westside Neighborhoods, graphically illustrating the problems associated with accessibility due to the Penn Central tracks running east/west and the Norfolk and Western railroad track running north/south through the Westside Neighborhoods.

The City of Sandusky is presently engaged in development of an Industrial Park Feasibility Analysis and Development Plan. Recommendations included in the 1971 Sandusky Comprehensive Development Plan and the 1980 Westside Neighborhood Development Plan and Program indicated the need for Sandusky to expand its tax base through the development of new industrial growth. The presence of substantial amounts of industrially zoned acreage in the Westside Neighborhoods provides an excellent location within an already industrialized area for future industrial development and expansion. Residential development opportunities within the area also exist. The separation of the Westside Neighborhoods from the rest of the City by the Norfolk and Western railroad, however, places restrictions on the potential for growth within the Westside Neighborhoods.

Accessibility has been identified in the Westside Neighborhood Development Plan and Program as one of the major constraints, if not the major constraint, to future growth and development within the Westside Neighborhoods. Realtors and developers in the City concede that development has been hampered due to the access problems associated with the railroad crossings, especially at Venice Road.

This lack of access can be attributed mainly to the delays caused by the north-south passage of long, slow-moving freight trains along the Norfolk and Western Railroad right-of-way. North-south access is also limited by the east-west Penn Central right-of-way, but the east-west access problem is more critical due to the fact the main built-up area in Sandusky lies east of this railroad right-of-way and the largest amount of vacant developable land is in the Westside Neighborhoods to the west of this railroad right-of-way. In addition, a potentially hazardous condition exists relative to the requirement for full-time access to the western sector of the community by several classes of emergency service vehicles.

A series of rail-traffic and time delay studies were conducted by City staff at each of the three at-grade railroad crossings. The studies were conducted during the month of February 1981 and reflect twelve hour field observation results at each subject location. The rail-traffic and time delay study provides a perspective through which consideration of accessibility problems relative to the Westside Neighborhoods can be made. The study findings reflect minimum-level findings, given the typically lighter rail traffic in the winter months and the fact that the Ford Motor Company Plant was not in operation at the time the field study was made.

The greatest number of street closings occurred along Edgewater Avenue, with 17 trains observed; Tiffin Avenue experienced 11 trains and Venice Road had 5 trains. The greatest impact on vehicular traffic resulting from the closings occurred at Venice Road, with 309 vehicles affected; 98 vehicles were affected at Tiffin Avenue and 71 vehicles were affected at Edgewater Avenue.

Based upon the neighborhood evaluation and planning recommendations contained in the 1980 Westside Neighborhood Development Plan and Program, three alternative grade separation locations are proposed to improve the accessibility of the Westside Neighborhoods and thereby stimulate the area's rate of development. The three alternative locations are (Plate 1):

- Site A -- intersection of Norfolk and Western railroad tracks with Venice Road.
- Site B -- intersection of Penn Central railroad tracks with Edgewater Avenue.
- Site C -- intersection of the Norfolk and Western railroad tracks with Perkins Avenue (proposed Ferndale Drive) and Tiffin Avenue.

Proposed alignments, profiles, and cross-sections have been developed for each grade separation site alternative. Planning, engineering and cost analyses have also been made, as well as an evaluation of the impact of the construction of a grade separation upon the future development of the Westside Neighborhoods.

II. EVALUATION OF EXISTING CONDITIONS

A. Site A and Vicinity

Grade separation Site A is proposed to be located at the intersection of the north/south bound Norfolk and Western railroad tracks (2 tracks) with Venice Road. The vicinity offers generally flat terrain containing very poorly drained Toledo silty clay soils, typically found near the Lake. Though silty clay soils have slow permeability, they pose few development constraints to a proposed grade separation.

Site A is comprised of general commercial/industrial and residential activities (especially in the northwest quadrant which fronts Venice Road). The Branch Trucking Warehouse, located behind the single-family homes, fronts onto Huron Street further north of the intersection. The Southwest quadrant of Site A contains the Vulcan Materials Building and a motel, both of which front onto Venice Road. The northeast quadrant contains presently vacant land, while in the southeast a single-family dwelling unit exists on the corner, and a vacant building exists behind that. Strip commercial development and a drive-in front onto Venice Road, extending in an easterly direction.

Natural gas lines run within the Venice Road right-of-way and extend under the Norfolk and Western Railroad tracks. A sanitary sewer line also runs parallel to Venice Road. Overhead utility lines run parallel to both Venice Road and Huron Street with the poles located on the south side of Venice Road and the west side of Huron. None of these utilities would cause major problems for construction of a grade separation.

Traffic volumes along Venice Road and in the vicinity of the Norfolk and Western Railroad is considerably heavy, in excess of 14,000 vehicles over a 24-hour period.^{1/} Rail traffic to and from the Norfolk and Western marshalling yards, which are located to the south, consists of slow moving coal trains with southbound (unloaded) speeds being approximately seven (7) to eight (8) miles per hour and northbound (loaded) speeds averaging less than four (4) miles per hour. The winter months average three (3) trains of sixty (60) cars per train during a 24 hour period making round trips between the docks and the coal yard. During the summer months there is an increase in train traffic which doubles this traffic volume.

Field investigation at the intersection (City of Sandusky Field Survey: 1981) resulted in an estimated time delay of about 7.5 minutes (the average time for a train to clear the intersection with Venice Road). The heavy volume of rail traffic at the intersection is compounded by the large volume of the east/west bound auto traffic on Venice Road.

^{1/}Source: City of Sandusky Traffic Count, 1980.

Emergency access is an important criteria to be considered in the determination of a grade separation site. The high insurance rates (City-wide Class 4 6.5.0 rating versus Class 91.5.0. rating for parts of Westside Neighborhoods) within the Westside Neighborhoods are due in large measure to the access limitations imposed by the Norfolk and Western Railroad crossing at Venice Road. A passing coal train effectively cuts off access from the downtown for almost seven and one-half minutes. Although the Westside Neighborhoods have their own fire station, and the City has a total of three fire stations, 80% of all fire calls require some fire equipment to cross the Norfolk and Western tracks at Venice Road. The back-up system used by the City requires at least one unit from each of the three fire stations to shift either to the fire itself or to the next station district to provide back-up coverage.

Emergency access problems also occur for ambulance service to the Westside Neighborhoods. The only ambulance service provided for the City is located downtown, requiring all access to the Westside Neighborhoods to cross the Norfolk and Western Railroad tracks. Adequate ambulance service is subsequently impeded. In addition to emergency access problems associated with fire and ambulatory care services, the Norfolk and Western Railroad tracks cut the police district in half, adding to the difficulty in providing efficient police service for the area. The emergency access problems combine to cause the high insurance rates, thus slowing future development within the Westside.

B. Site B and Vicinity

Grade separation Site B is proposed to be located at the intersection of Edgewater Avenue and the east/west bound tracks owned by the Penn-Central Railroad. Conrail trains are the primary users of these Penn-Central tracks. The intersection is just south of Sandusky Bay, and its broad, flat topography contains Toledo silty clay soils. The general land use types located adjacent Edgewater Avenue in the vicinity consist primarily of general industrial and agricultural areas.

The northwest quadrant contains a community baseball field immediately adjacent Edgewater Avenue and the Conrail tracks. South of the tracks on both the west and east sides of Edgewater Avenue is level terrain, used as agricultural land. The agricultural land poses few development restrictions for the proposed grade separation; however, some of this agricultural land is owned by Penn-Central and has recently been sold to a real estate development firm. The agricultural land fronting onto Venice Road with the Conrail tracks behind it, is well-suited for industries or commercial use. Located within this vicinity is the Union Chain Company.

The existing utilities at Site B consist primarily of underground water lines and overhead electrical utilities. The water line parallels Edgewater Avenue, providing service for the areas to the north of the Conrail tracks. The existing utilities do not pose unusual development restrictions on the Site B Alternative.

Traffic volumes associated with Site B are mixed. The rail traffic is extremely heavy, the Conrail track being the primary east/west service line between New York and Chicago. Auto traffic during the rush hour periods of 7-9am and 4-6pm on Edgewater Avenue, carries only approximately 18% of the volume of that on Venice Road during the same rush hour periods.^{1/}

Rail activity along the tracks operated by Conrail, in comparison with that of the auto traffic, is extremely intense. Information provided by the Conrail chief dispatcher in Toledo indicates train volumes of from sixty-five (65) to eighty (80) trains per day during the summer months, to a low of forty-five (45) to fifty-five (55) trains per day during the winter months. Although the volume of train traffic along the Conrail tracks is high, the fast traveling speeds diminish the overall time delays for motorists at the Site B intersection. Passenger trains travel approximately seventy (70) miles per hour and have an average of eight cars and two engines per train, thus resulting in a time delay of only about 7.2 seconds.

The van trains and regular freight trains carry considerably more cars per train and consequently result in longer time delay periods. Van trains have an average car length of approximately eighty-six (86) feet, with six (6) engines per train and an average of 90 cars per train traveling east, and 125 cars per train traveling west. The travelling speed is approximately seventy (70) miles per hour, thus causing an average time delay of less than three minutes. The observed average time delay was three minutes.^{2/} These times are considerably less than the seven and one-half minute delays caused by the Norfolk and Western Railroad system on Venice Road. Freight trains traveling at speeds of only fifty miles per hour pose time delays very similar to those of the van trains. This is due to the shorter car length of freight trains.

Although the volume of the rail traffic is intense, the faster traveling speeds of the trains minimizes the time delays associated with the Conrail tracks. The combination of the shorter time delay and the lighter automobile traffic in the vicinity of Site B does not pose the same severity with regard to emergency access as was determined in the vicinity of Site A.

1/ Source: City of Sandusky Traffic Count, 1980.

2/ Source: City of Sandusky Field Survey, 1981.

C. Site C and Vicinity

Alternate grade separation Site C is proposed to be located at the intersection of Perkins Avenue (proposed Ferndale Drive), with the north/ south bound Norfolk and Western railroad tracks. The topography and soils characteristics are consistent with that of the previous two site locations. Toledo silty clay soils comprise the flat terrain and present no major development constraints to the proposed site.

The existing land use surrounding Site C is predominately industrial, located west of the tracks; while single-family residential land use is situated east of the Norfolk and Western tracks and south of Tiffin Avenue. Several isolated general commercial lots are scattered along Tiffin Avenue east of the railroad tracks, with a bar being located in the northeast corner adjacent the Norfolk and Western tracks and Tiffin Avenue. The proposed 192 acre Industrial Park (Industrial Park Feasibility Analysis and Development Plan: 1981) is planned to be developed west of the Norfolk and Western tracks just north of the City corporation line.

Sanitary sewer lines and natural gas lines parallel Tiffin Avenue throughout the entire vicinity. Water lines cross the sewer and gas lines at Perkins Avenue. Sewer, gas and water lines also cross at the Tiffin Avenue and Perkins Avenue intersection. Electric transmission lines are located approximately 500 feet south of and parallel to Perkins Avenue. Overhead utility lines exist on the southeast side of Tiffin Avenue and both sides of Perkins Avenue. The existing utilities surrounding Site C pose development constraints. Relocation and adjustment would, however, be possible.

Loaded trains travel north at a speed of three miles per hour, and the empty trains moving south into the yards at speeds of seven miles per hour result in estimated time delays of about seven minutes, twenty-four seconds. Observed time delays average two minutes, however. The time delays are compounded by the relatively heavy traffic associated with the Tiffin Avenue and Perkins Avenue area. Traffic volumes along Tiffin Avenue in the vicinity of the at-grade crossing with the Norfolk and Western Railroad tracks approach 7500 vehicles per 24-hour period.^{1/}

Emergency access to the Westside Neighborhoods is hampered by the Norfolk and Western Railroad, and the same problems associated with access across the tracks at Site A occurs here.

^{1/} Source: City of Sandusky Traffic Count, 1980.

III. EVALUATION OF PROPOSED ALIGNMENTS

Proposed alignments, profiles, and cross-sections for the three proposed grade-separated rail-crossings are shown in Plates 2-4. Each proposed alignment is described below. A summary of the estimated project cost for each of the three grade separation alternatives appears in Table 1.

A. Venice Road Alignment, Alternative A (Plate 2)

The proposed relocated Venice Road alignment begins at the point of intersection of Venice Road with Tiffin Avenue, and proceeds in a westerly direction to a point of termination at its approximate intersection with the abandoned Penn Central Railroad tracks. The existing Venice Road would be terminated at a point west of Olds Street but would remain open from that point westerly to provide access to properties in the vicinity of the existing Venice Road. A connection is proposed from the relocated Venice Road to Olds Street, to provide access north of the existing Venice Road, and also from the relocated Venice Road to Superior Street.

The Venice Road overpass consists of a proposed 225-foot bridge to span the Norfolk and Western Railroad tracks, and Huron Street. The structure is proposed to be constructed of pre-stressed concrete girders with a 52-foot wide reinforced concrete deck. The cost of the structure is estimated to be approximately \$819,000.

The relocated Venice Road alternative will require the largest amount of right-of-way acquisition of the three proposed alternatives. Over eight (8) acres of land will need to be acquired in order to accommodate the mainline roadway and access roads. Construction of the overpass will require the demolition of one building, located at the southwest corner of the intersection of the existing Venice Road and Superior Street. The estimated cost for acquisition for the right-of-way for the Venice Road alternative is \$266,000 (based upon Erie County tax records).

Construction of the Venice Road overpass will require the relocation of twelve (12) utility poles. Preliminary analysis of drainage requirements associated with the Venice Road alternative indicates the need for seven (7) catch basins, 2,000 feet of 24" storm sewer and two (2) headwalls.

B. Edgewater Avenue Alignment, Alternative B (Plate 3)

The proposed relocated Edgewater Avenue alignment begins within the vicinity of Cement Avenue, and proceeds westerly and southerly to the intersection of the realigned Edgewater Avenue with Venice Road. An access road from the relocated Edgewater Avenue is proposed to provide access to properties located west of Horseshoe Avenue and north of the proposed realignment.

The Edgewater Avenue overpass will utilize a 210-foot bridge to carry traffic over the Conrail railroad tracks. The overpass is proposed to be constructed of steel-rolled beams with a 52-foot reinforced concrete deck. The cost for the bridge is estimated to be approximately Six Hundred Thousand Six Hundred Dollars (\$600,600).

Right-of-way acquisition for the Edgewater Avenue alignment is estimated to be the least costly of the three alternatives; requiring 4.6 acres of land.

The Edgewater Avenue overpass will require the relocation of twelve (12) utility poles. Drainage improvements for the proposed overpass is proposed to consist of six (6) catch basins, 1,400 feet of 24" storm sewer, 600 feet of paved cutter, and one manhole.

C. Perkins Avenue Alignment, Alternative C (Plate 4)

The proposed Perkins Avenue alignment begins at the point of intersection of the existing Perkins Avenue at Stanford Street, and proceeds in a westerly direction to Superior Street, at the point of intersection of the relocated Perkins Avenue with Superior Street and the proposed Ferndale Drive. Access to parcels located south of the relocated Perkins Avenue is provided for by the existing Perkins Avenue via Tiffin Avenue. Access to properties located north of the proposed overpass is accommodated by the construction of an access road from the realigned Perkins Avenue to Tiffin Avenue in the vicinity of the existing Olds Street right-of-way.

The Perkins Avenue overpass requires the construction of a 340-foot long bridge in order to span the Norfolk and Western railroad tracks, Tiffin Avenue, and Huron Street. The structure is proposed to be constructed with steel beams and a 52-foot reinforced concrete deck. The approximate cost of the bridge is \$1,237,600. Construction of the Perkins Avenue realignment and overpass will require 5.7 acres of land for right-of-way and the demolition of four (4) structures. Based upon Erie County tax records the cost for acquisition relative to the right-of-way is estimated to be \$265,000.

Seven (7) utility poles will need to be relocated for construction of the Perkins Avenue overpass. Drainage improvements relative to the construction and alignment of the overpass are proposed to consist of the installation of eight (8) catch basins, 2,400 feet of storm sewer, and one (1) headwall to adequately drain the vicinity.

D. Alignment Changes, Related Traffic Control, and Probable Effect on Traffic Flow

Changes in alignment for the subject thoroughfares are proposed as shown in the accompanying Plates 2 through 4, and are necessary to accommodate the construction of the proposed overpasses. The grade separations and mainline roadways have been designed to accommodate four lanes of traffic travelling at speeds of 40 miles per hour. Alignment alterations have also been proposed for some of the access roads within the alternative vicinities to improve site distance and turning maneuverability. These alignments are also shown in the accompanying plates.

The necessary traffic control devices required at the intersection of mainline overpass roadways and access roads is difficult to determine at this time. Further traffic counts and studies will need to be conducted as part of any subsequent detailed design analysis that the City may wish to pursue for a particular proposed alignment. Each intersection will, however, require at least a "stop" sign at each access road intersection approach.

Both the Venice Road and Perkins Avenue overpasses will eliminate time delays caused by the Norfolk and Western rail traffic. The Edgewater Avenue overpass is expected to have some effect on reducing delays caused by Conrail trains, however, east-west traffic utilizing the Edgewater overpass will still have to contend with delays caused by train traffic along the Norfolk and Western railroad tracks located east of the proposed overpass location.

Traffic volumes are expected to increase to some degree along the mainline roads associated with all three of the proposed overpass locations. This phenomenon is attributable to the travel time savings resulting from the grade separation, and will therefore promote greater usage of the roadway associated with the particular overpass. The proposed improvement at Venice Road is expected to best handle anticipated increases in traffic volume. The predominant traffic flow through the intersections of Venice Road with Superior Street and Olds Street will not have substantial amounts of turning movements; this fact increases the capacity of the intersections while maximizing the efficiency of the mainline overpass roadway.

There may be some complications attributable to construction of the Perkins Avenue overpass. Olds Street would then become a major access road between Perkins Avenue and Tiffin Avenue and would be expected to carry a considerable amount of traffic. A substantial number of turning movements can be expected at the intersection of Olds Street and Perkins Avenue. Should Ferndale Drive not be constructed west of the overpass, turning movements will be predominant at the intersection of the overpass and Superior Street. The increase in the number of turning movements will constrain the capacity of the intersections, and lessen the effectiveness of the overpass.

The Edgewater Avenue grade separation site will have traffic problems similar to those described for Perkins Avenue. The predominant movements at the intersection of Venice Road and the Edgewater overpass will be related to turning movements.

Table 1
ESTIMATED PROJECT COST
GRADE SEPARATION ALTERNATIVES

| Description | Alternative Venice Road | Alternative Edgewater Avenue | Alternative Perkins Avenue |
|--|----------------------------|---------------------------------|-------------------------------|
| 1. Clearing and Grubbing | \$ 26,600 | \$ 5,700 | \$ 26,500 |
| 2. Demolition | 10,400 | 5,200 | 14,700 |
| 3. Excavation & Embankment ^{1/} | 795,000 | 673,900 | 646,300 |
| 4. Subgrade Compaction | 15,200 | 9,300 | 10,200 |
| 5. Pavement, Subgrade, Base and Curb | 373,800 | 226,100 | 257,200 |
| 6. Drainage | 116,700 | 100,900 | 139,000 |
| 7. Bridge | 819,000 | 600,600 | 1,237,600 |
| 8. Roadside Improvements ^{2/} | 8,800 | 4,900 | 6,900 |
| 9. Guardrails ^{3/} | 22,600 | 19,400 | 15,200 |
| 10. Traffic Control (Signing, Signals, Marking) | 3,000 | 2,000 | 2,000 |
| 11. Utility Adjustment ^{4/} | 7,200 | 7,200 | 4,200 |
| 12. Miscellaneous Construc- tion Items (10% of Line 13) | 219,900 | 165,500 | 236,000 |
| 13. Sub-Total Construction (Items 1 through 11) | 2,199,000 | 1,655,200 | 2,359,800 |
| 14. Right-of-Way | 266,000 | 136,600 | 265,000 |
| 15. Construction Engineer- ing and Contingen- cies (10% of Line 13) | 219,900 | 165,500 | 236,000 |

Table 1 (Continued)

| Description | Alternative Venice Road | Alternative Edgewater Avenue | Alternative Perkins Avenue |
|---|-------------------------|------------------------------|----------------------------|
| 16. Preliminary Engineering (10% of Line 13) | 291,900 | 165,500 | 236,000 |
| 17. Total Estimated Cost | <u>\$3,124,700</u> | <u>\$2,288,300</u> | <u>\$3,332,800</u> |

- 1/ Embankment does not include compaction.
- 2/ Roadside improvements include grass seeding.
- 3/ Guard Rail includes Anchor Assembly.
- 4/ Utility Adjustment is based on pole relocation only.

Source: Woolpert Consultant (1980 Cost Data).

IV. RECOMMENDED ALIGNMENT AND EVALUATION OF DEVELOPMENT IMPACT

A. Selection Criteria and Recommended Alignment

The selection of the best location for a grade separation in the Westside Neighborhoods utilized design objectives to analyze and weigh the relative merits of each alternate site location. Specific design objectives used in the appraisal of each alternative location include consideration of the following:

1. Locate the grade separation to strengthen the functional characteristics of the existing and planned transportation network.
 - a. Coordinate the grade separation facility with recommendations contained in the Westside Neighborhood Development Plan and Program and Sandusky Comprehensive Development Plan.
 - b. Alleviate to the greatest extent possible the transportation problems which currently exist in the Westside Neighborhoods.
2. Coordinate the proposed grade separation with existing and future planned development patterns.
 - a. Strengthen the Westside Neighborhoods by improving increased accessibility for development areas (such as the proposed Westside Neighborhoods Industrial Park).
 - b. Minimize the impact of the proposed grade separation on existing development by maintaining adequate access within the vicinity of the grade separation, and by minimizing acquisition and relocation resulting from implementation.
3. Minimize engineering costs.
 - a. Minimize right-of-way requirements.
 - b. Minimize necessary reconstruction of existing transportation routes.
 - c. Minimize necessary reconstruction and/or replacement of existing utilities.
 - d. Minimize the length required for the grade separation.

4. Minimize time delays caused by the high volume rail traffic, thus increasing emergency access efficiency and accessibility, generally.
5. Maximize economic benefits through increased development opportunities due to improved access.
6. Minimize changes in travel patterns so that the design standards of the existing thoroughfare network are not exceeded.
7. Maximize social benefits by providing increased safety and emergency access for the Westside Neighborhoods.

Of the three alternative site locations analyzed in the preceding chapter, the Venice Road location (Site A) is recommended as the best location relative to the design objectives described above. Site Alternative B, although being the least costly solution, would not improve accessibility given the additional at-grade crossing at Monroe Street, the relatively shorter time delays evidenced, and the relatively lighter vehicular traffic evidenced along Edgewater Avenue. Site Alternative C presents itself as the most costly solution, even without consideration of the additional expense of Ferndale Drive. Without Ferndale Drive a grade separation at Site C would do little to increase accessibility. This alternative would also have the greatest impact on changing travel patterns.

B. Impact of the Grade Separation on Development
Within the Westside Neighborhoods

The potential for continued development within the Westside Neighborhoods can be increased by the construction of the Norfolk and Western Railroad grade separation at Venice Road. Interviews with area developers and realtors indicate that the demand for development on the City's Westside is presently "soft" because of existing accessibility limitations, and that a stronger land development market in the Westside Neighborhoods (relative to suburban types of development within Erie County) can be stimulated by the construction of a grade-separated rail crossing. The following development impact analysis provides an indication of the overall expected property tax benefits associated with development of the grade separation.

Estimation of the property tax benefit of a grade-separated rail-crossing within the Westside Neighborhoods is based upon a "steady state" analysis of the probable affect such a facility would have on

the rate of development within the Westside Neighborhoods, and the resultant gross increase in property tax revenues attributable to such development. The "steady state" analysis assumes a constant property tax rate over the period of analysis, and additionally holds constant property values (no inflation factor has been applied) and assessment practices. The intent of this analysis is to provide the City of Sandusky with an approximation of the magnitude of the property tax benefits that may be attributable to a grade-separated crossing.

The City's population is expected to reach 35,600 persons by the year 2000, based upon a continuation of present local and regional development trends.^{1/} The projection assumes a modest level of growth for the City relative to expected growth within the County, particularly in relationship to suburban-types of growth expected in unincorporated portions of the County adjacent the City. A second "high" forecast has also been prepared for the City, resulting in an expected population (by the year 2000) of 37,600 persons. This "high" forecast assumes that more favorable growth and development factors will materialize over the twenty-year forecast period. Interviews with local area realtors and developers indicate that the accessibility problems inherent in the Westside Neighborhoods resulting from the at-grade railroad crossings inhibit development of the area, and place the Westside Neighborhoods at a competitive disadvantage relative to Perkins and Margaretta Townships. Given that the majority of the City's vacant developable land occurs in the Westside Neighborhoods, and the apparent constraining affect upon development attributed to poor accessibility within this part of the City, the analysis that follows will assume a "modest" twenty-year growth rate for the City of 12.1%, without construction of a grade separation; and a "high" growth rate of 18.4%, with construction of a grade separation. The difference between these two rates of growth will be attributed to accelerated growth within the Westside Neighborhoods.

The fiscal impact analysis compares the property tax generating potential of four classes of land use (residential, commercial, industrial, and all other land) for the "modest" growth (without grade separation) and "high" growth (with grade separation) assumptions.

^{1/} Erie County Land Use Plan,
Woolpert Consultants (1980).

Table 2
City of Sandusky, Ohio

FORECAST OF LAND USE
WESTSIDE NEIGHBORHOODS

| Land Use | 1980 Acreage | Year 2000 Forecast | |
|-------------|-----------------|-----------------------------|--------------------------|
| | | Without Grade Separation | With Grade Separation |
| Residential | 403 | 451 | 476 |
| Commercial | 62 | 70 | 74 |
| Industrial | 182 | 204 | 374 |
| Other | 2,030 | 1,952 | 1,753 |
| Total | 2,677 | 2,677 | 2,677 |

Source: Westside Neighborhood Development Plan and Program (1980) and Woolpert Consultants. Forecast of Industrial land use "with grade separation" includes proposed 214-acre Industrial Park.

Table 2 summarizes the affect of development in the Westside Neighborhoods, by land use, under the two growth assumptions. Market values were then determined on a per-acre basis for each land use category, based upon a review of 1980 real estate transactions, and applied to the City's current property tax rate of 51.1 mills. (Table 3).^{1/}

Applying the estimated tax revenue figures to the year 2000 forecasts of land use for each of the two growth assumptions results in the amount of property tax revenue expected to be generated in the Westside Neighborhoods by the year 2000 (Table 4). The difference in revenue between the "high" growth and "modest" growth scenarios is estimated to be the property tax benefit attributable to the construction of a grade-separated intersection in the Westside Neighborhoods.

The year 2000 estimated property tax impact of \$325,513 is not sufficient, by itself, to justify the construction of a separated grade crossing. The estimated impact most likely, however, under-represents the actual impact. First, land values and tax rates will not remain constant and will very likely increase over time. Second, the property tax impact was computed only for the year 2000, no attempt has been made to determine the cumulative impact over the twenty year forecast period, given uncertainty over the exact rate of development at any specific time over the twenty year period. Third, the analysis considers only real property; the tax impact would be higher if personal property taxes and payroll taxes were also forecasted. Finally, intangible benefits, as described below, need to be considered by the City in evaluating whether or not to provide a grade-separated crossing within the Westside Neighborhoods.

Table 3
City of Sandusky, Ohio
ESTIMATED TAX REVENUE (PER ACRE)

| Land Use | Market Value Per Acre | Generated Tax Revenue (Per Acre) |
|-------------|--------------------------|-------------------------------------|
| Residential | \$245,000 | \$4,381 |
| Commercial | \$270,000 | \$4,828 |
| Industrial | \$ 75,000 | \$1,341 |
| Other | \$ 8,500 | \$ 152 |

Source: Woolpert Consultants.

^{1/} The real estate transactions data was also compared with supplemental data gathered from a review of tax records, conducted to determine right-of-way acquisition costs for each of the three proposed alignments.

Table 4
City of Sandusky, Ohio

FORECAST OF ESTIMATED PROPERTY TAX REVENUE
WESTSIDE NEIGHBORHOODS

| Land Use | Year 2000 Property Tax Revenue | |
|-------------|--------------------------------|-----------------------|
| | Without Grade Separation | With Grade Separation |
| Residential | \$1,975,831 | \$2,085,356 |
| Commercial | \$ 337,960 | \$ 355,824 |
| Industrial | \$ 373,564 | \$ 501,936 |
| Other | \$ 296,704 | \$ 266,456 |
| Total | \$2,884,059 | \$3,209,572 |

Source: Woolpert Consultants

C. Consideration of Intangible Benefits

The tangible benefits (as described in the preceding section) which can be realized by the City of Sandusky from the construction of the grade separation are an important consideration in determining whether or not to construct such an improvement. However, the intangible (or non-quantifiable) benefits are also important elements and should be considered. The health, safety and welfare of the Westside Neighborhood and its citizens represent benefits which cannot be weighed mathematically.

Improved safety resulting from a grade separation is one such "intangible"; improved accessibility is another. The increased accessibility furnishes a means to strengthen the tie between the Westside Neighborhoods and the rest of the City. A grade separation over the Norfolk and Western railroad tracks would eliminate the time delays presently associated with that intersection. The improved access would allow emergency vehicles (including fire, police and ambulance) to proceed unimpeded across the railroad tracks.

D. Summary of Financing Alternatives

Several alternatives are available for financing the proposed grade separation at the intersection of Venice Road and the Norfolk and Western railroad tracks. The financing alternatives include federal grants and/or loans, matching funds and local bonding capacity with-

in the City. The ability to successfully apply for grants and/or loans from the federal government depends largely upon the availability of funds within the program, the type of program, and the number of communities applying for funds within the given funding cycle. The future availability and scope of the various non-local funding sources described below is uncertain given the budget recommendations of the present federal administration.

M-SYSTEM FEDERAL AID URBAN HIGHWAY PROGRAM:

This program is primarily designed to assist state highway agencies in constructing and rehabilitating the interstate highway system and in building or improving primary, secondary and urban system, roads and streets.

All capital projects in urban areas of more than 50,000 population must be based on a continuing comprehensive planning process. M-System funds cannot participate in any maintenance activities such as pot-hole patching. The Ohio Department of Transportation (ODOT) is responsible for reviewing and approving or rejecting on a final basis specific projects. M-System funds consist of 75% federal funds and 25% local funds for construction.

The availability of M-System funds prior to 1985 is unlikely for a grade separation project, given the states present commitment to the City for current highway projects and anticipated funding levels.

COMMUNITY DEVELOPMENT BLOCK GRANT (SMALL CITIES) PROGRAM:

The U.S. Department of Housing and Urban Development provides 100% grants to governmental agencies who make application and meet minimum requirements. The objective of the program is to assist communities in providing decent housing, a suitable living environment, and expanded economic opportunities principally for persons of low and moderate income. Some eligible activities include acquisition, rehabilitation, or construction of public works facilities, demolition of dilapidated housing, housing rehabilitation and economic development projects.

A community must file a pre-application, and if the pre-application rates high enough under the selection criteria an invitation to submit a full application will be issued. The full application will be reviewed to make sure that it meets all requirements including that of proposing an acceptable strategy for meeting the needs of low and moderate income families. The application process is very competitive.

COASTAL ENERGY IMPACT PROGRAM

The objective of the CEIP is to assist states and local governmental units in planning for and dealing with social, economic and environmental consequences of coastal development. Assistance in the form of project grants are awarded for eligible activities including public facility plans which are related to social, economic, and environmental impacts resulting from new or expanded energy development activity. The 1981 funds for Ohio, however, have been frozen. The Reagan administration has also proposed a cut in the program which will effectively cause its expiration in 1982.

URBAN DEVELOPMENT ACTION GRANT PROGRAM

The Urban Development Action Grant (UDAG) Program is funded through the U.S. Department of Housing and Urban Development. The purpose of the program is to assist severely distressed cities and counties in alleviating physical and economic deterioration by reclaiming neighborhoods which have had excessive housing abandonment and deterioration and by revitalizing the areas of the communities by population, outmigration or stagnating or declining tax base.

The primary criteria for selection among applicants is the comparative degree of distress and ratio of private investment to the UDAG dollars requested. The higher the private commitment the better the chances of approval. No activities will be funded that do not have a firm commitment or private resources to the project.

GENERAL OBLIGATION BONDS:

Projects which confer community-wide benefits may be financed by the issuance of General Obligation Bonds. Through this method, the taxing power of the jurisdiction is pledged to pay the debt incurred. General Obligation Bonds are backed by the full-faith and credit of the issuing municipality and are payable out of tax revenues. General Obligation Bonds are generally issued to finance permanent types of improvements, such as municipal buildings, parks and recreation facilities, local street improvements projects, and the like.

According to the City Auditor, Sandusky has a 1980 assessed valuation of \$223,765,420. The City's current outstanding debt, subject to the 10-1/2% limitation mandated by State law, is \$1,995,000. Current outstanding debt within the 5-1/2% limit which does not require referendum is \$1,650,000. The City, based upon its present assessed valuation, has the potential to issue up to \$10,657,100 in additional General Obligation Bonds. This amount exceeds the preliminary cost estimated for the construction of a separated grade-crossing and also provides a margin for the City to undertake additional planned capital improvements.

