

**A GENERAL EVALUATION
OF THE EFFECTS OF POSSIBLE
RICHARDS AVENUE EXTENSIONS
ON TRAVEL PATTERNS IN
SANTA FE**

WHITE PAPER

MAY 18, 2010

FINAL

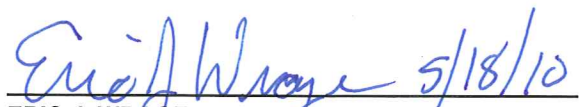
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I. INTRODUCTION

As a result of a legislative request the New Mexico Department of Transportation was asked to evaluate the effects of extending Richards Avenue to Cerrillos Road and to NM 599. The current alignment of Richards Avenue ends north of Rodeo Road at the Arroyo de los Pinos and then begins again just south of Siringo Road on the other side of the arroyo.

The possibility of a Richards Avenue extension was also discussed during the I-25 Corridor Study from NM 599 to Old Pecos Trail, as that study evaluated the need and benefit from a possible Richards Avenue interchange with I-25.

Extending Richards Avenue would provide an additional north-south corridor in Santa Fe, particularly if extended across the Santa Fe River to NM 599. If this extension was considered, a likely alignment would be to extend Richards Avenue/Henry Lynch Road across the Santa Fe River and connect it to CR70. From CR70 it would continue on to NM 599. The NM 599 Corridor Study also has considered an interchange at NM 599 and CR 70 that would provide an additional access to NM 599 for Santa Fe.

A vicinity map is shown in Figure 1.

A. Study Purpose

The purpose of this White Paper is to evaluate the effects of extending Richards Avenue and to briefly discuss the general regional impacts this extension would have on regional traffic patterns in the Santa Fe area. Four scenarios were considered:

1. *Scenario 1 – Extension to Cerrillos Road*

This scenario extends Richards Avenue across the Arroyo de los Pinos from Rodeo Road to Cerrillos Road. Both a 2-lane and 4-lane alternative were evaluated.

2. *Scenario 2 – Extension to CR70/NM 599*

This scenario continues Scenario 1 across the Santa Fe River all the way to CR 70 and NM 599. In this scenario traffic signals were included at the intersection of NM 599 and CR70. Both a 2-lane and 4-lane alternative were evaluated.

3. *Scenario 3 – Extension to Cerrillos Road with Richards Interchange*

This scenario is identical to Scenario 1 except that it includes a full-access interchanges at Richards Avenue and I-25. Both a 2-lane and 4-lane alternative were evaluated.

4. *Scenario 4 – Extension to CR70/NM 599 with Interchanges*

This scenario is identical to Scenario 2 except there are interchanges at both Richards Avenue and I-25 and CR70 and NM 599. Both a 2-lane and 4-lane alternative were evaluated.

The connections used in the modeling exercise are shown in Figure 2. The specific alignment, cross-section and environmental impacts of any future extension would be determined by future study.

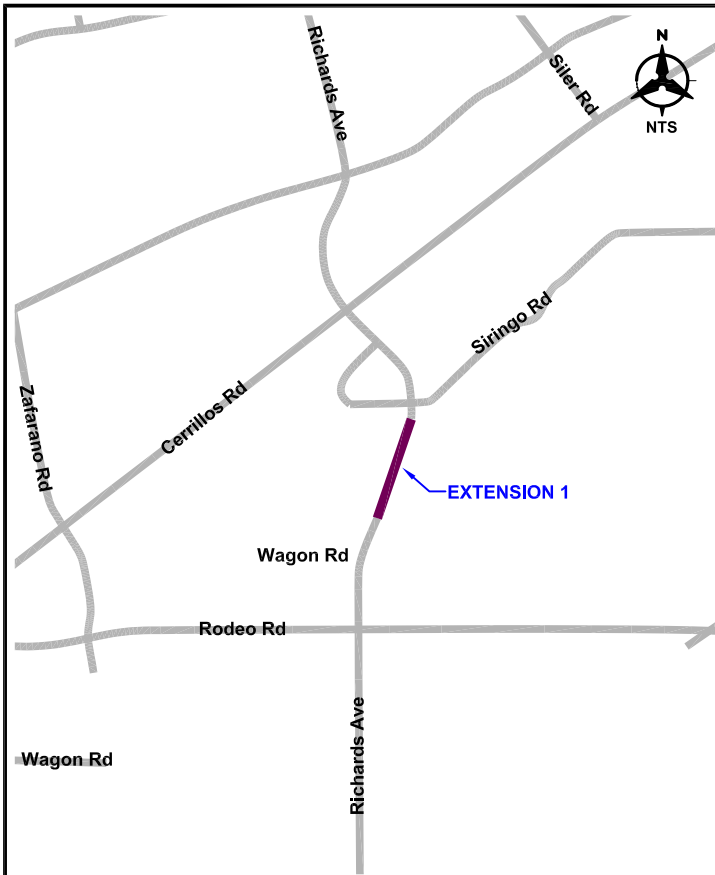


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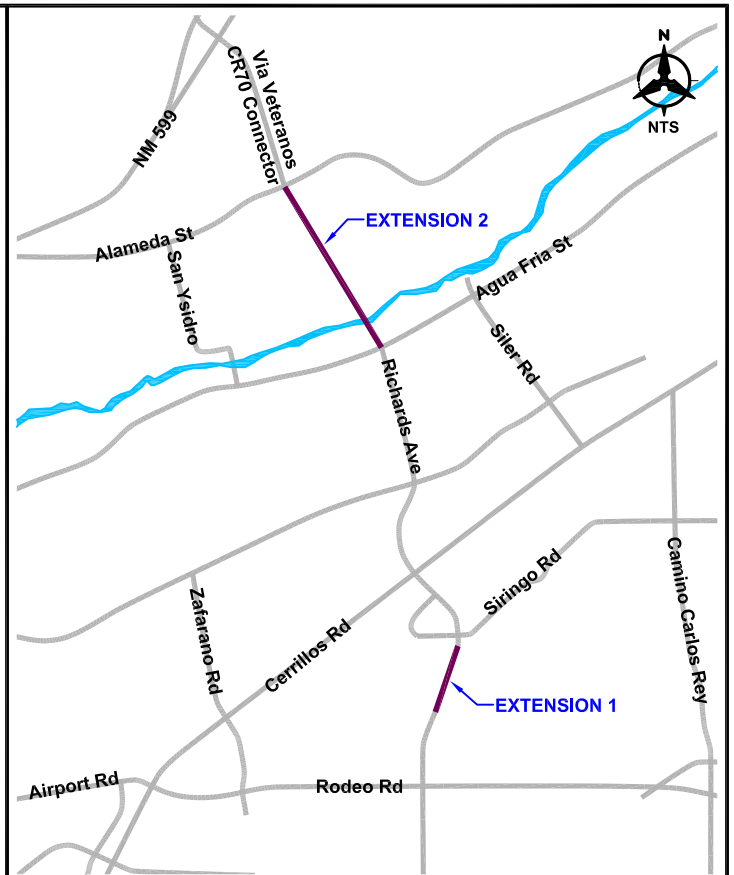
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ENGINEERING  SPATIAL DATA  ADVANCED TECHNOLOGIES

**RICHARDS AVENUE EXTENSION
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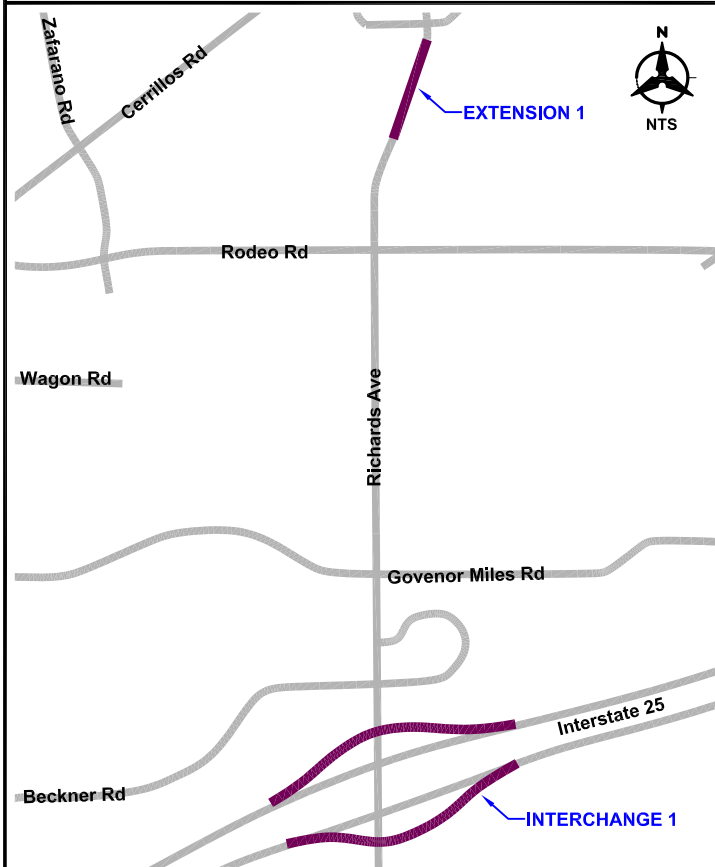
**FIGURE 1
VICINITY MAP**



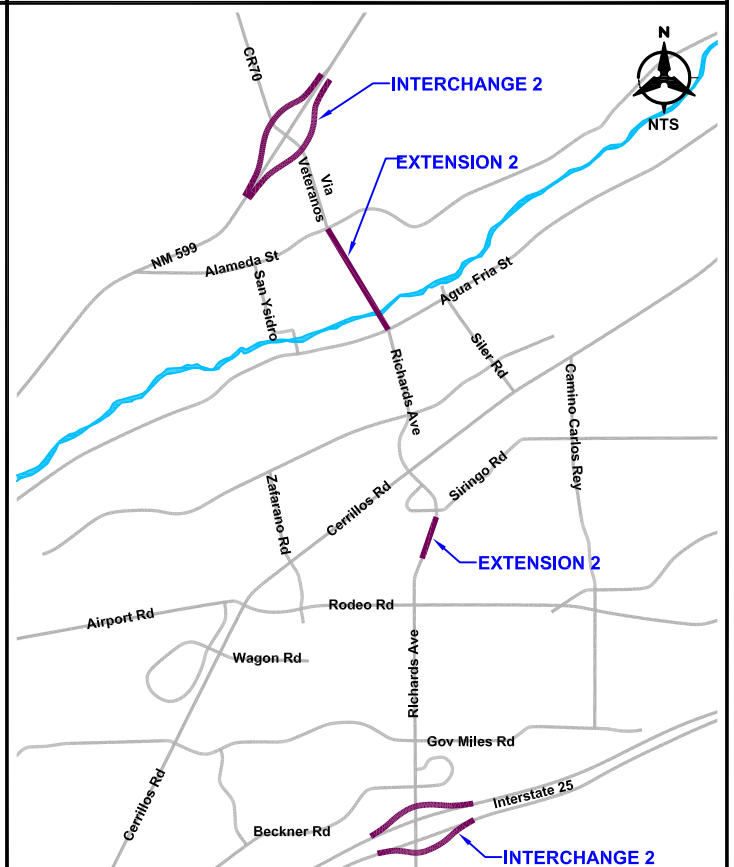
SCENARIO 1 - Connect to Cerrillos Rd



SCENARIO 2 - Connect to NM 599



SCENARIO 3 - Richards Interchange



SCENARIO 4 - NM 599 and I-25 Interchange

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FIGURE 2
SCENARIO OPTIONS

B. Study Procedure

The study was conducted entirely by utilizing the VISUM Santa Fe Regional travel demand model. This model was originally developed by the Santa Fe MPO and PTV America for use in Metropolitan Transportation Plan development and updated in 2006 by the NMDOT and PTV America for use in the three Santa Fe Corridor Studies that are now complete: 1) I-25 from NM 599 to Old Pecos/NM 466, 2) NM 599 from US 84/285 to I-25, and 3) St. Francis Drive from Rabbit Road/Old Agua Fria Road to NM 599.

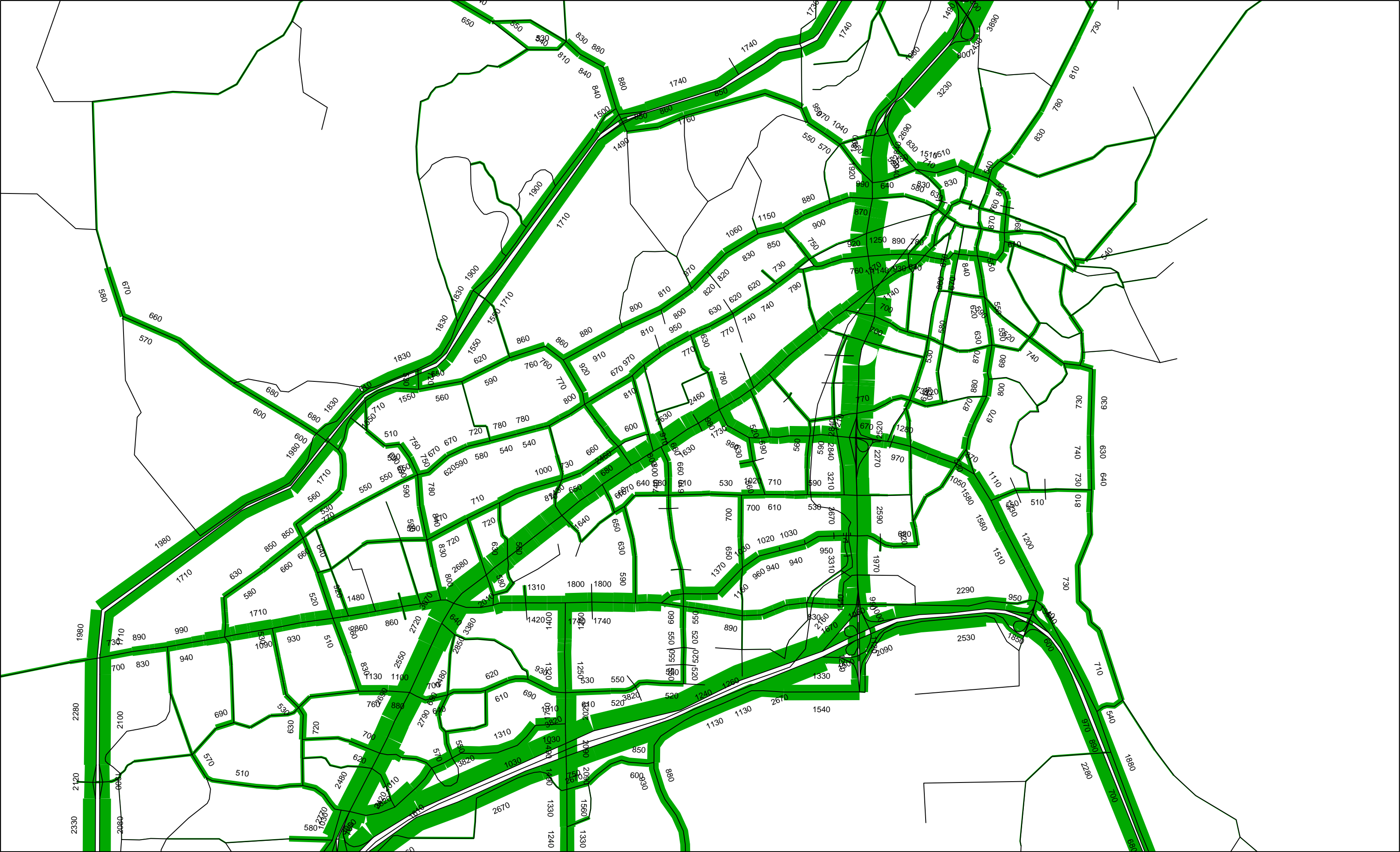
This study consisted of modeling the various scenarios and assessing the changes in travel behavior based on the model results. No consideration of right-of-way, environmental considerations or other engineering criteria were included. This White Paper is intended only to be an evaluation of travel behavior changes. A full, comprehensive, and complete NMDOT Location Study Procedures, National Environmental Policy Act (NEPA) compliant engineering and environmental study would be required prior to any design or construction using Federal funds. It is recommended that this process involve significant public input and outreach.

II. SCENARIO TRAFFIC ANALYSIS

Appendix A lists the changes to the VISUM Santa Fe Regional Travel Demand Model for each scenario. The horizon year DOT Base Model used in the Corridor studies above was used as the base case model for comparative evaluation. The DOT Base Model Horizon Year PM Peak Hour traffic forecast is shown in Figure 3.

The DOT Base Model includes the current 2030 MPO Future Roads Network, with the exception of the Governor Miles extension from Camino Carlos Rey. This roadway was removed from the Future Roads Network by the Santa Fe MPO Transportation Policy Board. The DOT Base Model utilized in the Corridor Studies also includes Richards Avenue as a 4-lane roadway from Avenida del Sur to Rodeo Road, the Las Soleras Development roadway network and development, and the privately funded Jaguar Interchange with NM 599 that is currently under design and development.

The VISUM Santa Fe Regional Travel Demand Model has been validated primarily on PM Peak Hour traffic counts. The model does not forecast AM and Daily traffic volumes, however it is considered that the PM Peak Hour forecast is a more reliable forecast. Trends in the AM Peak Hour will be discussed after the initial PM Peak discussion, with AM graphics included in Appendix B.



A. Scenario 1 – Extension to Cerrillos Road

Scenario 1 extends Richards Avenue from Rodeo Road to Cerrillos Road. This scenario is intended to show the results of an interim condition prior to the construction of interchanges at Richards Avenue and I-25 and CR70 and NM 599. Both a 2-lane and a 4-lane typical section were evaluated. The differences between the DOT Base Model and Scenario 1 are shown in Figure 4 and Figure 5, respectively. The green bars show where there is an increase in traffic due to the extension and the red bars show a reduction in traffic due to the extension. The numerical change in traffic volume is also shown on the graphic. The scales used to determine bar width are proportional throughout the report and allow for a visual presentation of the differences. Volume changes less than 25 cars in the peak hour are not shown.

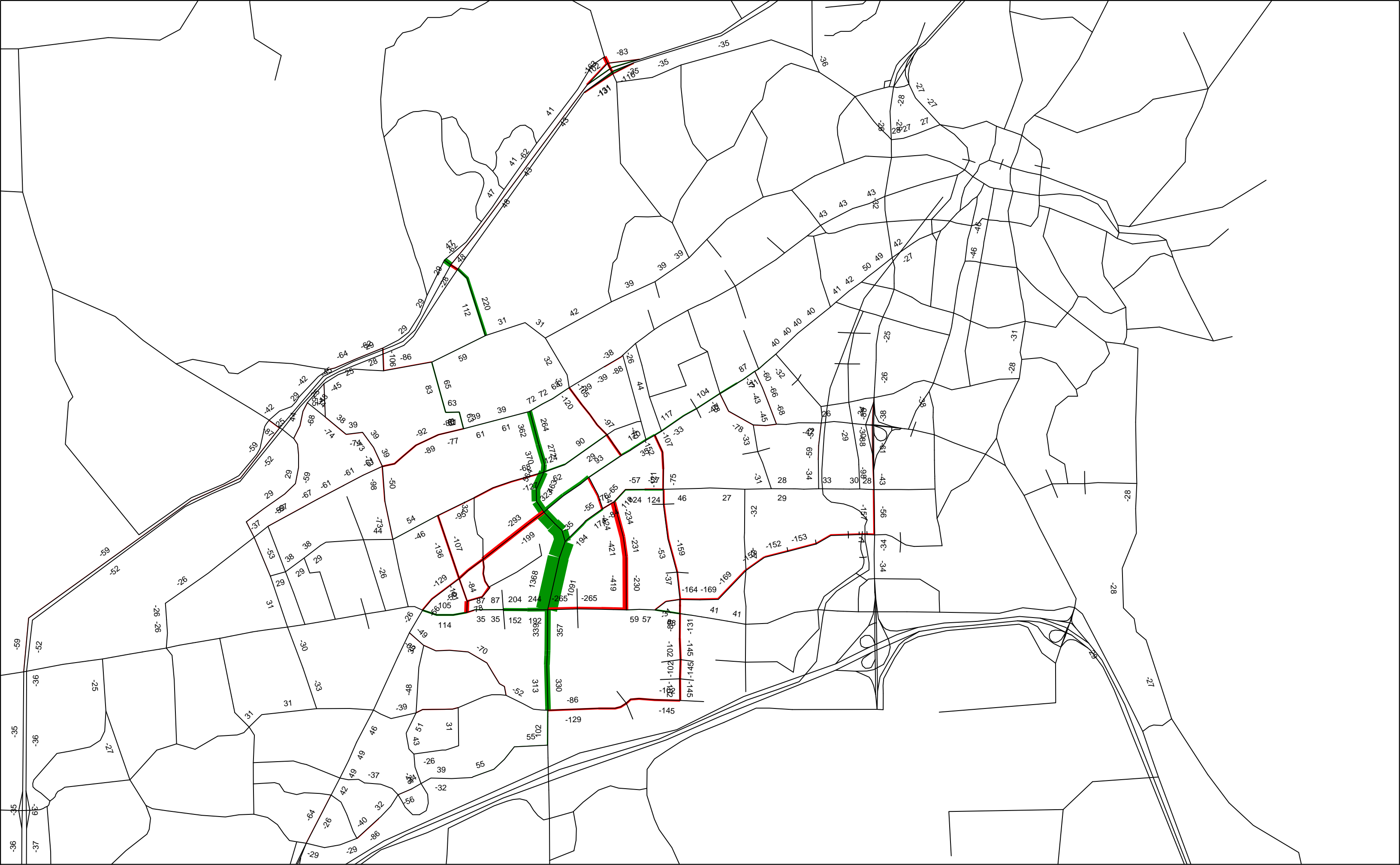
1. Two-Lane Extension

As shown in Figure 4, the 2-lane extension attracts substantial traffic volume from the local streets adjacent to the new roadway. Avenida de las Campanas shows a substantial reduction in traffic, approximately 30%. Other roads with smaller reductions include Governor Miles, future Wagon Road, Zafarano, Camino Carlos Rey, and CR70/West Alameda Street north of the Santa Fe River. Cerrillos Road has an approximately 13% increase east of Richards Avenue, and a small 8% reduction to the west of Richards Avenue. St. Francis Drive has very small reductions, particularly when considered on a percentage basis. Also of note is a small reduction in traffic on Zia Road due to the extension.

It also can be seen from the figure that some roadways will carry additional traffic as a result of the extension. Not surprisingly, Richards Avenue attracts additional traffic when it becomes a continuous street between the Community College District and Agua Fria Road (via Henry Lynch). Short sections of Rodeo, Cerrillos, Siler, and Calle de Cielo also carry relatively minor increases in traffic as travel patterns adjust due to the new roadway. The use of the extension as a cross-town connection is shown by the increase in traffic on the CR70 Connector from West Alameda Street to NM 599.

2. Four-Lane Extension

As shown in Figure 5, the 4-lane extension exhibits similar changes as the 2-lane extension, except the volumes and area of influence are increased due to the additional capacity of the 4-lane section. The effects on St. Francis Drive are more substantial although still small on a percentage basis. The reductions on Zia Road are also increased with the 4-lane alternative, as they are on Avenida de las Campanas. The increases on Cerrillos Road are slightly larger than in the 2-lane alternative, with an increase in the reach of Cerrillos Road affected by the extension.



B. Scenario 2 – Extension to CR70/NM 599

Scenario 2 results in a continuous Richards Avenue from Avenida del Sur in the Community College District to NM 599. This scenario is intended to show the results of an interim condition prior to the construction of interchanges at Richards Avenue and I-25 and CR70 and NM 599. Both a 2-lane and a 4-lane typical section were evaluated. The differences between the DOT Base Model and Scenario 2 are shown in Figure 6 and Figure 7, respectively. As before, the green bars show where there is an increase in traffic due to the extension and the red bars show a reduction in traffic due to the extension. The numerical change in traffic volume is also shown on the graphic. Volume changes less than 25 cars in the peak hour are not shown.

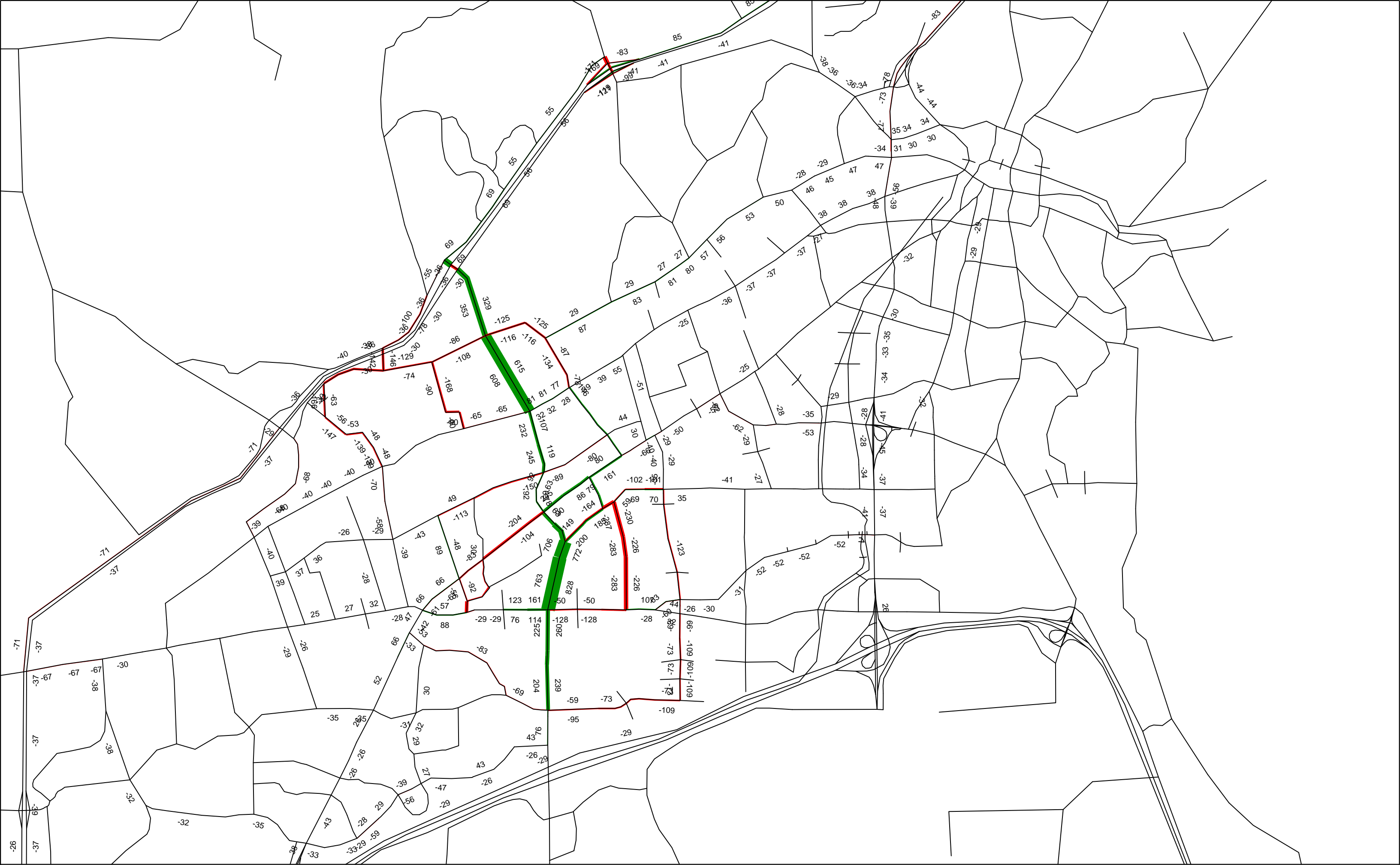
1. Two-Lane Extension

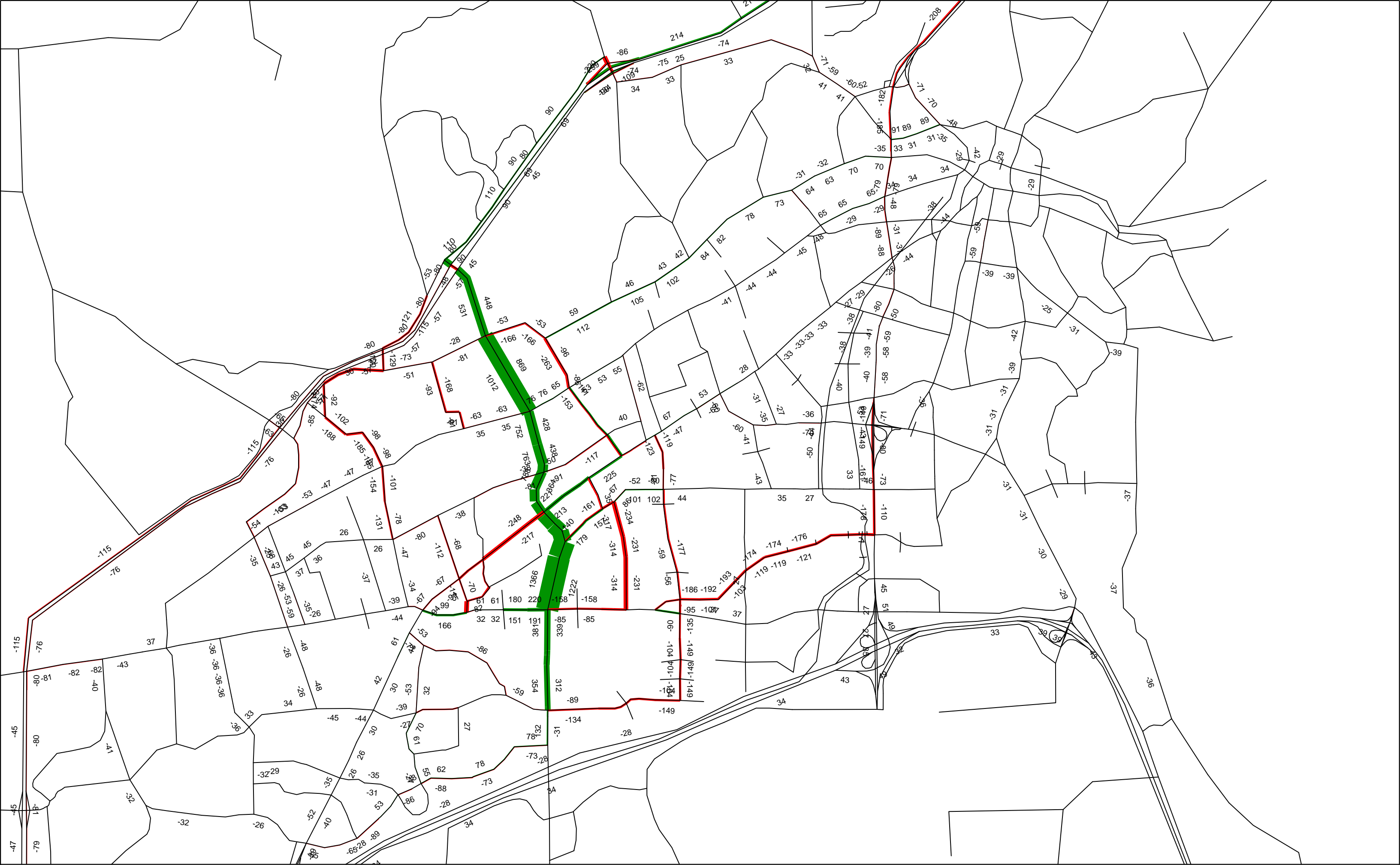
As shown in Figure 6, the 2-lane extension attracts substantial traffic volume from the local streets adjacent to the new roadway. As in Scenario 1, Avenida de las Campanas shows a substantial reduction in traffic, approximately 30%. The San Ysidro Crossing, County Road 62 and the Siler Road river crossings all have reductions due to the new river crossing, as does the section of Alameda Street west of Siler Road. Other roads with reductions include Governor Miles, future Wagon Road, Zafarano, Camino Carlos Rey, and Cerrillos Road west of Richards Avenue. St. Francis Drive has minor reductions, particularly when considered on a percentage basis. Also note that there is a small reduction in traffic on Zia Road due to the extension, although with the continuous connection to NM 599 the reduction is greater for eastbound traffic, where in Scenario 1 the greater reduction was westbound. This is likely due to trips utilizing NM 599 instead of St. Francis.

As in Scenario 1, some roadways carry additional traffic as a result of the extension. Not surprisingly, Richards Avenue attracts additional traffic when it becomes a continuous street between the Community College District and NM 599. Short sections of Rodeo, Cerrillos, Siler, and Calle de Cielo also carry minor amounts of additional traffic as travel patterns adjust due to the new roadway. However the increases in traffic are not substantially larger than that in Scenario 1. Indeed, the volume on the extension between Rodeo and Cerrillos Road is not substantially different from that in Scenario 1, even with the continuous connection between Rodeo and NM 599.

2. Four-Lane Extension

As shown in Figure 7, the 4-lane extension exhibits similar changes as the 2-lane extension, except the volumes are increased due to the additional capacity of the 4-lane section. The effects on St. Francis Drive (on the north end) are more substantial, as are the reductions on Zia Road.





C. Scenario 3 – Extension to Cerrillos Road with Richards Interchange

Scenario 3 considers the extension of Richards Avenue to Cerrillos Road with an interchange at Richards Avenue and I-25 as proposed in the I-25 Corridor Study. Both a 2-lane and a 4-lane typical section were evaluated. The differences between the DOT Base Model and Scenario 3 are shown in Figure 8 and Figure 9, respectively. As above, the green bars show where there is an increase in traffic due to the extension and the red bars show a reduction in traffic due to the extension.

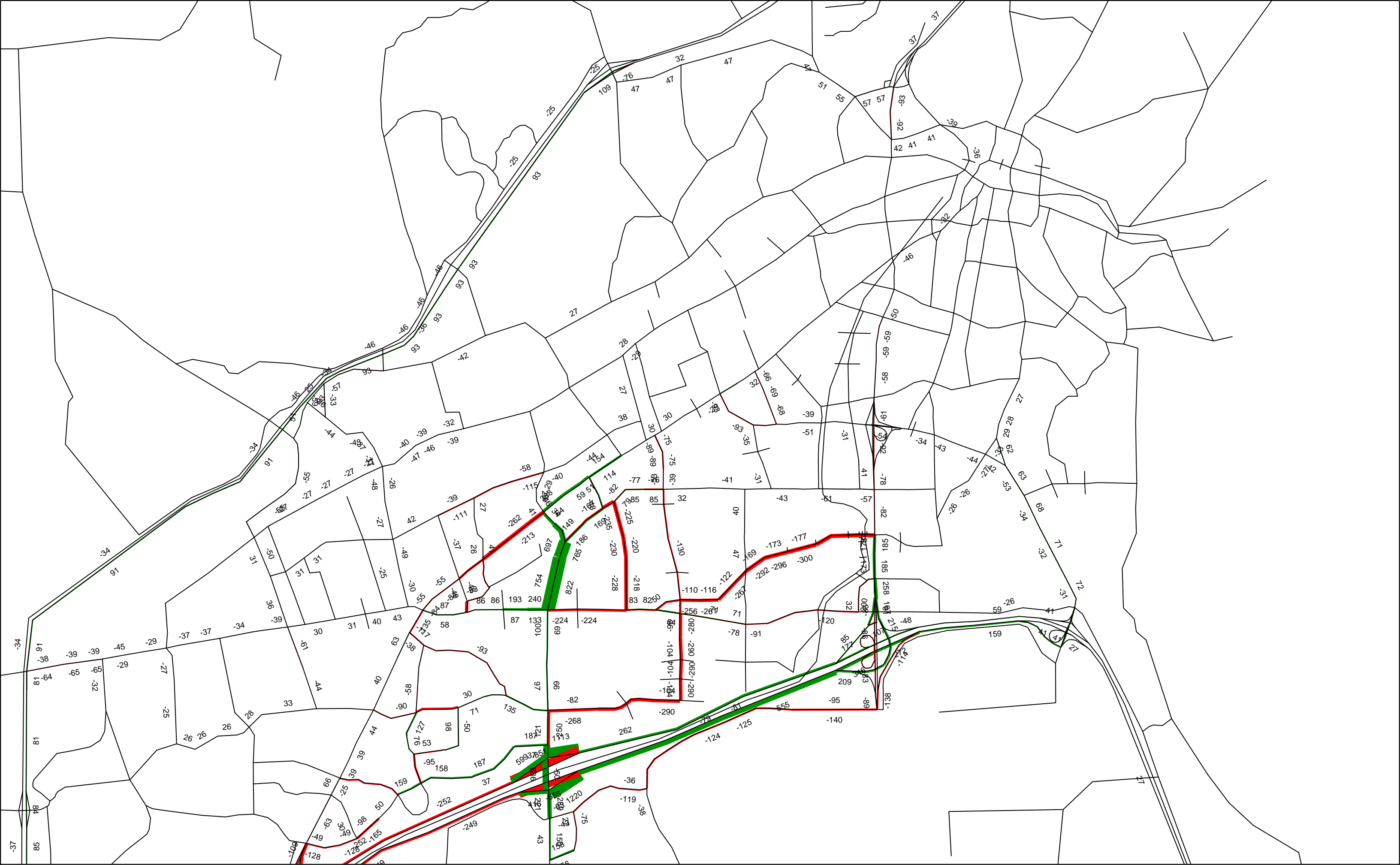
1. Two-Lane Extension

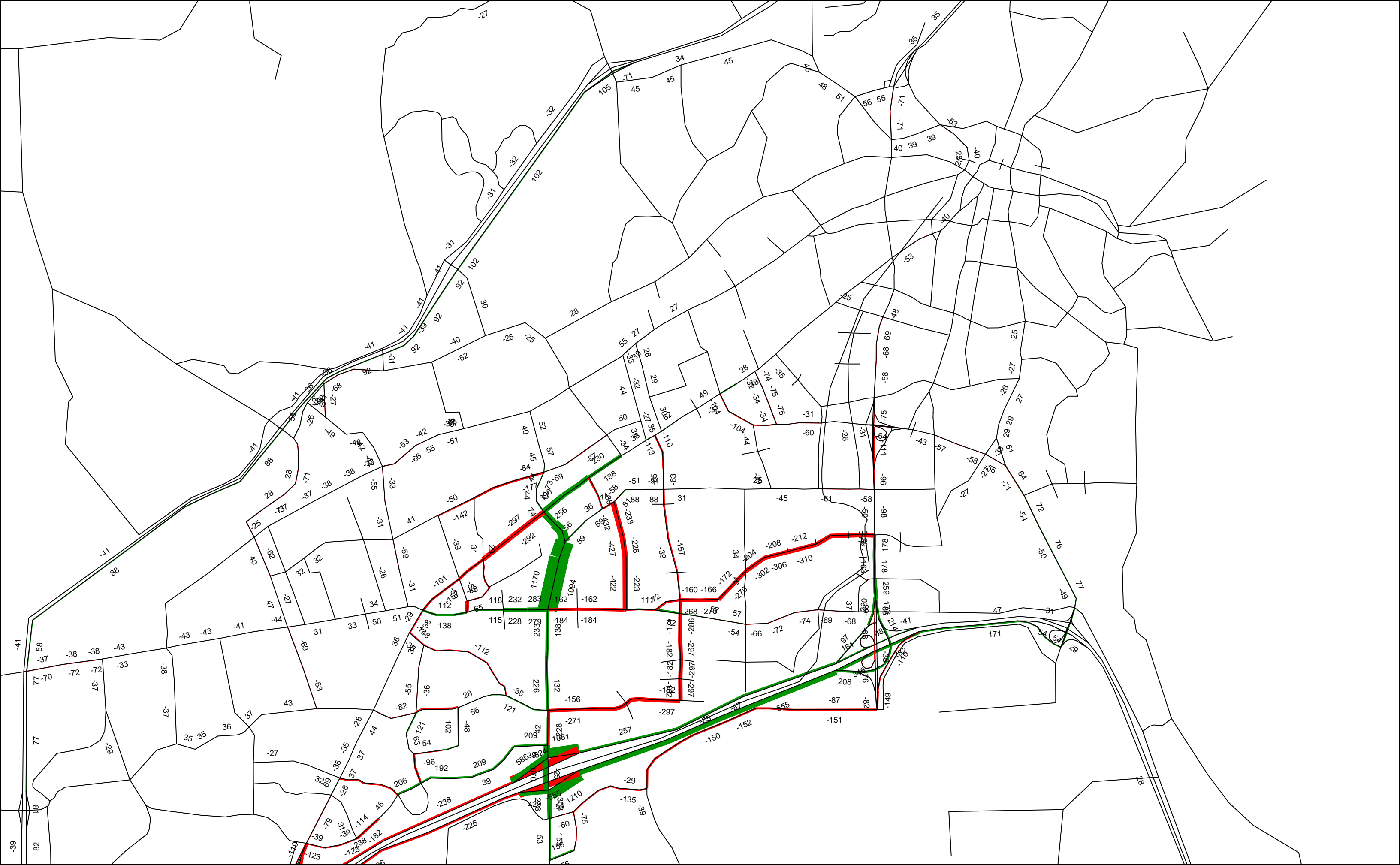
As shown in Figure 8, the 2-lane extension attracts substantial traffic volume from the local streets adjacent to the new roadway; and it can be seen that the Richards interchange also has a dramatic impact on travel patterns as the reduction on Rodeo and Zia Roads and Camino Carlos Rey are more significant than Scenarios 1 and 2 (compare Figure 4 and Figure 8 to see the impacts from the Richards interchange). The effects of this scenario on St. Francis Drive are: 1) the addition of the Richards interchange results in additional traffic on the south end of St. Francis, and 2) the lack of a continuous road between I-25 and NM 599 in Scenario 3 limits the impact of the Richards Avenue extension on the remainder of St. Francis Drive.

It can also be seen that the streets with increased traffic do not change substantially from Scenario 1, indicating that the increased traffic volumes are generally localized and likely local travel as opposed to cross-city traffic.

2. Four-Lane Extension

As shown in Figure 9, the 4-lane extension exhibits similar changes as the 2-lane extension, except the volumes are increased due to the additional capacity of the 4-lane section. The effects on Zia Road are more substantial, with limited effects on St. Francis Drive due to the lack of a continuous connection to NM 599.





D. Scenario 4 – Extension to CR70/NM 599 with Interchanges

Scenario 4 extends Scenario 3 all the way to CR70/NM 599 and also includes an interchange at CR70 and NM 599. Both a 2-lane and a 4-lane typical section were evaluated. The differences between the DOT Base Model and Scenario 4 are shown in Figure 10 and Figure 11, respectively. As before, the green bars show where there is an increase in traffic due to the extension and the red bars show a reduction in traffic due to the extension.

1. *Two-Lane Extension*

Similar to Scenario 3, the 2-lane extension of Scenario 4 all the way to NM 599, shown in Figure 10, attracts substantial traffic volume from the local streets adjacent to the new roadway. The reductions on Rodeo, Camino Carlos Rey and Zia are similar to Scenario 3. As in Scenario 2 there are also reductions on streets adjacent to the new river crossing. The effects of this scenario on St. Francis Drive are limited to the increases in traffic on St. Francis south of Zia (as in Scenario 3) but with limited impact at the north end of St. Francis.

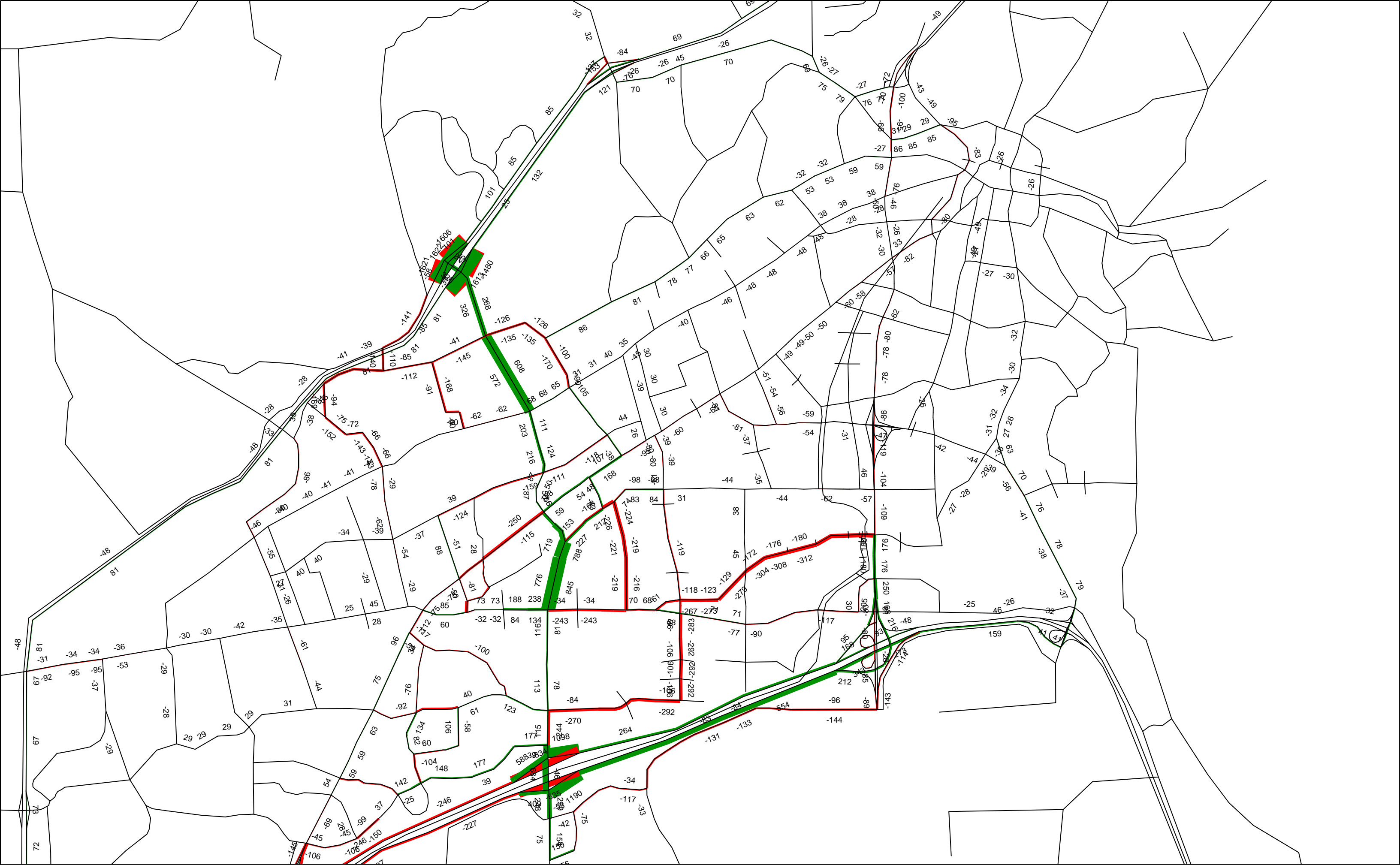
It can also be seen that the streets with increased traffic (other than those affected by the Richards Interchange) do not change substantially from Scenario 1 and 2, indicating that the increased traffic volumes are generally localized and likely local travel as opposed to cross-city traffic utilizing the Interstate via the interchanges.

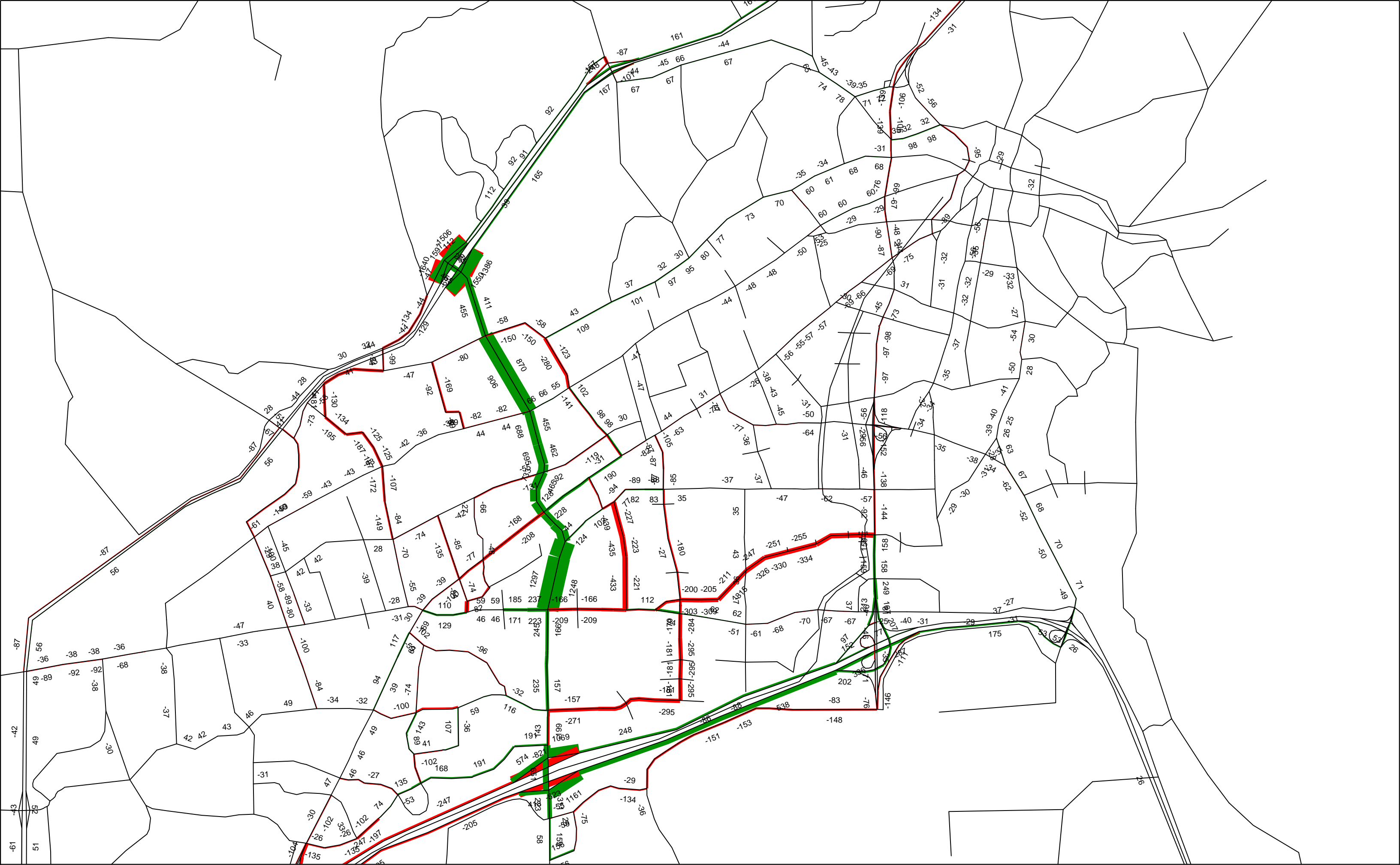
2. *Four-Lane Extension*

As shown in Figure 11, the 4-lane extension exhibits similar changes as the 2-lane extension, except the volumes are increased due to the additional capacity of the 4-lane section. The effects on Zia Road are slightly more than the 2-lane alternative, with slightly increased reductions on St. Francis Drive due to continuous connection to NM 599 and the additional capacity that the 4-lane alternative provides.

E. AM Peak Hour

Similar graphics to those shown for the PM Peak Hour in the previous figures have also been produced for the AM Peak Hour and are included in Appendix B. The results are comparable to those discussed herein.





III. CONCLUSIONS

The extension of Richards Avenue to Cerrillos Road and to CR 70 will have varied effects on the adjacent City streets. Results of the modeling exercise suggest that the traffic on the new extensions will draw from the local traffic and not substantially effect regional travel behavior.

Without the interchanges at I-25 and NM 599 (Scenario 1 and 2) the most prominent changes in traffic volumes will accrue to parallel routes such as Camino Carlos Rey, Avenida de las Campanas, CR 62, the San Ysidro Crossing and the Siler Road river crossing. Smaller reductions will be seen on Governor Miles, future Wagon Road and Zia Road. There are limited reductions on St. Francis Drive in Scenario 1 and 2 with a 2-lane section, and slightly greater reductions (primarily on the north end of St. Francis) with a 4-lane section.

Under Scenario 3, with the extension only to Cerrillos and the Richards interchange at I-25, the presence of the Richards interchange results in additional traffic reductions on Governor Miles and Rodeo, the south section of Camino Carlos Rey and Zia Road. These reductions increase slightly if the extension is a 4-lane roadway. Other changes in travel behavior are comparable to that of Scenario 1.

With the complete extension of Richards to NM 599 with an interchange at both Richards and I-25 and CR70 and NM 599, the changes are again similar to that of Scenario 1 and 2, that is, primarily localized traffic from parallel routes use the extension. As in the other scenarios, the 4-lane section attracts more traffic to the extensions with commensurate changes on the parallel routes.

It also should be noted that amongst the four scenarios, the forecast traffic volume on the extensions (between Rodeo and Cerrillos and Agua Fria and Alameda, are very similar for each scenario for the same laneage (2-lane or 4-lane). This again indicates that the bulk of the traffic on the extension will be localized in nature and not the result of a large regional shift of traffic from major arterials like St. Francis Drive or NM 599.

From this analysis it appears that the Richards extension would adjust local travel patterns with limited impacts on the main arterials of the region, except in the immediate vicinity of the extension or on parallel routes. The notable exception to this conclusion is Governor Miles, Camino Carlos Rey and Zia Road, whose traffic volumes reduce substantially with the both extension and the Richards interchange in place, although the Richards interchange has the largest impact on reducing traffic on these streets.

IV. FUTURE STEPS TO CONSIDER

Funding for roadway projects is limited in Santa Fe, and all areas of the State. It is also recognized that the Santa Fe MPO, member staff and the MPO Transportation Policy Board have final authority on transportation planning projects in the region. In order to assist in that planning effort the table below lists a potential priority plan and rough order of magnitude cost estimate for the projects.

Priority	Project	Study ¹	Preliminary Design ¹	Construction ¹
1	Rodeo-to-Cerrillos Connection	Complete for City Project ²	2014 – \$250k	2016 – \$2.5M
2	4-Lane Richards Avenida del Sur / I-25 to Rodeo	Complete for Federal Project ³	2015 – \$250k	2018 – \$7M
3	Cerrillos to NM 599 Extension	2016 – \$600k	2019 – \$500k	2012 – \$20M
1 – Rough Order of Magnitude Estimate 2 – This White Paper 3 – I-25 Corridor Study				

Table 1 – Future Steps

Appendix A

Model Changes For Each Scenario

Model Changes to Create Scenarios for Richards Extension White Paper

Starting Base Model:

Santa-Fe-Forecast-rev-LU-10092009-working-DOT-Base-Version2-11092009.ver

Approach:

Add nodes for Richards Interchange and CR 70 Interchange so they will exist in all difference networks created

Save as Santa-Fe-Forecast-rev-LU-10092009-working-DOT-Base-Version2-01282010.ver

Scenario BD 1 – Extend to Cerrillos and Add Richards Interchange with I-25

From Revised Base Model

Add link from Rodeo to Cerrillos – note type, number of lanes, speed, etc.

Save out as initial BD3

Add Richards Interchange with I-25 - note link numbers so can use in BD2

Also note type, number of lanes, speed, etc.

Signalize Interchange intersections

Save as Santa-Fe-Forecast-rev-LU-10092009-working-BD1-01282010.ver

Scenario BD2 – Extend to CR 70 with CR70 interchange with NM 599

Add link to CR 70 – use link numbers after Richards Interchange link numbers in BD1

Note type, number of lanes, speed, etc.

Add CR 70 Interchange with NM 599 – note link numbers, type, number of lanes, speed, etc.

Signalize Interchange intersections

Save as Santa-Fe-Forecast-rev-LU-10092009-working-BD2-01282010.ver

Scenario BD 3 – Extend from Rodeo to Cerrillos and connect to CR 70, Signalize intersection with NM 599

Open Interim BD3

Add link to CR 70 – use link numbers as in BD2

Note type, number of lanes, etc.

Signalize CR 70 intersections with NM 59

Save as Santa-Fe-Forecast-rev-LU-10092009-working-BD3-01282010.ver

Model Changes to Create Scenarios for Richards Extension White Paper

Detailed Model Revisions:

Richards Interchange Nodes

Split Link 933 (NB I-25), Place Node 2007 for NB off-ramp – Uncontrolled – Type 5 (Diverge)

Split Link 886 (SB I-25), Place Node 2008 for SB on-ramp – Uncontrolled – Type 4 (Merge)

Slit Link 895 (Richards), Place Node 2009 for SB I-25 ramp intersection with Richards - Uncontrolled (for now) – Type 1

CR 70 Interchange Nodes

Split Link 401 (NB NM 599), Place Node 2010 for NB off-ramp – Uncontrolled – Type 5 (Diverge)

Split Link 301 (NB NM 599), Place Node 2011 for NB on-ramp – Uncontrolled – Type 4 (Merge)

Split Link 122 (SB NM 599), Place Node 2012 for SB off-ramp – Uncontrolled – Type 5 (Diverge)

Split Link 300 (SB NM 599), Place Node 2013 for SB on-ramp – Uncontrolled – Type 4 (Merge)

Save as Santa-Fe-Forecast-rev-LU-10092009-working-DOT-Base-Version2-01282010.ver

Connect Richards and Rodeo to Richards and Camino Carlos Rey

Add link 2380 from Node 878 to Node 839 – Type 70 Arterial Class IV, 1-lane each direction, 35 MPH

Save as Interim Santa-Fe-Forecast-rev-LU-10092009-working-BD3-01282010.ver

Richards Interchange with I-25

NB Off-Ramp - Add link 2381 from Node 2007 to Node 999 – Type 20 Ramps, 1-lane, 35 MPH

NB On-Ramp - Add link 2382 from Node 999 to Node 978 – Type 20 Ramps, 1-lane, 35 MPH

SB Off-Ramp - Add link 2383 from Node 979 to Node 2009 – Type 20 Ramps, 1-lane, 35 MPH

SB On-Ramp - Add link 2384 from Node 2009 to Node 2008 – Type 20 Ramps, 1-lane, 35 MPH

Signalize Node 999 – Type 10 Signalized Control

Signalize Node 2009 – Type 10 Signalized Control

Save as Santa-Fe-Forecast-rev-LU-10092009-working-BD1-01282010.ver

Connection to CR 70 & NM 599

Add link 2385 from Node 720 to Node 580 – Type 70 Arterial Class IV, 1-lane each direction, 35 MPH

Model Changes to Create Scenarios for Richards Extension White Paper

CR 70 Interchange with NM 599

Move Node 496 a bit south for NB NM 599 Ramp with CR 70

Move Node 2495 a bit north for SB NM 599 Ramp with CR 70

NB NM 599 - Add link 2386 from Node 2010 to Node 2011 – Type 31 NM 599 adj, 2-lane, 55 MPH

NB NM 599 - Add link 2386 from Node 2010 to Node 2011 – Type 31 NM 599 adj, 2-lane, 55 MPH

NB Off-Ramp - Modify link 2373 from Node 2010 to Node 496 – Type 20 Ramps, 1-lane, 35 MPH

NB On-Ramp - Modify link 2374 from Node 496 to Node 2011 – Type 20 Ramps, 1-lane, 35 MPH

SB Off-Ramp - Modify link 2377 from Node 2012 to Node 495 – Type 20 Ramps, 1-lane, 35 MPH

SB On-Ramp - Modify link 2378 from Node 495 to Node 2013 – Type 20 Ramps, 1-lane, 35 MPH

Signalize Node 496 (NB NM 599 ramp)– Type 10 Signalized Control

Signalize Node 495 (SB NM 599 ramp) – Type 10 Signalized Control

Save as Santa-Fe-Forecast-rev-LU-10092009-working-BD2-01282010.ver

Open Interim BD3

Connection to CR 70 & NM 599

Add link 2385 from Node 720 to Node 580 – Type 70 Arterial Class IV, 1-lane each direction, 35 MPH

Signalize CR 70 intersections with NM 599

Insert Main Node 10 Type 10 Signalized Control – Combine Nodes 495 and 496

Main Turns – verified appropriate

Save as Santa-Fe-Forecast-rev-LU-10092009-working-BD3-01282010.ver

Appendix B

AM Peak Hour Graphics

