

AN ABSTRACT OF THE THESIS OF

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Title THE IMPACT OF NATIONAL INTERSTATE ROUTE 5 ON  
ADJACENT NON-AGRICULTURAL LAND USES IN THE WILLAMETTE  
VALLEY, FROM SALEM TO PORTLAND, OREGON

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(Major professor) ✓

The impacts of modern limited-access highways on the spatial distribution of non-agricultural development, and their influence in the shaping of occupancy patterns, are far-reaching and should be of eminent concern to all Americans. The location of the Interstate routes, with 80 percent of their 41,000 miles crossing rural localities, renders large areas of previously inaccessible agricultural and other rural land accessible to the urban-related land uses of commercial, residential, and industrial developments. The very nature of the spatial interaction of rural lands with these urbanizing forces (as a result of Interstate Highway construction), results in the creation of a problem of national importance -- the increasingly rapid and usually uncontrolled conversion of some of the nation's prime agricultural lands to non-agricultural uses.

The nature and extent of the dynamic effects of

increasing encroachment by urban-related spatial systems into agricultural areas are exemplified by the route of National Interstate 5, from Salem to Portland, Oregon. Previous to the transgression by this segment of Interstate 5, the area was predominantly devoted to agricultural uses. Since urban-related development adjacent to this highway has occurred during the last ten years, it provides an excellent focus for the study of highway-related land uses similar to those occurring on the national level.

The purpose of this study, therefore, is twofold:

1. An examination and evaluation of the present and possible future impact of the recently constructed limited-access highway, Interstate 5, on adjacent non-agricultural land uses from Salem to Portland, Oregon. The extent and nature of this development is evaluated in the light of such influential factors as the nature of access, topographical features, distance and relation to urban centers, entrenchment of prior or present land uses, and real estate values.

2. An examination of the problem of disorganized and uncontrolled commercial sprawl in the vicinity of interchanges, and in areas of ribbon development adjacent to the freeway. The possibilities of utilizing land use controls, particularly progress being made in the formulation of zoning provisions, are also examined.

The analysis revealed that, aside from the removal of productive farm land taken by the right-of-way, the aggravation of existing drainage problems, and the parceling of farms and farm operations, the construction of Interstate 5 set dynamic forces in motion that are completely altering the existing spatial organization of land uses and economies along its route. It was concluded that Interstate 5 has become a dominant influence in the shaping of non-agricultural occupancy patterns on adjacent lands. The economic and land use changes appear to result from the stimulus provided by the highway for commercial, residential, and industrial development, and from the attending changes in existing land ownership, land values, and in existing land use controls.

In view of the realization that the effects of limited-access highways are far-reaching and extend much beyond the immediate properties from which right-of-way was acquired, several recommendations are presented for consideration:

1. When acquiring lands on which modern highways are to be constructed, consideration should be given to the character of land capabilities near the right-of-way, and to the impact the highway will have upon spatial organization and use systems.

2. A program should be initiated by responsible agencies to inform and educate the public as to the

total implications of the present trend of rapid conversion of large quantities of prime agricultural land to non-agricultural uses.

3. The public at large should be made to realize that money spent now on the examination of alternative Interstate routes to utilize lands of limited agricultural capabilities and the employment of land use controls are actually investments for the future.

THE IMPACT OF NATIONAL INTERSTATE ROUTE 5  
ON ADJACENT NON-AGRICULTURAL LAND USES IN THE  
WILLAMETTE VALLEY, FROM SALEM TO PORTLAND, OREGON

by

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THE IMPACT OF NATIONAL INTERSTATE ROUTE 5  
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INTRODUCTION

Man from his earliest beginnings has been aware of the necessity for adequate communications and travel facilities. This necessity has constantly urged him to improve and improvise new facilities for transportation. In technologically advanced nations, the highway has emerged as the most common form of communication. Especially in the United States, the development of highways has played a dominant role in the transformation of the economic and social patterns of life. They have been a major force in the nation's shift from a rural to a highly industrialized economy; and, today, they are a major influence in the shaping of the occupance pattern.

Recognizing the growing need for improved transportation facilities, Congress authorized the National System of Interstate and Defense Highways by passing the Federal-Aid Highway Act of 1944. Federal funds were made available to the States which had the responsibility for construction and maintenance) only in limited amounts, however, until after the passage of the Federal-Aid Highway Act of 1956. This latter act, supplemented by the Federal-Aid Highway Act of 1961, authorized the expenditure of more than 40 billion dollars for the construction

Figure 1

THE NATIONAL SYSTEM OF INTERSTATE  
AND DEFENSE HIGHWAYS



Open to Traffic  
1972 41,000 Miles

Not Yet In Progress 3,649 Miles	Engineering and Right-of- Way in Progress 11,820 Miles	Under Construction 6,135 Miles	Open to Traffic 19,396 Miles June 30, 1965
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of an integrated 41,000 mile highway network (13, p. 1). This tremendously enlarged highway system will represent, by the time of completion in 1972, the greatest peacetime construction program in history. It will be comprised of an integrated network of the nation's most heavily traveled routes, linking the country's metropolitan areas and industrial centers, serving the national defense, and connecting with routes of continental importance in Canada and Mexico (15, p. 13).

The Federal-aid highway program is administered by the Bureau of Public Roads, U.S. Department of Commerce, in cooperation with the individual states and their Highway departments. The costs of the Interstate Highway projects are paid on a matching basis, the Federal government paying 90 percent and the state governments ten percent. The states pay for the work and then claim reimbursement for the Federal share of the cost (15, p. 9).

The location of Interstate routes suggests that modern highways will exert strong influences in rural areas. Although the Interstate Highway System constitutes only about 1.2 percent of all highway and street mileage, it is estimated that it will carry over 20 percent of the nation's traffic and will pass through 37 percent of the counties. These counties contain over 50 percent of the nation's population and account for the

production of about half of all farm products sold. Over 80 percent of the mileage of the system will be located in rural areas (16, p. 123). Thus, the major share of new right-of-way needed for the Interstate Highway System, representing some 1.5 million acres and about a seven percent increase in the total area devoted to highways in the United States, will be situated in rural areas.

It is not the large quantities of agricultural land being utilized by the Interstate Highway System itself (from 20 to 40 acres per mile) that is of great concern; it is, rather, the tremendous influence that the system has as a stimulation for non-agricultural land uses that is becoming a critical concern. The controlled access, planned interchanges, separated roadways, and other modern design features make the Interstate routes remarkably safe and at the same time permit sustained and reasonably high speed of travel and economy in vehicle operation. As a result, large areas of previously inaccessible agricultural and other rural lands are made accessible to the urban worker. According to the United States Department of Agriculture, while significant amounts of farm land (approximately a million acres annually) are converted directly from farm to residential and commercial uses, even more land is being withdrawn

from agricultural production and held for future conversion to non-agricultural uses (16, p. 131). The availability of rapid transportation (i.e., the Interstate Highway System and other freeways) is the primary cause for one of the greatest problems facing the agriculturalist and the nation today -- the increasingly rapid conversion of high-quality land to more intensive non-agricultural uses.

National Interstate Route 5, from Salem to Portland, Oregon, is an excellent example of the affects that greatly increased access to urban centers can have upon the encroachment of urban developments in agricultural areas. Previous to the transgression by Interstate 5, in November of 1955, this area was predominantly in agricultural uses. Since the development adjacent to this highway has occurred during the last ten years, it provides an excellent focus for the study of highway-related land use changes within the scope of a Master's degree thesis.

#### Objectives of the Study

The main objective of this study, therefore, is to examine and evaluate the present and possible future impact of the recently constructed limited-access highway, Interstate 5, on adjacent non-agricultural land uses from Salem to Portland. A secondary objective

involves an evaluation of present and proposed land use controls, and their effectiveness in controlling development in areas adjacent to Interstate 5.

The nature of Interstate Highways is such (with access available only at limited locations) that the limited access locations offer the most logical areas for commercial development. Such development may occur in the form of service enterprises such as service stations, motels, and restaurants; other commercial enterprises such as equipment and trailer-truck sales, recreation facilities, and shopping centers; industrial sites; or residential areas. The extent and nature of this development is evaluated in the light of such influential factors as the nature of access, topographical features, distance and relation to urban centers, entrenchment of prior or present land uses, and real estate values.

The secondary objective of the study is an examination of the problem of disorganized and uncontrolled commercial sprawl in the vicinity of interchanges (such as the Market Street Interchange), and in areas of ribbon development adjacent to the freeway. In connection with this, the possibilities of utilizing land use controls, particularly progress being made in the formation of zoning laws, are also examined.

### Research Procedures and Techniques

Research procedures include the following: (1) the analysis of available background data pertinent to the Interstate System as a whole; (2) the assembly of published materials relative to Interstate 5, including liberal use of aerial and oblique photographs, and various maps of the study area before and after highway development (3) examination of land values and changes in ownership before and after development; (4) field investigations of the entire route from Salem to Portland; (5) interviews with highway officials, county officials, other research agencies, and those residential developers whose properties are adjacent to the right-of-way and interchanges. For interview purposes a checklist was constructed and used to assure standardization and completeness of the responses voiced by the various business operators. Interviews were conducted with owners and/or operators of all business establishments in the vicinity of all interchanges and the ribbon or string developments. Residential developments were examined by interviewing the various real estate agencies involved in selling property in developments adjacent to Interstate 5.



### Limitations of the Study

The basic limitations of the study are believed to be as follows:

(1) Since only ten years have passed since the completion of the freeway, development is still in its infancy. In fact, the study revealed that approximately 70 to 80 percent of the present non-agricultural development has occurred within the last five years, and it is expected that growth during the next ten years will be considerably greater than during the previous ten years. Since increased development can only be speculated, the accuracy of projection trends is necessarily limited.

(2) The size of the study area implies limitations in that only a north-south segment of 40 miles along Interstate 5 is utilized to delineate a typical situation of an agricultural area traversed by a limited-access highway. The study area was curtailed at the city limits of Portland to avoid the urban developments that were present prior to the completion of Interstate 5. The bypass around Salem was included in the study, because the completion of the freeway bypassing Salem (now encompassed by Salem) was prior to any urban development in the area, and much of the present urban development can be associated with Interstate 5.

In spite of the inherent limitations of the study,

it is believed that the examples cited represent a reasonably accurate account of the situation of non-agricultural development in a fairly typical agricultural area traversed by a limited-access highway. It is hoped that these examples will enlighten and provide some insight to the effects that such highways can, and do, have on agricultural areas through which they pass.

## THE STUDY AREA

The lowlands of the northern Willamette Valley, extending some 40 miles from Salem to Portland, are the areas traversed by Interstate 5. Three counties are situated within this area: Marion, Clackamas and Washington counties. Twenty-seven miles of Interstate 5 traverse Marion County, five miles cross Clackamas County, and the last eight miles are in Washington County (see Figure 2).

### Physical Setting

The topography of the study area is, in general, flat, but hilly areas occur in both the northern and southern borders. The area is essentially an alluvial plain produced by the burying of a former stream-modified lowland with enormous quantities of sediments brought in by tributary streams (5, p. 5). Poor drainage is a characteristic of the lower, smoother areas that not only interferes with agricultural activities, but also requires special consideration in the construction of highways. The low-level surface in conjunction with a high water table places restrictions on the availability of fill material for highway construction. This was especially noteworthy in the construction of Interstate 5. Much of the fill for the elevated roadbed and



Figure 2. The Portland-Salem Area, illustrating Interstate 5 within the study area and its spatial relationship with surrounding counties, urban centers, and highways.

interchanges was extracted from sites adjacent to the right-of-way. This has increased the drainage problem for surrounding agricultural land by causing standing water in excavated areas (see Figure 3). In addition, the elevated roadbed has had a damming and ponding effect on runoff.

The drainage problems are aggravated by the nature of climatic and soil conditions. The lowlands of the northern Willamette Valley have a mild, humid marine climate, with approximately 90 percent of the 40 inches of annual precipitation received during the nine winter months. This distribution of precipitation, complicated by the prevalence of heavy soils, greatly restricts the possibilities of evaporation, transpiration by agricultural crops, or absorption by the soil. The result of highway construction is that more of the potential runoff is left standing, rendering even worse the natural drainage problems.

#### The Highway Right-of-Way

The right-of-way requirements for Interstate 5 (with its separated lanes and limited-access feature that stress safety and accelerated speed of movement) removed considerable acreages of productive land from agricultural use. Although accompanying non-agricultural development is a more formidable threat to



Figure 3. One of the several excavated areas adjacent to Interstate 5 that has resulted in a pronounced drainage problem. This site is located approximately three miles south of the Woodburn Interchange.



agriculture, the loss of land to the highway right-of-way is an important ramification of the total impact of Interstate 5.

The Salem to Portland segment of Interstate 5 can be divided into two sections, according to the nature of construction: (1) The highway segments at either end of the study area, which are characterized by four lanes of traffic separated only by guardrail, have a right-of-way width of approximately 250 feet.<sup>1</sup> These segments comprise a total of 9.7 miles (3.7 miles from Nyberg Interchange north to Portland and five miles from North Santiam Interchange north to Hayesville Interchange, an area which is part of the Salem Bypass).<sup>2</sup> (2) The highway segment from the Hayesville Interchange to Nyberg Interchange, a distance of 30.3 miles, has a right-of-way which averages approximately 300 feet wide, with the north and south bound lanes of traffic separated by a median strip of grass and shrubbery.

The variation in the right-of-way widths of the divided and separated segments of Interstate 5 are dependent, in part, on the requirements for cuts, fills,

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1 Freeways not separated by a median strip, but only by a guardrail, are referred to as divided highways.

2 Note Figure 22, page 55, a photograph of Nyberg Interchange showing the north and south bound lanes of traffic separated by a median strip, converging to divided highway, separated only by a guardrail.

slope, and drainage of the highway. In the case of the Nyberg to Portland segment, the hilly and forested terrain resulted in more difficult and expensive construction in achieving the desired cuts and fills (Figure 4). For the segment from the North Santiam to the Hayesville Interchange, some previous residential development (especially along streets radiating out from Salem -- Center, D, Sunnyview Streets, and Silverton Road) was a factor restricting elaborate construction. On the other hand, the Hayesville to Nyberg segment (Figure 5) illustrates the influence of smooth, level topography that enabled more elaborate construction, with a median strip separating the lanes of traffic.

Probably even more influential than terrain, however, was the fact that the Salem to Portland segment of Interstate 5 was constructed and open to traffic prior to 1956, before the Federal government was paying a significant portion of the bill. The State of Oregon simply could not afford more elaborate construction that was to be made possible by the later Federal-Aid Highway Acts. Furthermore, much of the right-of-way (especially in the Nyberg to Portland segment) was purchased at the beginning of World War II, and some preliminary construction work was begun. This work preceded even the original Federal-Aid Highway Act of 1944, that authorized the





Figure 4. Lower Boones Ferry Road Interchange characterizes the hilly and forested terrain of the Nyberg to Portland segment of the route of Interstate 5. Note that this portion of the freeway is divided highway.



Figure 5. The Hayesville to Nyberg segment of Interstate 5, illustrating the smooth, level topography of the southern portion of the study area. Note the reflection of topography in the nature of freeway construction, with this portion of Interstate 5 utilizing a median strip to separate the north and south bound lanes of traffic.

National System of Interstate and Defense Highways, and, thus, before any money was being made available by the Federal government (5, p. 5).

It is interesting to note that the portion of Interstate 5 extending from the Aurora Interchange northward to Portland is to eventually become a six-lane freeway. According to State Highway officials, construction of overpasses to accommodate the six lanes of traffic is to begin in 1966. In fact, traffic on Interstate 5 has increased to the extent that it warrants the remodeling of the access ramps of the Wilsonville and Woodburn Interchanges. (For an example of the nature of changes in access, see Figure 6, the Wilsonville Interchange, as case in point.) State Highway officials state that traffic pressure also warranted changes in access at Market Street Interchange, but that the intensity of commercial development makes such a change impractical at the present time, due to the excessive cost of obtaining right-of-way.

The Salem to Portland segment of Interstate 5 has a total of 13 full interchanges, one partial interchange, 16 overpasses, six underpasses, and one roadside rest area (the Wilsonville Rest Area) now under construction.<sup>3</sup>

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<sup>3</sup> The partial interchange is the Bonita Interchange (Appendix 3A) which has access off Interstate 5 only from the north, and on Interstate 5 only to the north; there is no access to or from the south.

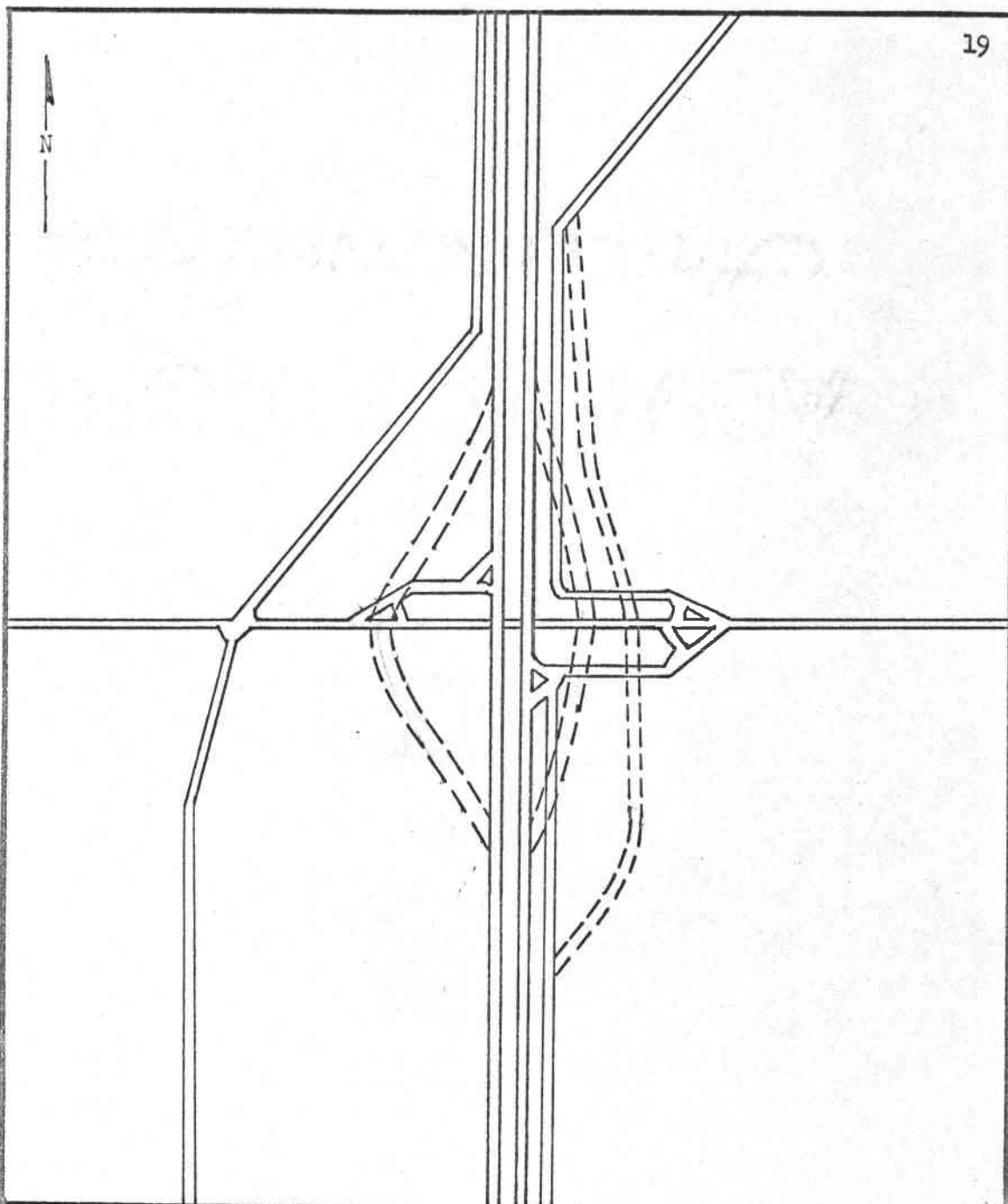


Figure 6

## WILSONVILLE INTERCHANGE

Future Approach Ramps 

Scale in Feet 

The construction standards of the Interstate Highway System are such that access is restricted to definite points where appropriate interchanges can provide safe access and exit without crossing the actual lanes of traffic. Location of interchanges, overpasses and underpasses is determined from a combination of local, county, state, and federal recommendations. The Bureau of Public Roads in Washington, D.C. has the final word as to location, since the Federal government pays most of the construction cost (90 percent). In general, interchanges in rural areas are usually at least two miles and not further than seven miles apart (13, p. 21). It is the general consensus of highway officials that these distances provide adequate access, and at the same time do not defeat the original purpose of the highway.

The average distance between interchanges on Interstate 5 in rural areas (away from the periphery of Salem and Portland) is approximately 3.8 miles. The distance between the Woodburn Interchange and the Aurora Interchange, however, is 10.5 miles, considerably exceeding the average. In urban areas, interchanges are usually less distances apart. Interstate standards require only that the acceleration lanes of one interchange do not overlap or interfere with the traffic pattern of another. The average distance between interchanges on

Interstate 5 through the outskirts of Salem is 1.2 miles, a distance considered by most highway officials as being a minimum distance.

The total extent of the right-of-way of Interstate 5 from Salem to Portland is 39.8 miles in length. According to State Highway officials, and calculations derived by use of a planimeter, the highway right-of-way and its accompanying construction features removes 1,392 acres from possible agricultural uses, or approximately 35 acres per mile. The right-of-way itself removes 996 acres, while interchanges, overpasses, underpasses, fill extraction sites, weighing and other control and maintenance areas, and the roadside park account for 396 acres of land. Thus, although the total acreage consumed by Interstate 5's right-of-way and its additional construction features is only one aspect of the impact and spatial interaction of Interstate 5, it is nevertheless a significant one.

CRITERIA OF INTERSTATE 5 LOCATION AND CONSTRUCTION  
AFFECTING NON-AGRICULTURAL DEVELOPMENT

The availability and ease with which adjacent land can be developed is directly related to the physical features and design of Interstate Highways as well as to the physical base upon which the highways are superimposed. The nature and extent of this development is a functional interaction of a variety of influential variables which, in essence, control and shape the destiny of land uses adjacent to modern highways.

Access and Exposure

The impact of access and exposure on adjacent land uses is made apparent by comparing the favorable access and exposure of developed sites to locations lacking in these qualities. The accessibility of land adjacent to Interstate 5 corresponds with the location of interchanges, and consequently, these are the sites where development has occurred. Conversely, sites without access to Interstate 5 are notably lacking in development. Figure 7, a photograph of State Street intersecting with Interstate 5, illustrates the critical role that access plays in the localization of development. Even though State Street is one of the more important arteries radiating out from Salem, lack of access to Interstate 5 has rendered it unfavorable as a development

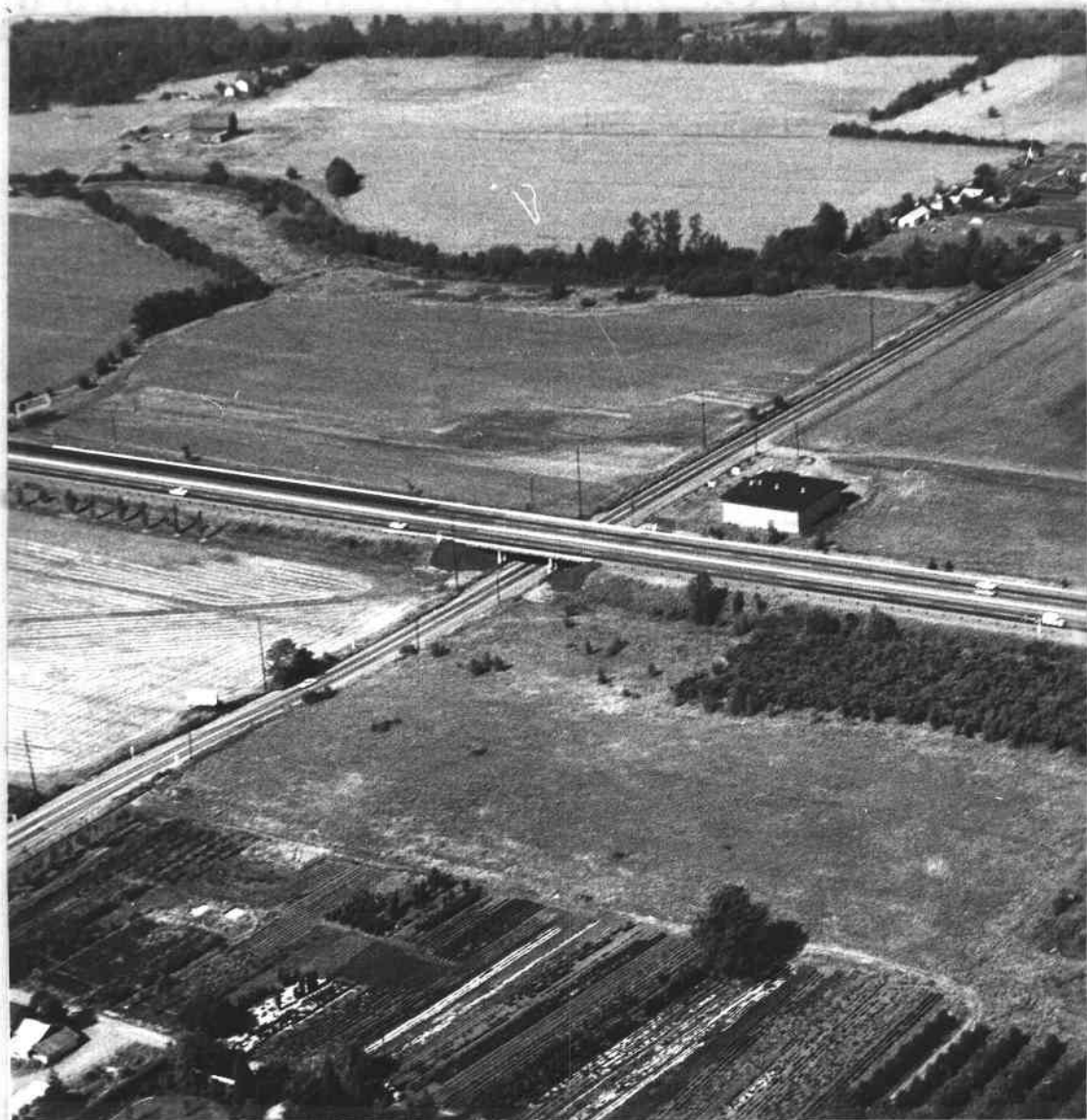


Figure 7. State Street and Interstate 5 on the periphery of Salem. Lack of access to Interstate 5 has rendered this site unfavorable for developments, even though State Street is an important artery radiating out from downtown Salem.



location.

The favorability of an interchange for development requires a combination of both good accessibility and exposure. But, often-times, even if the nature of the access is limited such as requiring an abrupt deceleration off and acceleration on to the freeway, the exposure or visibility of the development from the freeway will be of such quality as to overcome the deficiencies in access. The Market Street Interchange is an excellent example of this particular situation. Figure 8, a photograph taken from Interstate 5 south of the interchange, illustrates the value of exposure to the success of the Market Street development. Conversely, poor visibility may limit the favorability of a site, even when access is adequate. The Aurora Interchange, Figure 9, exemplifies such a situation. In this particular instance, visibility is severely limited by vegetative obstructions, and also by the elevated nature of the area adjacent to the freeway. As can be seen from Figure 9 the Aurora Interchange still is lacking in development except for a retail outlet for a nearby health food garden.

#### Nature of Interchange Design

The influence of interchange design in bringing about changes in land use has been partially examined previously (concerning access and exposure), but a



Figure 8. The Market Street Interchange illustrates the value that commercial developments place on visibility for aggressive advertising purposes. Note that even though each individual business may not be visible from the freeway, their advertising signs are.



Figure 9. The Aurora Interchange exemplifies the situation of visibility severely curtailed not only by vegetative obstructions, but also by the elevated nature of land adjacent to the interchange. The result is that the area is still in agriculture except for a retail outlet, for a nearby health food garden, in the southwest quadrant. The grove of trees on both sides of Interstate 5, at the top of the photograph, is the location of the Wilsonville Rest Area, presently under construction.

discussion of the several types of interchanges and their relationship in implementing development is appropriate at this time. Basically, there are four interchange designs utilized within the study area: (1) the semi-cloverleaf design, (2) the diamond design, (3) a widely dispersed design, and (4) design combining the semi-cloverleaf and diamond designs.

The semicloverleaf is the interchange utilized to the greatest extent throughout the study area. The three outstanding examples of this particular design are exemplified by the Market Street, Woodburn, and the 1957 North Santiam Interchanges (see Figure 10). It would appear, from the design itself, that the semicloverleaf is constructed to handle the least traffic of the four interchange designs, since all traffic on and off Interstate 5 is funneled at two locations -- one on either side of the over or under passing roads intersecting Interstate 5. The semicloverleaf design occupies a minimum of area and lends itself well to a concentration of development, as the funneling effect of traffic is quite pronounced.

The diamond designed interchange is represented by the Brooks Interchange (Figure 11). In this design the flow of traffic is distributed more evenly throughout the interchange, with an access ramp at each of the four



Figure 10. A 1957 view of the North Santiam Interchange, illustrating the semicloverleaf interchange design. Note that this design funnels all traffic on and off the freeway at two locations, one on either side of the overpass.

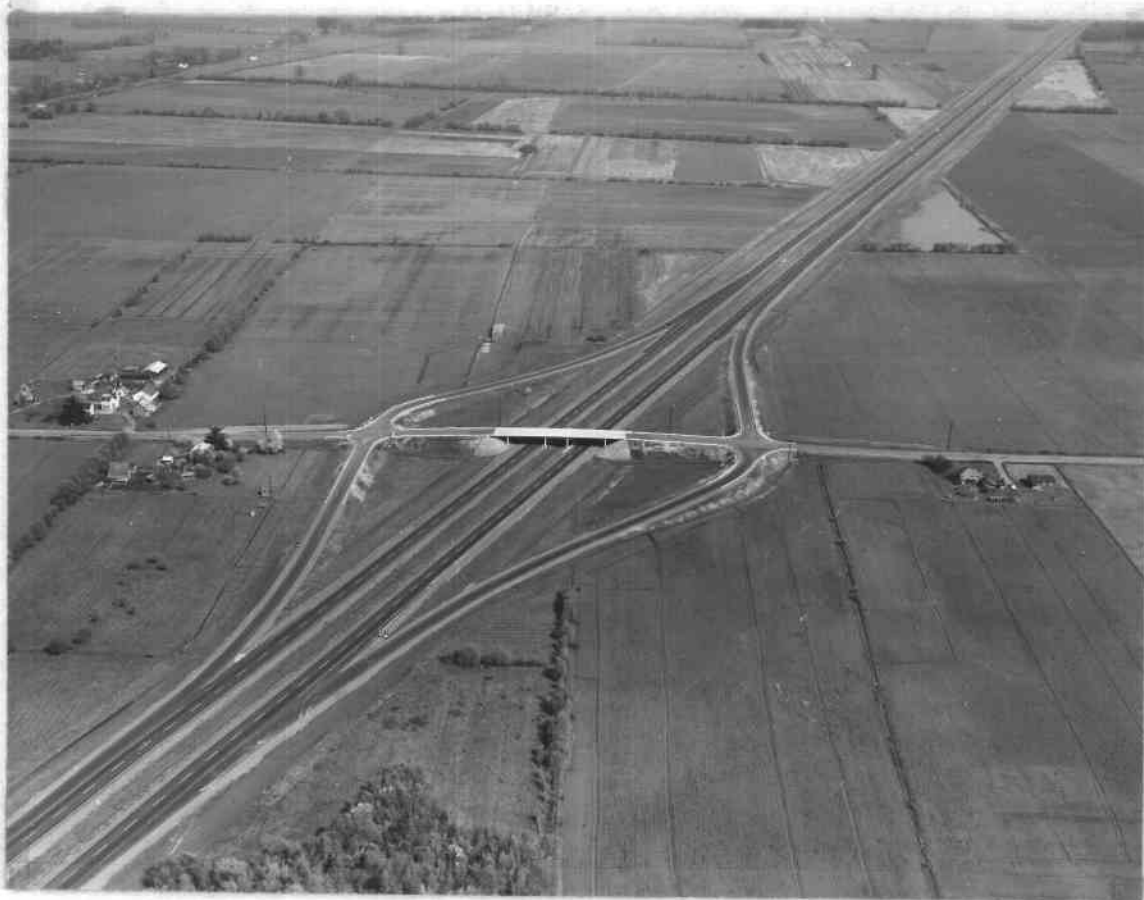


Figure 11. The Brooks Interchange represents the diamond designed interchange. Traffic is funneled on and off the freeway at four separate points.

corners. The diamond design utilizes more land than does the semicloverleaf, and its funneling effect is somewhat less pronounced.

The widely dispersed designed interchange is represented by the Hayesville Interchange (Figure 12). The design, with several one-way approaches, inherently does not lend itself to concentrated development, because the funneling effect of traffic is not as effective as with the semicloverleaf or the diamond designs. This interchange requires even greater acreages than does the diamond design.

The combination of the semicloverleaf and diamond interchanges, the "semicloverleaf-diamond", is exemplified by the present North Santiam Interchange (Figure 13). The "semicloverleaf-diamond" interchange is even more extensive in land requirements than the widely dispersed design, with even more one-way approaches which inherently do not facilitate a concentration of commercial development.

In the foregoing discussion it is apparent that of the several interchange designs employed within the study area, some are more conducive to a concentration of development than others. The semicloverleaf and diamond designs are the most advantageous for development, and the widely dispersed and semicloverleaf-diamond



Figure 12. The Hayesville Interchange is of the widely dispersed design, characterized by several one-way approaches that have discouraged effectively, until recently, a concentration of development.





Figure 13. The present North Santiam Interchange exemplifies the semicloverleaf-diamond interchange design. This interchange is designed to handle the heaviest traffic of the four interchange designs examined thus far. The North Santiam Interchange will be expanded to a full cloverleaf in the immediate future. The addition of another semicloverleaf to the present interchange will constitute a full cloverleaf interchange.

combination designs are the least desirable for development. It is interesting to note that of the 13 interchanges situated within the study area, only three are of the widely dispersed and semicloverleaf-diamond variety.

#### Topographical Influences

For the most part, Interstate 5 within the study area traverses the lowlands of the Willamette Valley, and as a result, land adjacent to the freeway has little relief and the relatively level surface is easily utilized by non-agricultural development. Where topography does inhibit development possibilities, the limiting qualities are drainage and the elevated or depressed nature of the adjacent land. Drainage is the more widespread problem, but adversities of slope are prevalent in the northern portions of the study area.

Drainage problems, however, are seldom a limiting factor in areas in close proximity to interchange locations. An exception to this is the Nyberg Interchange, where the southern half of the interchange is limited for development by low topography and poor drainage (Figure 23, page 56). In addition, the area is considerably below the freeway level, and before it would be suitable for development considerable fill would be required to bring it up to road grade. The limiting

influences of adjacent land areas being elevated above the freeway level is exemplified by the previously mentioned Aurora Interchange, where the topography obstructs the visibility and thus the development of the interchange site (see Figure 9, page 26).

#### Proximity to Urban Centers

When prospective sites adjacent to freeways are being examined for development, the most advantageous sites (when not limited by access and exposure, nature of interchange design, and topographical features) are those that are related to major traffic flow off and on the freeway. The nature of Interstate Highways, bypassing numerous urban centers, naturally concentrates traffic at those interchange locations offering access to these urban centers. It follows, that a considerable portion of the non-agricultural development adjacent to Interstate 5 is concentrated in close proximity to the urban centers that Interstate 5 bypasses or approaches.

Within the study area, Interstate 5 bypasses or approaches three urban centers: Salem, Woodburn, and Portland. Upon examination of all development adjacent to Interstate 5 it becomes readily apparent that a large proportion is associated with these three urban centers. Conversely, the Brooks Interchange illustrates the lack of development around an interchange located in a

sparsely settled area (see Figure 35, page 83). Although the Brooks Interchange offers excellent access visibility, an interchange design that should lend to development, and smooth topography, isolation from urban areas and related traffic flow has largely inhibited development. Not until May 1966 was there any development at Brooks; then a service station was established.

It should be recognized that there is a definite correlation between the nature of adjacent development and the spatial interrelation of Interstate 5 and urban centers. For instance, when Interstate 5 is bypassing an urban center (such as Salem) the adjacent development is characteristically commercial, associated with the interchanges. The interchanges, in this case, offer the easiest and most direct connectivity between Interstate 5 and the urban center. When Interstate 5 is approaching an urban center (such as Portland), however, development is characteristically residential and industrial, associated with ribbon development between the interchanges. In this instance, the interchanges are the linkage between the developments and the urban center via Interstate 5.

#### Prior Land Uses and Land Use Controls

The effect that an improved highway has on land development is ordinarily indicated first by the changes

that occur on vacant or extensively utilized lands. These lands are developed before previously occupied lands are converted to a higher use, primarily because they do not have existing zoning provisions, extensive buildings, or other improvements which hamper or deter development, and in general they are less expensive to purchase and develop than are lands in prior use.

In the case of lands adjacent to Interstate 5 utilization prior to November of 1955 was primarily devoted to agricultural, grazing, and forest activities. Land values at this time ranged from \$1,000 to \$2,000 per acre in the peripheral areas of Salem and Portland, and from \$250 to \$1,000 per acre in the more remote rural portions of the study area (8, p. 5, 33 and 41). It was this combination of available, relatively inexpensive, and extensively utilized land, in conjunction with the increased access afforded by Interstate 5, that sparked the present "glaciation" by non-agricultural development in areas adjacent to the freeway.

Land use controls, such as zoning provisions, affect the nature and extent of non-agricultural development. This is particularly evident in industrial developments. In Figure 30, page 67, an area of approximately five square miles has been zoned specifically for

light industry.<sup>4</sup> This area, prior to the construction of Interstate 5, was characterized by relatively inexpensive farm land and relatively extensive farming operations. Commercial development can also be affected by land use controls. For example, at the Market Street Interchange, the urban encroachment of Salem has encompassed the Market Street development within the city limits, as of 1965. Consequently, although prior to this there were little or no development restrictions (other than state and county building codes), developers since have had to petition surrounding residents to secure permission to extend the commercial zoning in the vicinity of the interchange. Wilson Buick (half oval building in the northwest quadrant of Figure 16, page 43), is an example of such a business that had to obtain a zoning change before construction could begin.

It is generally agreed that land adjacent to Interstate 5 lacks substantial land use controls, other than the respective county building codes. But it can be seen from the examples cited that when land use controls are utilized, they can have definite influences on the nature and extent of non-agricultural development in areas adjacent to Interstate 5.

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4 Light industry is defined as industry without smoke-producing operations, and whose operations are not excessively noisy -- bothering neighboring residences. Steel fabrication is an example.

THE IMPACT OF INTERSTATE 5 ON THE EXTENT AND NATURE  
OF NON-AGRICULTURAL DEVELOPMENT

In addition to the removal of productive farm land taken by the right-of-way, the aggravation of existing drainage problems, and the parceling of farms and farm operations, the construction of a modern limited-access highway (such as Interstate 5) sets dynamic forces in motion that can completely alter the existing spatial organization of land uses and economics along its route. Thus, it may be hypothesized that these highways have become a dominant influence in the shaping of the modern occupancy patterns of the nation. The economic and land use changes appear to result from the stimulus provided by the highway for commercial, residential, and industrial development, and from the attending changes in land ownership, land values, and in existing land use controls.

To arrive at a better understanding of the impact of a limited-access highway on the nature and extent of development, as well as to test the hypothesis, a sequence of photographs has been assembled and analyzed. These photographs, taken at intervals of about four years along the route in the study area, illustrate the changes in land use that have occurred from 1957 to the summer of 1966 (for photographic locations see Appendix 3B).

The photographic illustrations focus on the spatial

distribution of the three basic types of land use changes: commercial, residential, and industrial developments. The sequence coverage by the photographs gives perspective to the nature and extent of correlation between Interstate 5 impact and these adjacent developments. It should be recognized that these examples of alienation in land use cited in this study represent a part of the estimated million acres of agricultural land in the United States which are being converted to non-agricultural uses each year. Even more is withdrawn from agriculture and held for future non-agricultural uses.

#### Commercial Development

Some land uses are notably a product of favorable location. The ease of movement and the limited-access features of Interstate 5 not only concentrates the north-south traffic flow, but also bypass numerous cities and towns. The bypasses, therefore, increase the distances between accessible established service centers, and this creates a demand for new roadside services. The most logical locations for the new commercial developments are the sites adjacent to the interchanges.

The dynamic influence of such a location is illustrated by the interchange development at the southern end of the study area. This is the Market Street



Interchange, located on the portion of Interstate 5 which bypasses Salem just east of the city proper. From Figure 14, which was taken in August of 1957, it is readily discernible that nine years ago the area was still primarily devoted to an agricultural economy. Market Street was a lightly traveled artery serving the east central Salem suburbs and some of the farm area farther to the east, and the bypass at this time was only a two-lane highway, opened in 1955. In 1958 the bypass was widened to four lanes and the interchange revamped to conform to the new traffic pattern (8, p. 39). Even in August of 1957, the beginnings of commercial activity were in evidence in the southeast quadrant of the interchange, with the near completion of a Mobil Service Station and construction underway on a Standard Service Station.

Figure 15 was taken four years later (November 1961), after the completion of the four-lane bypass. By this time commercial activity had greatly increased with the construction of two additional service stations, a forty-unit motel, a drive-in restaurant, and a luxury lounge and restaurant. An additional commercial stimulant in the general vicinity was the completion of the Roseland Shopping Center (upper left portion of photograph).

Figure 16 (taken July 1966), represents the present



Figure 14. An August 1957 view of the Market Street Interchange, taken two years after the opening of the two-lane bypass. The vicinity is still primarily devoted to agricultural activities, but commercial development has been initiated.



Figure 15. A September 1961 view of the Market Street Interchange, taken six years after the opening of the two-lane bypass and three years after the completion of the four-lane bypass. Commercial development has accelerated and agricultural activities are rapidly disappearing from the scene. The Roseland Shopping Center is in the upper left portion of the photograph.



Figure 16. A March 1966 view of the Market Street Interchange, taken 11 years after the opening of the two-lane bypass and eight years after the completion of the four-lane bypass. Agricultural operation in the area has practically ceased because of actual commercial developments or because land is being withheld for future development. Areas A, B, C, and D are such withheld lands presently for sale or lease. Tracts 1 and 2 are sites presently under construction.

commercial development at the Market Street Interchange. Presently, there are seven additional service stations, two large motels, a luxury restaurant, two drive-ins, a car and truck repair service, and the large Eastwood Plaza Shopping Center. It is readily apparent that most of the development at Market Street has occurred since 1961, or within the last five years. It is generally agreed among the various commercial enterprises that the Eastwood Plaza Shopping Center should receive much of the credit for the stimulation of this development. Even so, most commercial proprietors agree (except those in the shopping center itself) that approximately 70 to 80 percent of their business is attributable to Interstate 5. Moreover, it was discovered that the primary location factor for the Eastwood Shopping Center was the congestion of traffic resulting from the intersection of Market Street and Interstate 5. (From interviews, Appendix 2B).

Whereas commercial activity along Market Street, between Interstate 5 and Salem, has taken a tremendous surge upward since the opening of the freeway, the activity drops off abruptly to the east of the interchange proper. This fact supports an axiom that properties between a major interchange and the city center generally attain premium commercial value (9, p. 39).

Commercial development at the Market Street

Interchange is continuing. A restaurant and a motel are presently under construction in the sites marked 1 and 2. Areas marked A, B, C, and D are examples of agricultural land now unproductive and awaiting development (Figure 16).

Changes similar to those cited at Market Street can also be noted at other interchange areas. An interchange in which development began later than Market Street, but which occurred no less explosively when it got underway, is the Woodburn Interchange (Figures 17, 18, and 19). This interchange, just west of the town of Woodburn, the local hub of a small general farming community with a population of 5,000, is 28 miles south of Portland and 17 miles north of Salem via Interstate 5. Lying to the west of the interchange is an agricultural area which is devoted primarily to the raising of grain and grass seed crops.

Figure 17, the Woodburn Interchange taken August 1957, reveals no commercial development since completion of Interstate 5 in 1955. The entire interchange area is still in the realm of the agriculturalist. Even Figure 18, a September 1961 view of the area, indicates only the beginnings of development. Although the photograph reveals only one service station (a Standard station in the lower left portion of the photograph), the



Figure 17. The Woodburn Interchange taken August 1957, two years after the completion of Interstate 5. No development has yet occurred, and the area is still completely devoted to agriculture.



Figure 18. The Woodburn Interchange taken September 1961, six years after the completion of Interstate 5. Development thus far has been slow, with one service facility and the beginnings of the Woodburn Senior Estates. The community in the upper right portion of the photograph is Woodburn.





Figure 19. The Woodburn Interchange taken July 1966, eleven years after the completion of Interstate 5 and five years following Figure 18. During the last five years development has been explosive, mostly associated with the Senior Estates.

right-central portion of the photograph shows the start of what will eventually become the dominant land use and an important stimulant for other development, the Woodburn Senior Estates.

Figure 19, taken less than five years later (July 1966), presents a panoramic view that shows that Woodburn's development has been of an explosive nature, and also shows the dominant role that one development can play in the stimulation of other development. Senior Estates, at the present time, has under development 350 acres, and immediate plans for an additional 57 acres south of the main development. Officials of Senior Estates report that a total of over 1,400 individual home sites are planned; at the present time about 1,000 have been sold, but slightly less than that number are occupied or under construction. Estate officials state that two of the prominent selling points attributable to Interstate 5 are the accessibility of Estates to Salem and Portland, and their excellent visibility from the freeway for advertisement purposes.

In addition to the homesites of Woodburn Senior Estates, the present commercial development includes a motel, apartments, a golf country club (all of which are part of the Estates), a \$2.5 million shopping center, a drive-in restaurant, and five service stations. All the

service enterprises contacted agreed that only approximately 50 percent of their business was attributable to Interstate 5, and that the remainder was associated with the Senior Estates. This figure includes even those services that abut the interchange.

Continued development at the Woodburn Interchange appears to be imminent, since the northwest, southwest, and southeast quadrants of the interchange are still relatively unoccupied and are listed with realtors. A Richfield station and Belle Passi Village residential development are proposed for the southeast quadrant, and it is reported that the Nazarene Church has acquired some acreage in the northwest quadrant for a summer church camp. The southwest quadrant is presently still in agriculture, but has been listed with a realtor for future commercial use.

Other concentrations of commercial development adjacent to Interstate 5 are still in the relatively early stages of growth compared to the Market Street and Woodburn Interchanges. The Wilsonville and Nyberg Interchanges represent two of the newer and less advanced commercial developments. The Wilsonville Interchange (Figures 20 and 21) is about ten miles south of Portland and one-quarter mile east of Wilsonville, a small community with a population of 250 and the local hub of a



Figure 20. A November 1961 view of the Wilsonville Interchange, showing a beginning of commercial activity in the vicinity. Agricultural enterprises, however, still dominate the land use scene.



Figure 21. A July 1966 view of the Wilsonville Interchange, showing only a modest increase in commercial activity, most of which, however, has occurred within the last year. Development can be expected to continue at an accelerating rate.

general farming area prior to the construction of Interstate 5.

In 1958, following completion of the freeway, construction began on the F. H. Dammasch State Hospital, approximately one mile southwest of Wilsonville. The selection of this location took into consideration the direct and rapid freeway access to the centers of population. Since completion of Interstate 5 there has been considerable real estate activity in the general vicinity, especially in residential properties with riverfront lots along the Willamette River a mile south of the interchange (8, p. 17). Some commercial activity has also been generated; by November 1961 there were two service stations, a restaurant, four trailer courts, and an architect's office near this interchange (Figure 20). At present there is another large restaurant, an additional service station, and a real estate office (Figure 21). Commercial activity should continue in the immediate future, since there is a proposed motel for the northwest quadrant, and the land south of Barclay's restaurant in the southeast quadrant is presently awaiting development. It is understood that development plans include a 50-unit motel and a bank (8, p. 17).

The Nyberg Interchange has experienced even less commercial activity than has the Wilsonville Interchange.

As recently as November 1961 commercial development was represented by only two service station facilities (Figure 22). During 1965, activity at the interchange was stimulated by the construction of the exclusive and luxurious Ramada Inn, a combination restaurant and motel (Figure 23). It was stated by Ramada Inn personnel that about 20 percent of their patrons arrived by air, and that they offer free bus service to and from the Portland International Airport one-half hour away. The quiet, rural location, accessibility to Portland, and excellent visibility from Interstate 5 were the three primary location factors responsible for the selection of the site.

Proposals for future development call for another service station, and a recreational park and trailer court in the northeast quadrant. Reports indicate that a shopping center is proposed for the northwest quadrant, a housing development for the southwest quadrant, and a golf course for the southeast quadrant (8, p. 9).

#### Residential Development

Residential development, like commercial development, is often associated with the increased access afforded by modern freeways. Improved transportation brings large acreages of land close enough to employment and shopping centers, in terms of traveling time, to make the land suitable for development. It is in this manner that



Figure 22. A November 1961 view of the Nyberg Interchange, revealing an area predominantly devoted to agricultural and forested lands, but with a beginning of commercial activity. Note the separated lanes of Interstate 5 converging to divided highway. The Tualatin River is in the background.



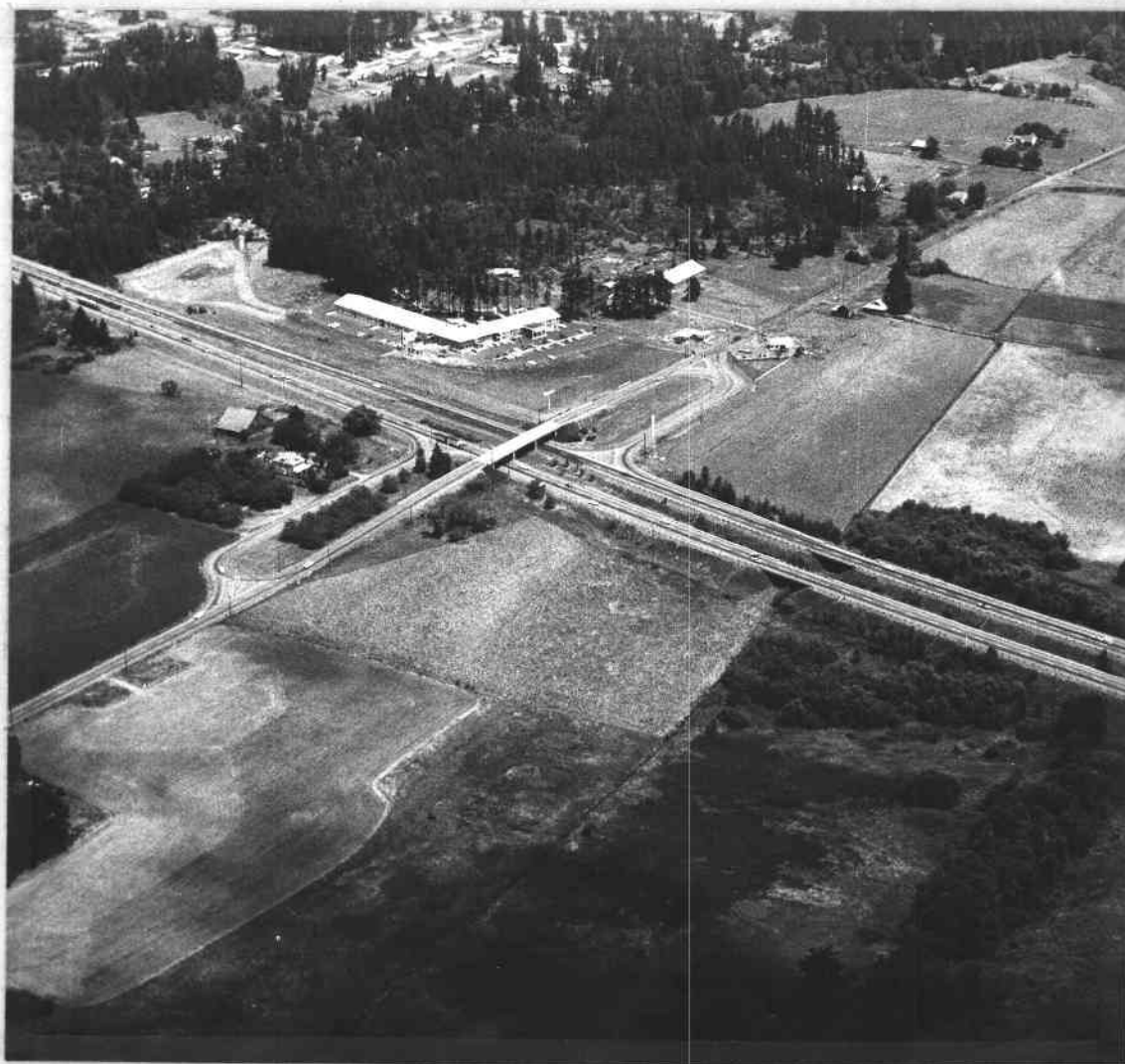


Figure 23. A July 1966 view of the Nyberg Interchange revealing little increase in commercial activity, other than the Ramada Inn. Development is restricted from the southern half of the interchange (lower right portion of photograph) because of the poor drainage and terrain below the level of the freeway. Residential expansion is occurring in the background.

Interstate Highways increase the supply of residential land; this effect has been recorded in areas adjacent to Interstate 5.

Residential developments that can be directly attributable to Interstate 5 are localized in the northern portions of the study area, where downtown Portland is readily accessible via the freeway. Most noteworthy of these developments are Southwood Park and Woodland Park (designated A and B in Figures 24 and 25). Both of these residential parks are located approximately five miles southwest of Portland along the southeast side of Interstate 5 near the Haines Road Interchange. Southwood Park, older of the two developments, was completed about 1960 (Figure 24). Woodland Park, located just south of the Southwood Park site, is still in the process of expanding, but most of the home units were completed prior to 1966 (Figure 25).

The homes in the two subdivisions include two-bedroom to four-bedroom models, ranging in price from \$13,000 to \$20,000 in Southwood Park, and from \$18,000 to \$24,000 in Woodland Park (11, p. 29). A noteworthy fact is that prices paid for home units adjacent to the freeway vary little from those paid for similar home units away from the freeway. The promoter stated that he did not consider the proximity of Interstate 5 a



Figure 24. A November 1961 view of the Southwood Park subdivision, marked A, located near the Haines Road Interchange. The area marked B, just south of Southwood Park, is the beginning of the Woodland Park subdivision. The site marked X is the Tigard Interchange, the northern boundary of the study area.



Figure 25. A July 1966 view of the Southwood Park and the Woodland Park subdivisions, located near the Haines Road Interchange. Both subdivisions cater to Portland commuters.

factor in pricing the individual units, but he did state that the success of the two subdivisions was attributable to the accessibility of downtown Portland; Interstate 5 has reduced commuting time from 30 to only ten minutes.

Several significant residential areas occur in the southern portions of the study area along the Salem bypass. These residential developments are considerably less dependent upon Interstate 5 for success, since the freeway does not offer direct access to downtown Salem. In fact, some realtors consider Interstate 5 to be a detrimental influence to residential subdivision, since it severs the areas east of the bypass from Salem proper, blocking the extension of sewers, water, and other city-provided facilities and services to the severed areas. The noise of Interstate 5 is an additional complaint voiced by residents adjacent to the freeway. The fact remains, however, that residential development has occurred and realtors generally agree in an estimate that, in spite of the detrimental influences, the proximity of Interstate 5 is a direct attraction for 30 to 40 percent of the residential sales. Realtors explain that many of the residents, with occupational requirements in other urban areas with access to Interstate 5, utilized the freeway for commuting purposes. Many sporting and recreational enthusiasts also reside in

these subdivisions because of improved access to mountain, lake, and stream areas. Other residents have selected home sites near the freeway for a combination of these reasons, plus the opportunity to live in the atmosphere of a rural area still close to the shopping centers associated with Interstate 5 interchanges.

Figures 26 and 27 illustrate residential growth in the vicinity of the Market Street Interchange. Figure 26 represents a November 1961 view of the area shortly after development was initiated. Figure 27, taken five years later (July 1966), reveals that residential growth has continued in the immediate area, but not as dramatically as has been occurring at sites adjacent to the freeway near Portland.

Trailer courts are another form of residential development found closely associated with Interstate 5. Seven of these are found in the study area. Figure 28, a view about one mile north of the Wilsonville Interchange at Boeckman Road, exemplifies trailer court development. The accessibility of Portland, and at the same time the rural atmosphere in close proximity to the Willamette River, are the location factors responsible for the success of the Boeckman Road trailer courts. Four of the seven trailer court sites in the study area are found in the vicinity of the Wilsonville Interchange.



Figure 26. A November 1961 view of residential development in the vicinity of the Market Street Interchange. Note the clustering effect of the subdivisions around the interchange. For rate of growth, compare the development in the lower right portion of photograph with Figure 27.





Figure 27. A July 1966 view of residential development in the vicinity of the Market Street Interchange. It is evident that residential growth along the Salem bypass is not as dynamic as is similar development adjacent to the freeway near Portland. The subdivision referred to in Figure 26 (lower left portion of photograph) has expanded some, but not dramatically.





Figure 28. The Walnut Park and Thunderbird mobile homes at Boeckman Road, one mile north of the Wilsonville Interchange. These courts are typical of seven such developments adjacent to Interstate 5 in the study area. Access to Interstate 5 is also available at the Safford Interchange in the far background.

### Industrial Development

Improved highways promote the growth of industry by their favorable influence on several of the factors of production. Modern highways not only provide industrial accessibility to rural land and improve the spatial interaction of industrial sites with markets and supply centers, but they also facilitate the commuting of employees through an improved and more efficient transportation network.

The requirements of industrial location (the availability of inexpensive tracts of land, accessibility to transportation and markets, and favorable land use controls), however, necessarily place limitations on developmental possibilities of sites adjacent to Interstate 5. These requirements presently restrict industrial growth to the northern portions of the study area, and at the present time only one locality has experienced development. This is an industrial park of approximately five square miles located six miles southwest of Portland on the west side of Interstate 5 near the Bonita Interchange (Figures 29 and 30).

Prior to 1961, little development had occurred in the area, and that was of a light manufacturing nature. Then, Fought and Company obtained a zoning change from light manufacturing to light industry, to permit the



Figure 29. A November 1961 view of an industrial park adjacent to Interstate 5 near the Bonita Interchange (interchange in upper center of photograph). The park is still primarily in agricultural activities, but Fought and Company (1) have established a structural steel fabrication plant. The other two buildings are a fruit preserve (jams and jellies) operation and a chainsaw bar producing company. Note a recently constructed 80-unit trailer park in the lower left portion of photograph and the residential developments east of Interstate 5.



Figure 30. A July 1966 view of the industrial park near the Bonita Interchange. The park is now occupied by 14 separate operations, and the entire area along the freeway appears to be occupied. The large operation in the center of the photograph is the convoy company; railroad carriers loaded with new cars can be seen in the yard awaiting unloading. The central building is an operation that repairs and services new Ford Corporation cars on the spot. Construction is under way on the Beaverton Freeway in the far upper right portion of photograph; this is the point where it will make junction with Interstate 5.

construction of a structural steel fabrication plant (Fought is designated (1) in Figure 29). This zoning change was responsible for initiating rapid expansion, and by July 1966 there were 14 separate industrial operations in the park (Figure 30).

Industrial firms now existing are characterized by steel fabricating, trucking terminals, car and truck services, equipment services, and (the most prominent operation of the development) a car convoy company. The convoy company is the only industry that is equally dependent on accessibility to the railroad. Most of the other operations utilize Interstate 5 exclusively for their transportation requirements. Although it may be an overstatement to say "the factory followed the freeway", there is ample evidence to suggest that Interstate 5 was as influential as inexpensive land, available markets, and favorable land use controls in localizing this industrial park. (From interviews, Appendix 2D).

The industrial park is continuing to expand, with another equipment service under construction, and several industrial sites are being offered for sale or lease. At the present rate of expansion, it will be only a short time before the five square miles presently zoned for industrial development is fully occupied. When this occurs, industrial zoning will no doubt be

extended as additional industrial demand warrants.

#### Affects on Outdoor Advertising

The outdoor advertiser is one of the most obvious nonvehicular beneficiaries of the highway, and almost every heavily traveled highway in the United States has billboards and signs of every description. The success of outdoor advertising is linked to the widespread use of the automobile by the general population. Because the objective of a billboard advertisement is to reach as many motorists as possible, locations accessible to urban areas and along Interstate Highways, with their heavy concentrations of traffic, are prime sites for billboard advertisement.

The Federal government recognized the growing problem of uncontrolled billboard construction in the Federal-Aid Highway Act of 1958, by declaring it to be in the public interest to encourage and assist the states to control outdoor advertising within the designated limits of the National System of Interstate and Defense Highways. Compliance with Federal regulations enabled a state to qualify for an incentive payment. This amounted to an extra one-half of one percent of the Federal contribution toward the cost of construction of Interstate Highways passing through its area. The Federal-Aid Highway Act of 1961 increased this incentive

payment from one-half of one percent to five percent, and 20 states, including Oregon, have entered into agreements with the Secretary of Commerce to fully control outdoor advertising along Interstate Highways (16, p. 172).

The Oregon Interstate Highways Outdoor Advertising Act, as amended in 1965, has severely restricted the numbers and types of billboards found adjacent to Interstate 5. Outdoor advertising signs located within view of any Interstate Highway must be at least 2,000 feet from any other outdoor advertisement. Signs that advertise roadside services exclusively must have an advertising area of less than 250 square feet, be within five miles traveling distance from the roadside service, and there are to be no more than two such signs in each direction within five miles of the roadside services. In addition, many areas along interstate highways are of such natural beauty that they are completely protected from outdoor advertising billboards. These "protected areas" are areas within 660 feet of the edge of the right-of-ways that have been acquired subsequent to July 1, 1956 (10).

There are approximately 100 large billboards evenly distributed along the north and south bound lanes between Salem and Portland. Figure 31 illustrates the nature of



Figure 31. A typical billboard advertising a roadside enterprise that can be found adjacent to Interstate 5 in the study area. The location is five miles south of the Woodburn Interchange. A second billboard is situated just ahead of the truck, about 2,000 feet from the first.



billboard construction and content, and the spacing requirement of 2,000 feet between signs. The photograph also illustrates a typical billboard location, a site in one corner of a field where as little land as possible is taken out of production. Rental fees for land occupied by the billboards are usually subject to negotiation between the landowner and the billboard owner; fees are reputed to be as high as \$50 a month for a strategic location (16, p. 170).

#### Changes in Land Ownership and Land Values

The changes in land use, resulting from highway construction and improved access, cannot be considered separately from changes in land ownership and land values. Basically, most of the impact of a highway is reflected in the changes in land values. Sales data are an excellent measure of highway impact, since increased land values and resulting changes in land use are usually associated with transfers of land titles.

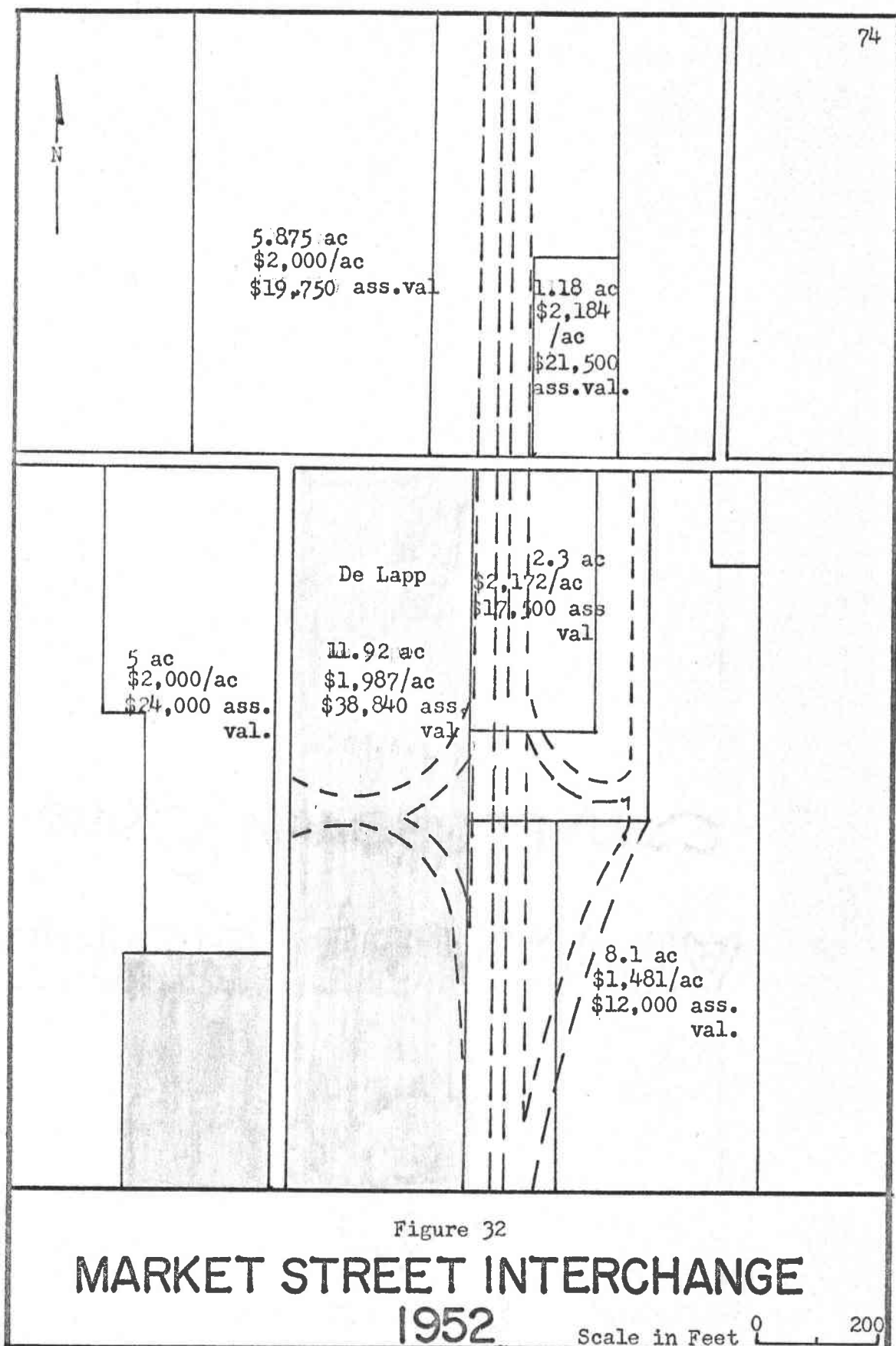
The completion of Interstate 5 subjected adjacent properties to the dynamic effects of new land use potentials, resulting in rising land values and changing occupancy patterns. The agriculturalist was attacked by both positive and negative forces; an increase in land values, and higher taxes on this higher priced land. Nowhere is the interaction of new land use potentials,

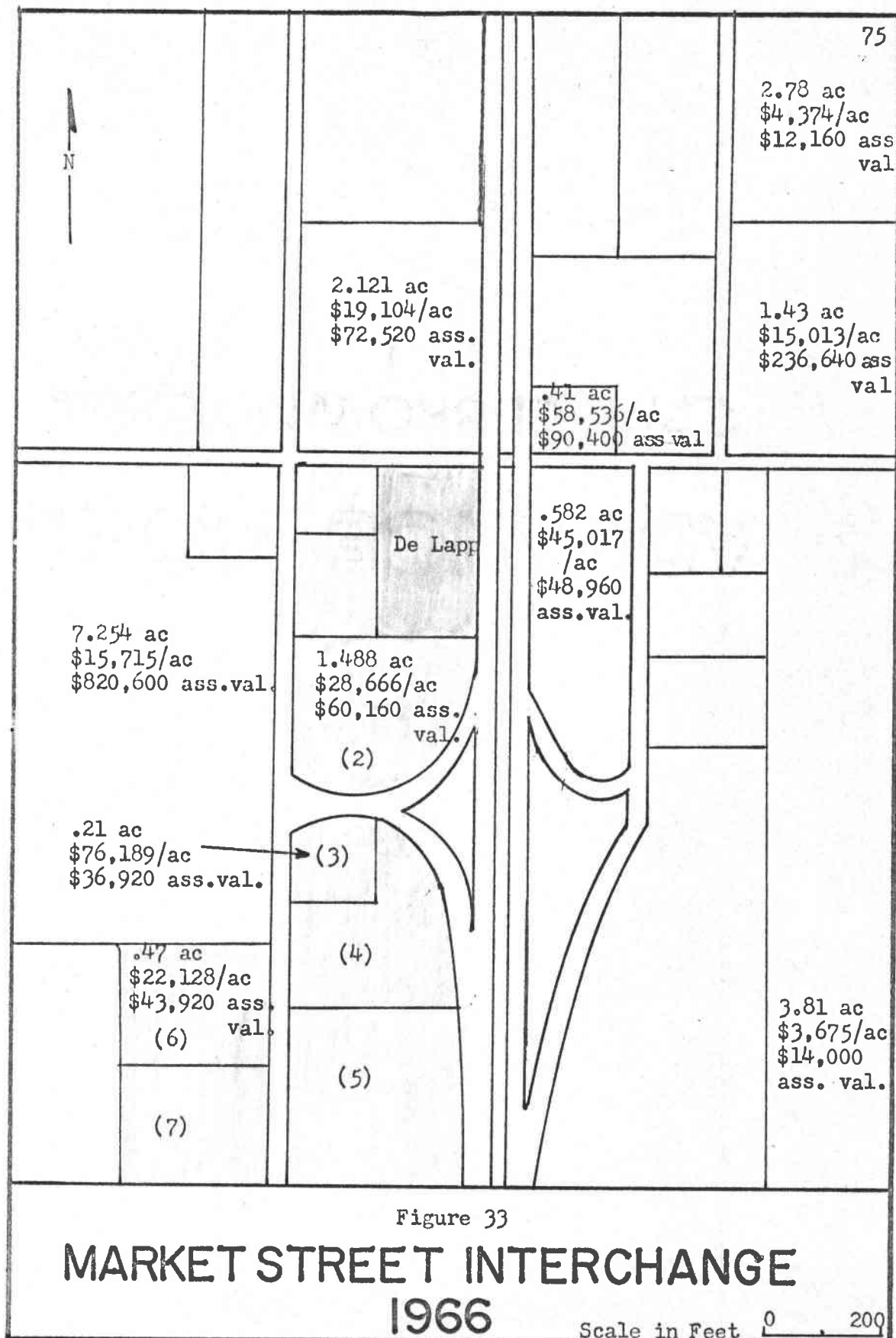
rising land values, and the changing occupancy pattern more portrayed than in the vicinity of the Market Street Interchange.

Figure 32, illustrating the ownership pattern of the area prior to the acquisition of property by the Highway Department in 1952, reveals the existence of 15 separate properties. By July of 1966, eleven years after the advent of Interstate 5, this number had grown to a total of 28 individual properties (Figure 33).<sup>5</sup> A more vivid impression of Interstate 5 impact is obtained when it is realized that only three of the original 15 property owners are still represented today, and that many of the present properties are the result of several subdivisions and have passed through a series of middlemen before being purchased by the present landowners. During each of these transactions a substantial profit was realized. In Figure 32, for example, in properties designated in yellow, the following sales and lease illustrate the activity and price trends typical of the Market Street Interchange over a period of three years (7, p. 41).

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<sup>5</sup> For simplification, properties leased or rented from an adjacent landowner were considered as a separate property.





Parcel 3 and 4, De Lapp to Lorenz, April 1956	2.24 acres....\$4,700
Parcel 5, De Lapp to Elfstrom, May 1956	2.1 acres..... 5,000
Parcel 2, De Lapp to Gen. Petroleum, June 1956	1.75 acres....10,000
Parcel 6 and 7, De Lapp to Dunham, Dec. 1956	2.49 acres....11,000
Parcel 4, Lorenz to Elfstrom, August 1957	1.5 acres..... 4,000
Parcel 3, Lorenz to Shell (lease), May 1958	0.8 acres.....20,000
Parcel 4 and 5, Elfstrom to Woodroffe, Oct. 1959	3.6 acres.....16,000

Figures 32 and 33, in addition to delineating the changes in land ownership, also illustrate the changes in land values. The number of acres, value per acre, and the total assessed value of the properties (land value plus improvements) are indicated in the years shown by the two Figures. In this manner, a comparison of before and after land values can be made, and the increases in value by virtue of Interstate 5 construction is readily discernible. Although it is difficult to relate land values of subdivided property to the values of the larger areas from which they were subdivided, it is obvious that substantial increases in land value have occurred and large profits were realized by their sale. As shown by Figures 32 and 33, land that was valued at \$2,000 per acre in 1952 has increased to at least \$15,000 per acre and often in excess of \$20,000 per acre; whereas similar lands removed from direct freeway influence are valued at between \$4,000

and \$5,000 per acre (see properties in the far northeast and southeast corners of Figure 33).

Changes in land ownership and land values have occurred throughout the study area, although not so dramatically as at the Market Street Interchange. The Market Street experience is a preview of the economic activity other interchanges in the study area will experience within the foreseeable future.

#### Land Use Controls

Intensive commercial developments associated with limited-access highways are not always desirable. Some developments (drive-ins, automotive facilities, and general merchandise functions) often create a number of serious problems. They may be disorganized, unsightly, noisy, interfere with orderly development of nearby land by consuming highway frontage and access, and may be accident hazards. Unorganized and uncontrolled development of this nature has occurred in areas adjacent to Interstate 5. The Market Street Interchange provides an example of such an unsightly, noisy, sprawling, and hazardous development. Congestion at this interchange is rapidly approaching the point of necessitating traffic improvements, such as widening Market Street to four lanes and the introduction of traffic lights.

A more desirable and efficient occupancy pattern in

the vicinity of a limited-access highway would include freeway-related service establishments on the most accessible sites, larger freeway-oriented developments (motels, restaurants and shopping centers) in locations near the interchange, and residential or industrial development beyond. This is the pattern that creates maximum convenience, maximum land values, and maximum tax revenues. Combined with a well designed local road system, this pattern provides efficient movement of traffic between the freeway and the developments along its borders.

Such a desirable and efficient pattern of growth is likely to occur only where the land surrounding an interchange is controlled by a single owner who understands its best use. Most often, however, such growth occurs where local government has comprehensive plans implemented by precise zoning and adequate local road standards. Such planning within the major incorporated cities is expected, but outside such corporate limits it seldom exists. The concept of such comprehensive land use planning is new to the state and to the county governments within the study area. At the Market Street Interchange, for example, county provisions did not exist until 1958 (other than local building codes). Development even then was not effectively controlled because the zoning

provisions were broad.

Presently, the state and county governments are conducting several studies concerned with zoning and other devices for land use control. These include the acquisition of easements, development rights, and wider right-of-way on interchange approach roads. The Mid-Willamette Planning Agency has presented a proposal for controlling development by the acquisition of easements on the approaches to interchange ramps. The length of the easements would be dictated by the nature of the intersecting road; they would be, for example, longer on a heavily congested highway and shorter on a lightly traveled road. This proposal would eliminate development adjacent to access approaches, thus alleviating congestion and traffic hazards in the vicinity of interchanges. Figure 34, a July 1966 view of the North Santiam Interchange, exemplifies the complete absence of interchange development when the accessibility along the intersecting highway is effectively controlled. Even though this interchange is situated near the periphery of Salem and the North Santiam highway is a major link between Salem and points east, there is no commercial activity. By effectively controlling access, the Oregon State Highway Department, in essence, controls the adjacent occupancy pattern.





Figure 34. The North Santiam Interchange, taken July 1966, exemplifies the effectiveness of controlled access along the intersecting highway with Interstate 5. Even though this interchange is on the periphery of Salem and the North Santiam highway, it is a major Oregon highway; there is no commercial development.

It has been suggested that the State Highway Department or other state agencies should be empowered to allocate zoning provisions in all areas bordering highways, not just in the vicinity of interchange approaches. This would, of course, involve the setting of some standards by the state for acceptable zoning patterns along state and federal highways. In the "long range" view, however, land use planning is the vital concern of local governments and citizens, since the uncontrolled development of land uses will not only impair property values and tax revenues, but it can lead to excessive costs in providing all types of local public services. For example, foresight would have dictated the laying of the sewer mains and other public services beneath the Salem bypass at the time it was constructed. But unfortunately, there was too little thought given to the relationship of Interstate 5 to the present and future patterns of commercial, industrial, and residential development throughout the extent of the study area.

#### Future Development

The advent of non-agricultural development within the confines of the study area was initiated relatively recently and is still in its infancy. It is conservatively estimated that 80 percent of the highway-related development has occurred within the last five years,

and from the numerous sites presently under construction or in the proposal stages, it appears that development will continue to mushroom in the foreseeable future. Continued expansion will no doubt occur in all areas adjacent to Interstate 5 as demand warrants. There are, however, several sites that presently have experienced little growth, but represent latent possibilities. These are the Brooks Interchange, a site near the Wilsonville Interchange, and the Hayesville Interchange.

The Brooks Interchange is located five miles north of Salem and one mile west of the small community of Brooks. Figure 35, taken July 1966, illustrates the present development -- one service station facility. The latent capabilities of the area are associated with residential subdivision and limited commercial growth near the interchange.

Residential subdivision possibilities stem from the proximity of the interchange to the rapidly expanding Keiser subdivisions. It is understood that a large subdivision is planned about one mile southwest of the interchange. A motel and restaurant are proposed for the northeast quadrant (8, p. 31).

It has been reported that a significant number of residents in nearby Keiser commute to Woodburn and Portland. The service station operator at the interchange



Figure 35. The Brooks Interchange, taken July 1966, illustrates latent possibilities of interchange development. The expansion of the nearby Keiser subdivisions and a proposed subdivision a mile to the southwest indicate potential activity at this interchange. Development thus far consists of one service station in northwest quadrant.

stated that approximately 20 percent of his business stemmed from these commuters; since (at the time of the interview) the facility had been in operation only a short time, this figure will undoubtedly rise. With the advent of expanding subdivisions, additional commuters will no doubt warrant increased commercial activity.

It is in the vicinity of the Wilsonville Interchange that a future industrial park is proposed. Figure 36 indicates that land with the necessary zoning has been acquired and is presently for sale or lease. This site is ten miles south of Portland and one-half mile north of access to Interstate 5 at the Wilsonville Interchange. Available area for an industrial park totals approximately five square miles with access to a railroad available. This site, however, will likely remain unoccupied until the Bonita Road Industrial Park is fully developed.

The Hayesville Interchange is located at the northeast periphery of Salem. At the completion of Interstate 5 construction, this area was comprised primarily of part-time and larger farms with scattered small commercial developments along the existing Pacific Highway (99 E). The design of this interchange, a widely dispersed design with several one-way approaches, does not lend itself well to concentrated commercial development. Consequently, growth has been retarded (especially when



Figure 36. A future industrial park possibility one-half mile north of the Wilsonville Interchange. The area involved is approximately five square miles, with access to railroad transportation also available.

considering the close proximity of Salem). The latent possibilities of the surrounding area lie in residential, manufacturing, and limited commercial activities.

The retarded development is shown even as recently as November 1961 (Figure 37). After six years of Interstate 5 influence, development was represented only by a large insurance company regional office in the southwest quadrant, and the beginnings of a residential subdivision in the northeast quadrant. By 1965, with the large but still expanding subdivision as a catalyst, commercial development was initiated. Figure 38, a July 1966 view of the area, reveals three service stations with two more under construction, a new restaurant, and a 30-unit trailer court under construction. A shopping center is also planned, in association with the residential subdivision, in the northeast quadrant.

Future development, with large tracts of land still unoccupied, should accelerate in the vicinity of this interchange. The residential subdivision should continue to expand in the northeast quadrant, and commercial activity will intensify along Portland Road serving Salem. Much of the southwest quadrant has been zoned for manufacturing, and with railroad service in the area and Interstate 5 access, the area should develop rapidly. A tract of 20 acres is presently for sale in the northwest quadrant.



Figure 37. The Hayesville Interchange, taken November 1961, illustrates the inhibiting effect of this widely dispersed design on development. Although this interchange is on the periphery of Salem and the intersecting road is a major Oregon highway, six years of Interstate 5 influence has resulted only in a large regional office of an insurance company and the beginnings of a residential development.





Figure 38. The Hayesville Interchange, taken July 1966, illustrates the development attraction of this interchange. The residential subdivision indicated in Figure 37 is the catalyst that is presently triggering a developmental boom. The subdivision at the far upper right of the photograph will eventually connect with subdivision adjacent to the interchange, creating even more commercial activity in the interchange area.

## SUMMARY AND CONCLUSIONS

The impacts of modern superimposed limited-access highways on the spatial distribution of non-agricultural development, and their influence in the shaping of occupancy patterns, are far-reaching and should be of eminent concern to all Americans. The location of the Interstate routes, with 80 percent of the mileage crossing rural localities, renders large areas of previously inaccessible agricultural and other rural lands accessible to the urban-related land uses of commercial, residential, and industrial developments. The very nature of this new spatial interaction of large expanses of relatively inexpensive rural land with urbanizing forces (as a result of Interstate Highway construction), results in the creation of critical national problems -- namely, the increasingly rapid conversion of high quality agricultural land to more intensive and usually uncontrolled non-agricultural uses.

The nature and extent of the dynamic effects of increasing encroachment by urban-related spatial systems into agricultural areas are exemplified by the route of National Interstate 5, from Salem to Portland, Oregon. From the foregoing analysis, the following conclusions are drawn.

1. Right-of-way requirements of Interstate 5 remove approximately 35 acres per mile.

2. The increased accessibility afforded by Interstate 5 has resulted in the development of adjacent non-agricultural land uses. In the ten years following the completion of Interstate 5, non-agricultural developments have already alienated in excess of 6,000 acres, which is considerably more than the 1,400 acres taken by the right-of-way and its accompanying constructional features.

3. Land close to Interstate 5 interchanges has developed more rapidly than has land between interchanges or land farther away from the freeway. Interchanges that are readily visible from the freeway and those with easy access have developed more rapidly than those without such attributes.

4. Land adjacent to Interstate 5 has developed more rapidly in areas that are in close proximity to urban centers than has land in rural locations.

5. Topographical influences have had little effect on development as topography throughout the study area is generally smooth. Although drainage is characteristically poor, it is not generally considered a limiting factor at interchange locations. Thus far, residential developments and the industrial site have been constructed in spite of the inherent drainage problems.

6. The nature of the interchange design has had little effect on development as a whole, but at interchanges with widely dispersed one-way approaches, which do not have a funneling effect, commercial development has been severely retarded. Most interchanges found in the study area are of the semicloverleaf design, which produces a pronounced funneling effect.

7. Prior land uses and land values have increased development possibilities in the study area. Lands adjacent to Interstate 5 are characteristically extensively utilized and inexpensive, a combination very conducive to the development of non-agricultural land uses.

8. Non-agricultural development is characteristically localized throughout the study area. Commercial development is localized in the vicinity of interchanges, residential development in the area beyond the interchanges, with a heavy concentration between interchanges near Portland, and industrial development is concentrated at one site between interchanges near Portland.

9. Changes in land use and ownership have been accompanied by significant changes in land values with sale prices jumping substantially as agricultural land has been converted to a "higher and more intensive use".

10. Land use controls appear to be desirable and necessary. When the effects of controlled land use are

compared with non-limited use the following is revealed:

(a) In a controlled land use situation, relatively more land adjacent to Interstate 5 is converted to intensive use than in a non-controlled land use situation; and (b) land values are also higher farther away from Interstate 5 in controlled land use situations than in non-controlled situations.

11. Non-agricultural development will continue throughout the extent of the study area, but three areas (the Brooks Interchange, an industrial park location near the Wilsonville Interchange, and the Hayesville Interchange) contain especially favorable possibilities for future development; and within the foreseeable future, these three sites should experience an acceleration of development.

12. Finally, it is apparent that the effects of limited-access highways are far-reaching and extend much beyond the immediate properties from which right-of-way was acquired. The mushrooming effect of non-agricultural development associated with the construction of Interstate Highways is clear when it is recalled that in excess of a million acres annually are converted directly or withdrawn from rural uses for non-agricultural development.

On the basis of the evidence presented in this

thesis, it is the final conclusion that when acquiring lands on which modern designed highways are to be constructed and the lands on which associated non-agricultural development will occur, consideration should be given to (a) the character of land capabilities in and near the right-of-way, and (b) the impact the highway will have upon spatial organization and use systems. A program should be initiated by responsible agencies to inform and educate the public as to the total implications of the present trend of rapid conversion of large quantities of prime agricultural land to non-agricultural uses. The task of location and justifying right-of-ways should not be left entirely to the highway engineers. The public at large should be made to realize that money well spent now on the examination of alternative Interstate routes, utilizing lands of limited agricultural capabilities and the employment of land use controls, are actually investments for the future. For once fertile fields have disappeared beneath the "glaciation" of concrete, blacktop, and brick and metal of a modern designed highway and its associated non-agricultural developments, they are gone forever from the nation's food and fiber base; and that, moreover, the disordered landscape that appears is unsightly to the viewers and is inefficient to the users.

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**MAPS:**

Oregon State Highway Department Maps; Interstate 5, Salem to Portland: 1": 10 miles, 1": 6.5 miles, 1": 3 miles, 1": 1 mile, 1": 400', and 1" : 100'.



## APPENDICES

APPENDIX A. BOND

APPENDIX B. LIBRARY

## APPENDIX 1A

## INTERVIEW CHECKLIST

Commercial Developments

- 1) Name:  
Location:  
Enterprise:
- 2) Year enterprise was built:
- 3) Was Interstate 5 a primary criterion in location of present enterprise?
- 4) What is your estimate of the percentage of business attributable to Interstate 5?
- 5) Was any consideration given to the nature of access and visibility in choice of location?
- 6) What consideration was given to the nature of topography, soils and drainage in location site?
- 7) Was nearness to urban center considered in the location of site? If so, to what extent?
- 8) Was the nature of interchange design a consideration in location decision? If so, in what manner?
- 9) Was there a previous owner of your establishment, or did you build? If previous owner, do you know why he sold?
- 10) What was purchase price of enterprise site? What is its present value?
- 11) Do you plan or know of anyone who is planning to expand in the development area? If so, is Interstate a primary factor for the expansion?

- 12) Was the advent of previous development a location criterion in locating at present site? Would you be willing to build adjacent to an undeveloped and unoccupied interchange?
- 13) Would you build in a similar location again? What would you consider as a prime area adjacent to Interstate 5 for future expansion?
- 14) Were there any zoning regulations in effect when you chose your present site? If so, what was their nature? Are there any at the present time? If so, what is their nature?
- 15) Will the proposed changes in Interstate 5 affect your business? If so, how?
- 16) Miscellaneous remarks:

## APPENDIX 1B

## INTERVIEW CHECKLIST (B)

Residential Developments

- 1) Name of development:  
Location:
- 2) Year that development was constructed:
- 3) Percentage of occupants employed in Portland:
- 4) Is Interstate 5 utilized in commuting to and from work?
- 5) Main reason for present location of residential site:
- 6) Was Interstate 5 a criterion in location of present residential site? Is Interstate 5 responsible for its success?
- 7) Does the nature of the topography, soils, and drainage adjacent to Interstate 5 influence residential location?
- 8) Is close proximity to access on freeway an important criterion in locating residential sites?
- 9) Is distance from urban centers an important criterion in location of residential sites?
- 10) Is the surrounding area continuing to grow in residential developments? If so, is Interstate 5 a primary influence?

11) Do residential developments adjacent to freeway differ in price or demand from those further away?

12) Are there any zoning regulations affecting residential development? If so, what is their nature?

13) Will proposed Interstate 5 changes affect present or future residential development?

14) Miscellaneous remarks:

## APPENDIX 1C

## INTERVIEW CHECKLIST (C)

Industrial Development

- 1) Name:  
Location:  
Nature of business:
- 2) Why was present location of plant chosen?
  - a. Interstate 5?
  - b. Access and exposure?
  - c. Topography, soils, and drainage?
- 3) Utilization of Interstate 5?
  - a. Transportation?
  - b. Source of customers?
  - c. Advertisement?
  - d. Transportation for employees?
- 4) Is distance to urban center (Portland) an important criterion in location?
- 5) Was there previous industrial development before you located at present site? If so, did this influence your decision?

- 6) Was the price of land higher in areas adjacent to Interstate 5 or in areas further away?
- 7) Were there, and are there presently zoning regulations that affect industrial location in this area? Do zoning regulations affect operation?
- 8) Do you know of anyone or are you planning to expand operations in the area? If so, is Interstate 5 a primary location factor?
- 9) Will the proposed changes in Interstate 5 affect your operation? If so, how?
- 10) Miscellaneous remarks:

## APPENDIX 2A

## PERSONAL INTERVIEWS

## PUBLIC SERVANTS:

1. Chin, James. Mid-Willamette Valley Planning Agency, Salem, 1966.
2. Hammer, Irene. Right-of-way Division, Oregon State Highway Department, Salem, 1966.
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## APPENDIX 2B

## PERSONAL INTERVIEWS

## COMMERCIAL DEVELOPMENT:

1. De Lapp Auto and Truck Repair, Market Street Interchange, 1966.
2. Wilson's Buick, Market Street Interchange, 1966.
3. Union 76 Oil Service Station, Market Street Interchange, 1966.
4. Woodroffe's Sloppy Joe's Drive-In Restaurant, Market Street Interchange, 1966.
5. Holiday Lodge Motel, Market Street Interchange, 1966.
6. Richfield Service Station, Market Street Interchange, 1966.
7. King's Motel, Market Street Interchange, 1966.
8. Enco Service Station, Market Street Interchange, 1966.
9. American Service Station, Market Street Interchange, 1966.
10. Crosby's Mobil Service Station, Market Street Interchange, 1966.
11. Pierce's Mobil Service Station, Market Street Interchange, 1966.
12. Starlight Drive-Inn, Market Street Interchange, 1966.
13. Keg and Platter Restaurant, Market Street Interchange, 1966.
14. Hiatt Lodge, Market Street Interchange, 1966.
15. Hi-Ho Pan Cake House, Market Street Interchange, 1966.
16. Trux Automotive Repair Center, Market Street Interchange, 1966.
17. Safeway Food Center, Eastwood Plaza Shopping Center, Market Street Interchange, 1966.
18. Apparel Shop, Eastwood Plaza Shopping Center, Market Street Interchange, 1966.
19. Pietros Pizza Parlor, Eastwood Plaza Shopping Center, Market Street Interchange, 1966.

## APPENDIX 2B

## PERSONAL INTERVIEWS

## COMMERCIAL DEVELOPMENT:

1. De Lapp Auto and Truck Repair, Market Street Interchange, 1966.
2. Wilson's Buick, Market Street Interchange, 1966.
3. Union 76 Oil Service Station, Market Street Interchange, 1966.
4. Woodroffe's Sloppy Joe's Drive-In Restaurant, Market Street Interchange, 1966.
5. Holiday Lodge Motel, Market Street Interchange, 1966.
6. Richfield Service Station, Market Street Interchange, 1966.
7. King's Motel, Market Street Interchange, 1966.
8. Enco Service Station, Market Street Interchange, 1966.
9. American Service Station, Market Street Interchange, 1966.
10. Crosby's Mobil Service Station, Market Street Interchange, 1966.
11. Pierce's Mobil Service Station, Market Street Interchange, 1966.
12. Starlight Drive-Inn, Market Street Interchange, 1966.
13. Keg and Platter Restaurant, Market Street Interchange, 1966.
14. Hiatt Lodge, Market Street Interchange, 1966.
15. Hi-Ho Pan Cake House, Market Street Interchange, 1966.
16. Trux Automotive Repair Center, Market Street Interchange, 1966.
17. Safeway Food Center, Eastwood Plaza Shopping Center, Market Street Interchange, 1966.
18. Apparel Shop, Eastwood Plaza Shopping Center, Market Street Interchange, 1966.
19. Pietros Pizza Parlor, Eastwood Plaza Shopping Center, Market Street Interchange, 1966.

20. Bowling Alley, Eastwood Plaza Shopping Center, Market Street Interchange, 1966.
21. Enco Service Station, Brooks Interchange, 1966.
22. Woodburn Senior Estates, Woodburn Interchange, 1966.
23. Enco Service Station, Woodburn Interchange, 1966.
24. Safeway Food Center, Woodburn Interchange, 1966.
25. Fairview Motel, Woodburn Interchange, 1966.
26. Shell Service Station, Woodburn Interchange, 1966.
27. Texaco Service Station, Woodburn Interchange, 1966.
28. Enco Service Station, Wilsonville Interchange, 1966.
29. Union 76 Oil Service Station, Wilsonville Interchange, 1966.
30. Barclay's Restaurant, Wilsonville Interchange, 1966.
31. Ramada Inn Motor Hotel and Restaurant, Nyberg Interchange, 1966.








## APPENDIX 2D

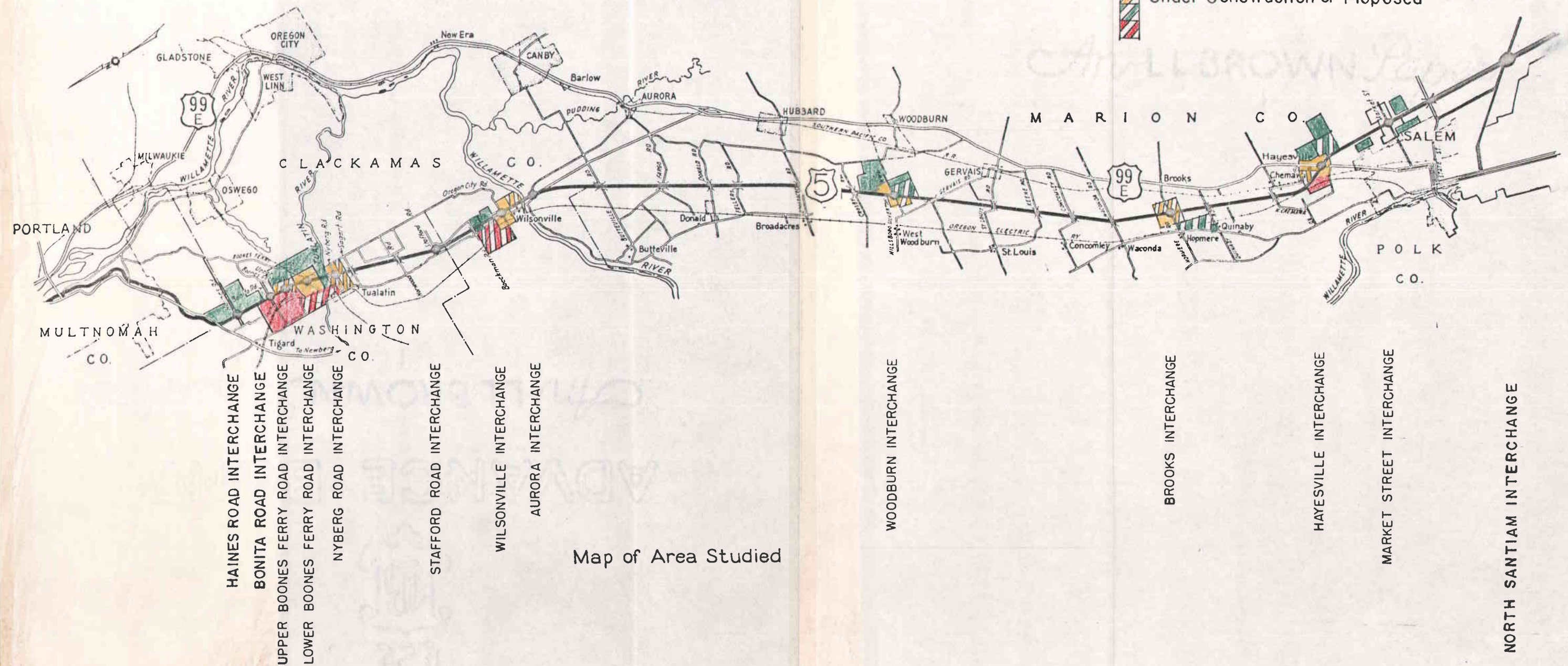
## PERSONAL INTERVIEWS

## INDUSTRIAL DEVELOPMENT:

1. Baker Equipment Rental Company, Bonita Industrial Park, 1966.
2. Chain Saw Bar Co., Bonita Industrial Park, 1966.
3. Dickinson Steel Fabrication, Bonita Industrial Park, 1966.
4. Fought & Company, Inc. Structural Steel Fabrication, Bonita Industrial Park, 1966.
5. Georgia Pacific Truck Terminal, Bonita Industrial Park, 1966.
6. Gerber Legendary Blades, Bonita Industrial Park, 1966.
7. Kenosha Convoy Company, Bonita Industrial Park, 1966.
8. Ted Nelson Metal Fabricating, Bonita Industrial Park, 1966.
9. Associate Truck Service & Truck Co., Bonita Industrial Park, 1966.
10. Sabor Steel Corporation, Bonita Industrial Park, 1966.
11. Zel Chemical, Bonita Industrial Park, 1966.

## "LEGEND"

-  Access Points
-  Overcrossing
-  Undercrossing
-  Commercial Development
-  Residential
-  Industrial
-  Under Construction or Proposed





## APPENDIX 3B

## PHOTOGRAPHIC LOCATIONS

