NEW MEXICO DEPARTMENT OF TRANSPORTATION
TPA-9999(5)
CN-U900030

NORTH PRINCE STREET & COMMERCE WAY
NORTH PRINCE STREET & EAST 21ST STREET
INTERSECTION ALTERNATIVES ASSESSMENT

Prepared For:

NMDOT

Prepared By:

PARSONS BRINCKERHOFF

March 4, 2013

Table of Contents

List of Figures

List of Tables

List of Appendices

Location: Intersections of N Prince Street/Commerce Way and N Prince Street/E 21st Street
City: Clovis, New Mexico
County: Curry County
NMDOT District: District 2

Intersection: N Prince Street (NM 209)/Commerce Way
Major Street (Classification): N Prince Street (Arterial) – urban divided 4-lane State Highway
ADT*: 23,382 (2005)
Minor Street (Classification): Commerce Way (Collector) – urban undivided 4-lane roadway
ADT: 5,938 (2005)

Intersection: N Prince Street (NM 209)/E 21st Street (NM 523)
Major Street (Classification): N Prince St (Arterial) – urban undivided 5-lane State Highway
ADT: 11,539 (2005)
Minor Street (Classification): E 21st Street (Arterial) – urban undivided 4-lane/5-lane roadway
ADT: 2,618 (2005)

*ADT volumes taken from 2005 NMDOT Consolidated Highway Database (CHDB) at intersection mile posts.

1. INTRODUCTION

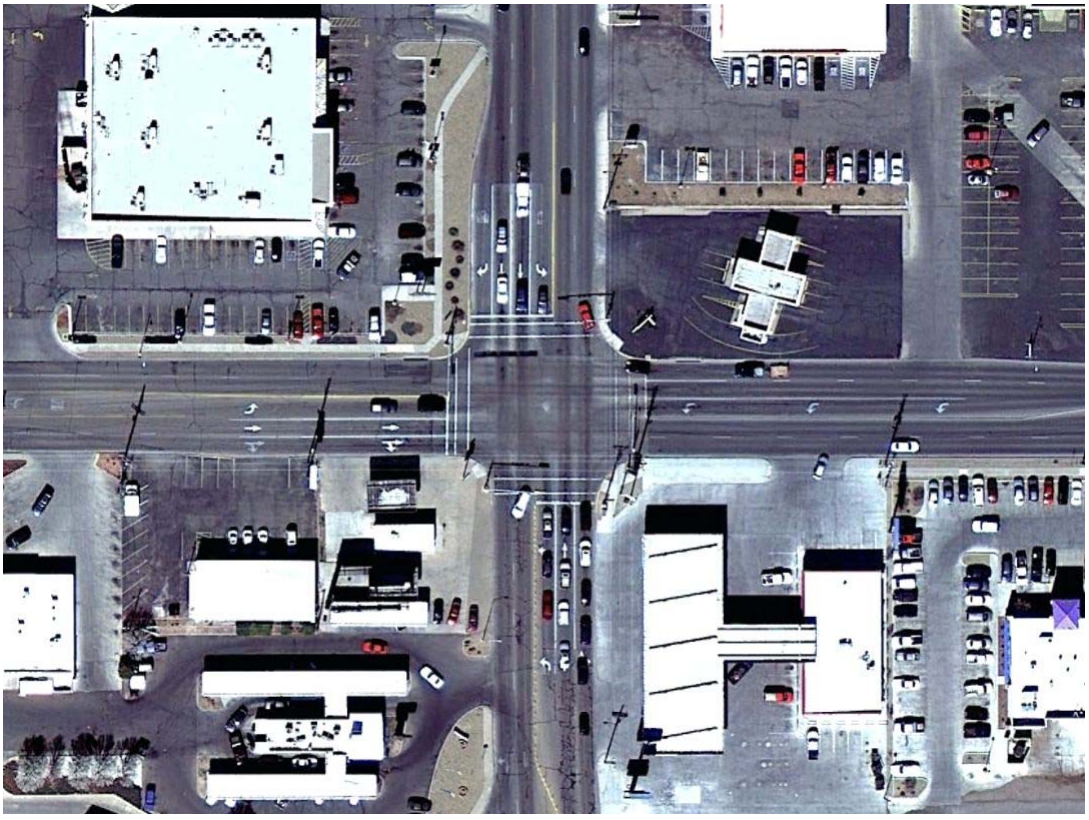
The purpose of this report is to evaluate intersection improvements for the N Prince Street/Commerce Way and N Prince Street/E 21st Street intersections in Clovis, NM based upon the findings of an intersection assessment that was completed by Parsons Brinckerhoff in September 2012. A map indicating the location of the intersections can be found in Appendix A and aerial photographs of each intersection are shown in Figure 1 (N Prince Street/Commerce Way) and Figure 2 (N Prince Street/E 21st Street).

The initial study identified the following operational issues:

- The N Prince Street/Commerce Way intersection operates at an overall acceptable level of service during each of the peak periods though there were operation deficiencies for several of the minor movements.
- Queue storage at the N Prince Street/Commerce Way intersection is inadequate for the eastbound left-turn movement (all peak periods) and for the northbound and southbound left-turn movements.
- The N Prince Street/E 21st Street intersection operates at an acceptable level of service during the AM peak (with deficiencies on the minor approaches) however; the intersection operates at a deficient level of service during the Noon and PM peak with deficiencies at both major and minor approaches during the Noon and PM peaks.
- Queue storage at the N Prince Street/E 21st Street intersection is inadequate for the northbound left-turn, southbound left-turn, eastbound left-turn and southbound right-turn movements.
- Operations at the N Prince Street/E 21st Street intersection negatively impacts operations of the N Prince Street/Commerce Way intersection. Inadequate storage for the left-turn movements result in blockage of the through-lanes that negatively impacts operations through the N Prince Street corridor.
- Signal spacing does not adhere to SAMM criteria for an urban principal arterial.

Figure 1: N Prince Street/Commerce Way Intersection

Figure 2: N Prince Street/E 21st Street Intersection



2. ALTERNATIVE DEVELOPMENT

Simple capacity improvements that would address the operational issues that were identified to either of the intersections are not feasible due to right-of-way constraints and intersection spacing. As-built information for the corridor indicates that there are 80-feet of right-of-way along N Prince Street and E 21st Street and approximately 90-feet along Commerce Way. There is additional right-of-way in the northwest quadrant of the E 21st Street intersection, along N Prince Street, that extends along the western boundary of the Walgreens property. Overall, there is limited public right-of-way available for any improvements because the right-of-way boundary exists just beyond the back of the sidewalk through each of the road corridors.

In general, there is inadequate capacity and queue storage along N Prince Street in the vicinity of Commerce Way and E 21st Street intersections. Therefore, to improve operations within the study area the following scenarios were developed and investigated:

- Modifications to the N Prince Street/Commerce Way intersection including but not limited to access restrictions at the intersection (i.e. right-in/right-out, limited left-turn access, etc.).
- Removal of the traffic signal at N Prince Street/Commerce Way, which would allow for an adjustment to the signal timing at N Prince Street/E 21st Street intersection.
- Adding additional capacity via the construction of new turn lanes
- Lengthening left-turn storage bays on the minor (eastbound and westbound approaches)

Several criteria were identified for the purpose of evaluating each of the alternatives that were developed. The criteria include the following: improvement cost, intersection capacity, queue storage, and potential impact. A No Build alternative was evaluated for each intersection for the purpose of creating a base line to evaluate the Build Alternatives against. The No Build alternative (Alternative 0) would assume no improvements or changes to the existing intersections.

3. N PRINCE STREET/COMMERCE WAY INTERSECTION

Six intersection alternatives were evaluated for the N Prince Street/Commerce Way intersection: The alternatives were developed with the intent of managing access at the intersection and creating opportunities to allow for improvements to the south leg of the N Prince Street/E 21st Street intersection. The alternatives include the following:

- Alternative 0: No Build
- Alternative 1: Right-In/Right-Out Access (Figure 3)
- Alternative 2: Right-In/Right-Out with Left-In Access (Figure 4)
- Alternative 3: Westbound Right-In/Right-Out Access (Figure 5)
- Alternative 4: Westbound Access Only (Figure 6)
- Alternative 5: Eastbound Access Only (Figure 7)

Alternative 1 would modify the access at the minor approaches to right-in/right-out movements that would be stop controlled. There would be no left-turn access from N Prince Street onto Commerce Way or into the private driveway.

Alternative 2 would modify access at the minor approaches to right-out egress, but would allow both left-in and right-in access. This would allow for all existing turning movements from N Prince Street to be maintained. This

alternative would be stop controlled at the minor approaches and the left-turn movements from N Prince Street would be via a yield condition.

Alternative 3 would restrict all access from Commerce Way and would allow right-in/right-out access from the private driveway. There would be no left-turn access provided from N Prince Street to either Commerce Way or the private driveway. The private driveway would be stop controlled.

Alternative 4 would provide full access from the east approach that would be signal controlled. This alternative would restrict all access from Commerce Way to N Prince Street. The southbound left-turn movement would be restricted, though the northbound left-turn movement would be maintained. It should be noted that this intersection would operate just above the threshold for the Peak Hour signal warrant and stop control could be a consideration for the intersection.

Alternative 5 would provide full access from Commerce Way that would be signal controlled. The alternative would restrict all access from and to the private driveway. The northbound left-turn movement onto Commerce Way would be maintained with this alternative. This alternative would meet the Peak Hour signal warrant threshold for traffic signal control.

Figure 3: Alternative 1 – Right-In/Right-Out Access

Figure 4: Alternative 2 – Right-In/Right-Out with Left-In Access

Figure 5: Alternative 3 – Westbound Right-In/Right-Out Access

Figure 6: Alternative 4 – Westbound Access Only

Figure 7: Alternative 5 – Eastbound Access Only

Table 1, shown below, compares each of the four alternatives that were evaluated for the N Prince Street/Commerce Way intersection.

Table 1: Alternative Evaluation – N Prince Street/Commerce Way

Alternative	Operations (LOS)	Network Impacts	Adequate Queue Storage	Allows Improvements at E 21st Street	Driveway Impacts	ROW Required	Construction Cost
Alternative 0: *No Build*	AM: B Noon: B PM: B	No	No	No	No	No	$ -
Alternative 1: *Right-In/Right-Out*	AM: A Noon: A PM: A	Yes	Yes	Yes	Yes	No	$ 115,000
Alternative 2: *Right-In/Right-Out with Left-In*	AM: A Noon: A PM: A	Yes	No	No	Yes	No	$ 125,000
Alternative 3: *Westbound Right-In/Right-Out Access*	AM: A Noon: A PM: A	Yes	Yes	Yes	Yes	No	$ 125,000
Alternative 4: *Westbound Access Only*	AM: A Noon: A PM: A	Yes	Yes	No	No	No	$ 335,000
Alternative 5: *Eastbound Access Only*	AM: A Noon: A PM: A	No	Yes	Yes	Yes	No	$ 310,000

The following conclusions can be summarized from the assessment of the Build Alternatives for the N Prince Street/Commerce Way intersection.

- Each of the Alternatives would provide acceptable operations during each of the Peak Hour periods. There would not be any deficient movements for any of the alternatives during any of the Peak Hour periods.
- Alternative 1, Alternative 2, Alternative 3, and Alternative 4 potentially would have negative impacts on traffic circulation in the local area. The restriction of left-turn egress from Commerce Way will likely have a impact the neighborhood streets west of the N Prince Street corridor by increasing traffic volumes. These roadways are not intended to support the traffic that will seek an alternative route to N Prince Street. The only logical routes that are designed to convey this traffic, N Main Street and W 14th Street, are approximately 0.6 miles west of the intersection.
    - In addition to negatively impacting neighborhood streets, there would also potentially be a negative operational impact to the stop controlled intersections west of N Prince Street, along E 21st Street that would be used by the displaced left-turning traffic.
- Alternative 5 may have a negative impact to vehicular access at the retail development east of the N Prince Street corridor. However, there is an additional full access point approximately 370-feet south of the Commerce Way intersection that could be utilized as the primary access point to the development. There is also access provided along E 21st Street.
- Adequate queue storage can be achieved for each of the Build Alternatives that do not include a southbound left-turn lane. Providing adequate length for southbound left-turn lane is not possible because it would negatively impact queue storage at the N Prince Street/E 21st Street intersection which is also insufficient.

- Alternative 1 and Alternative 2 would impact private driveways that would occur within the new dedicated right-turn lanes. Typically it is not desirable to have a driveway located within a turn lane and there do not appear to be any feasible options to provide alternative access to the properties along the southern and western approaches.
- None of the alternatives would require right-of-way acquisition.
- Reconstruction of the intersection while maintaining traffic signal control and eliminating access to either of the minor approaches will result in partial reconstruction of the existing traffic signal.

In summary, restricting access from Commerce Way will likely have a negative impact to the neighborhood streets west of the N Prince Street corridor that is a result of displaced vehicle trips. These alternatives are likely not feasible even though they provide an operational improvement because they would likely not be supported by the neighborhoods and may result in additional operational issues elsewhere. If any of these alternatives that restrict access from Commerce Way were to be considered, further study of the impacts of the displaced trips would be warranted. Restricting access to the east approach would appear to be more feasible. In addition to the operational improvements, there is additional access to the development south of Commerce Way which could be improved if required. The removal of the southbound left-turn lane and simplified signal operations would also make it more feasible to implement queue storage and signal timing improvements at the N Prince Street/E 21st Street intersection.

4. N PRINCE STREET/E 21ST STREET INTERSECTION

Four intersection alternatives were evaluated for the N Prince Street/E 21st Street intersection. The alternatives were developed with the intent of creating additional capacity at the intersection and providing adequate vehicular queue storage. The alternatives include the following:

- Alternative 0: No Build

Alternative 1: Intersection Capacity Improvements (

- Figure 8)
- Alternative 2: Intersection Capacity Improvements with Queue Storage Lengthening (Figure 9)
- Alternative 3: Signal Timing Improvement

Alternative 1 would address the capacity issues of the intersection through the addition of dedicated right-turn lanes in the northbound, eastbound and westbound directions. The improvement would result in the need for right-of-way acquisition in the three quadrants of the intersection. The traffic signal would still operate in the same manor however overlap phases could be implemented for each of the right-turn movements to coincide with the protected left-turn phases.

Alternative 2 would improve capacity and partially address the queuing issues at the intersection. Right-turn lanes would be constructed in the northbound, eastbound, and westbound directions. In addition, the southbound and eastbound left-turn lanes would be extended to accommodate estimated vehicular queuing. The northbound left-turn and southbound right-turn lanes would be extended to add additional queue storage, though intersection and driveway spacing will not allow for the lanes to be fully extended to accommodate estimated queuing needs. Similar to Alternative 1, right-of-way acquisition would be required for the improvements.

Alternative 3 would address capacity issues at the intersection assuming that the N Prince Street/E 21st Street intersection could be optimized for the standalone intersection. Currently the N Prince Street/E 21st Street intersection and N Prince Street/Commerce Way intersections have been optimized to maximize operations between the two intersections. This alternative would assume that an improvement would be made to the N Prince Street/Commerce Way intersection that would allow for the N Prince Street/E 21st Street intersection to operate independently. Access modifications to the N Prince Street/Commerce Way intersection could result in improved signal timing and queue storage for the northbound left-turn lane and were identified in the previous section.

Figure 8: Alternative 1 – Intersection Capacity Improvements

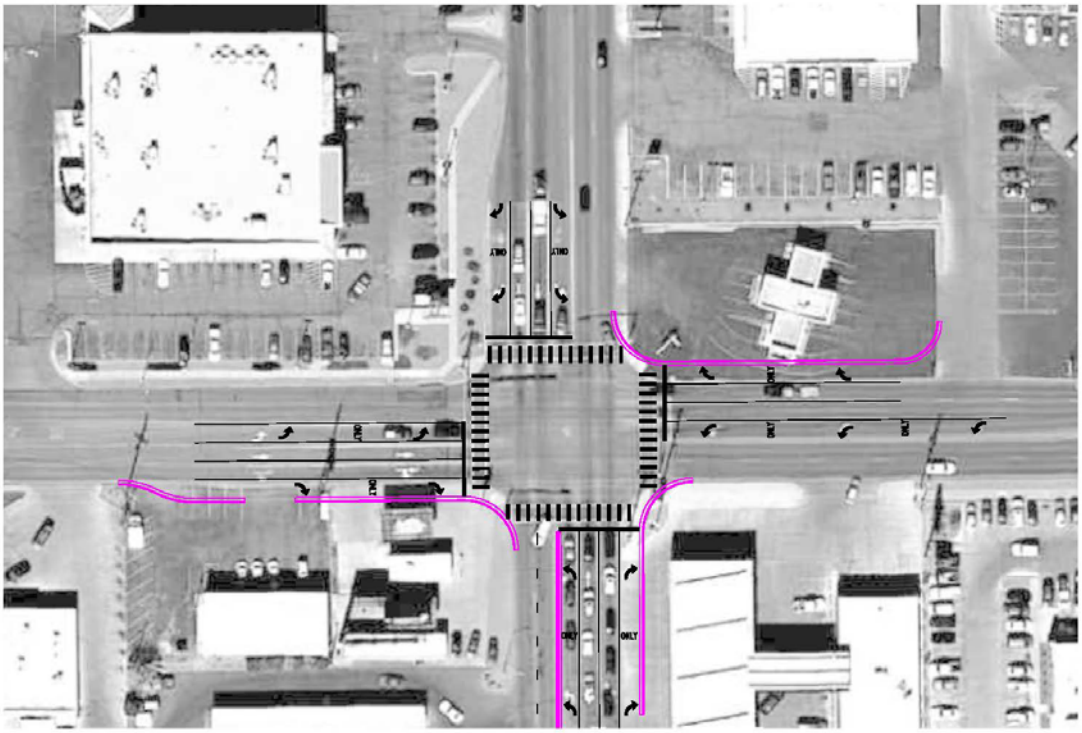


Figure 9: Alternative 2 – Intersection Capacity Improvements with Queue Storage Lengthening

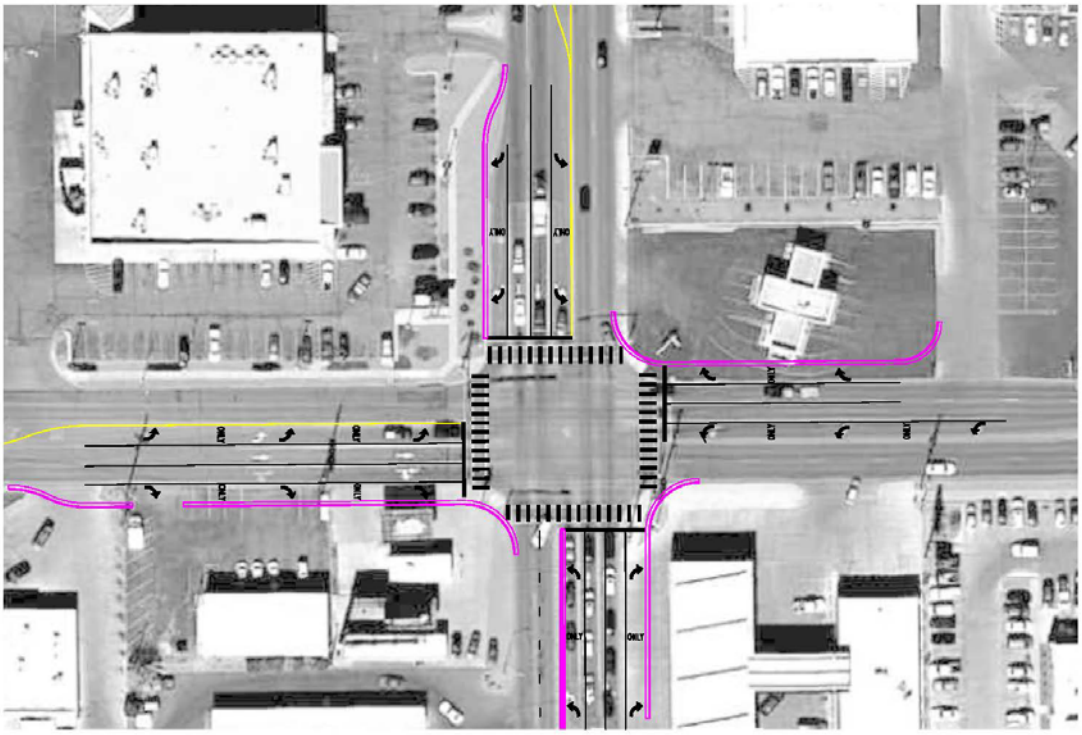


Table 2, shown below, compares each of the four alternatives that were evaluated for the N Prince Street/E 21st Street intersection.

Table 2: Alternative Evaluation – N Prince Street/E 21st Street

Alternative	Operations (LOS)	Adequate Queue Storage	Network Impacts	Driveway Impacts	Property Impacts	ROW Required	Construction Cost
Alternative 0: *No Build*	AM: C Noon: D PM: E	No	No	No	No	No	$ -
Alternative 1: *Capacity Improvement*	AM: C Noon: D PM: C	No	No	Yes	Yes	Yes	$ 440,000
Alternative 2: *Capacity Improvement Plus Storage Lengthening*	AM: C Noon: D PM: C	Yes*	No	Yes	Yes	Yes	$ 475,000
Alternative 3: *Signal Timing Improvement*	AM: C Noon: D PM: D	No	No	No	No	No	$ -

The following conclusions can be summarized from the assessment of the Build Alternatives for the N Prince Street/E 21st Street intersection.

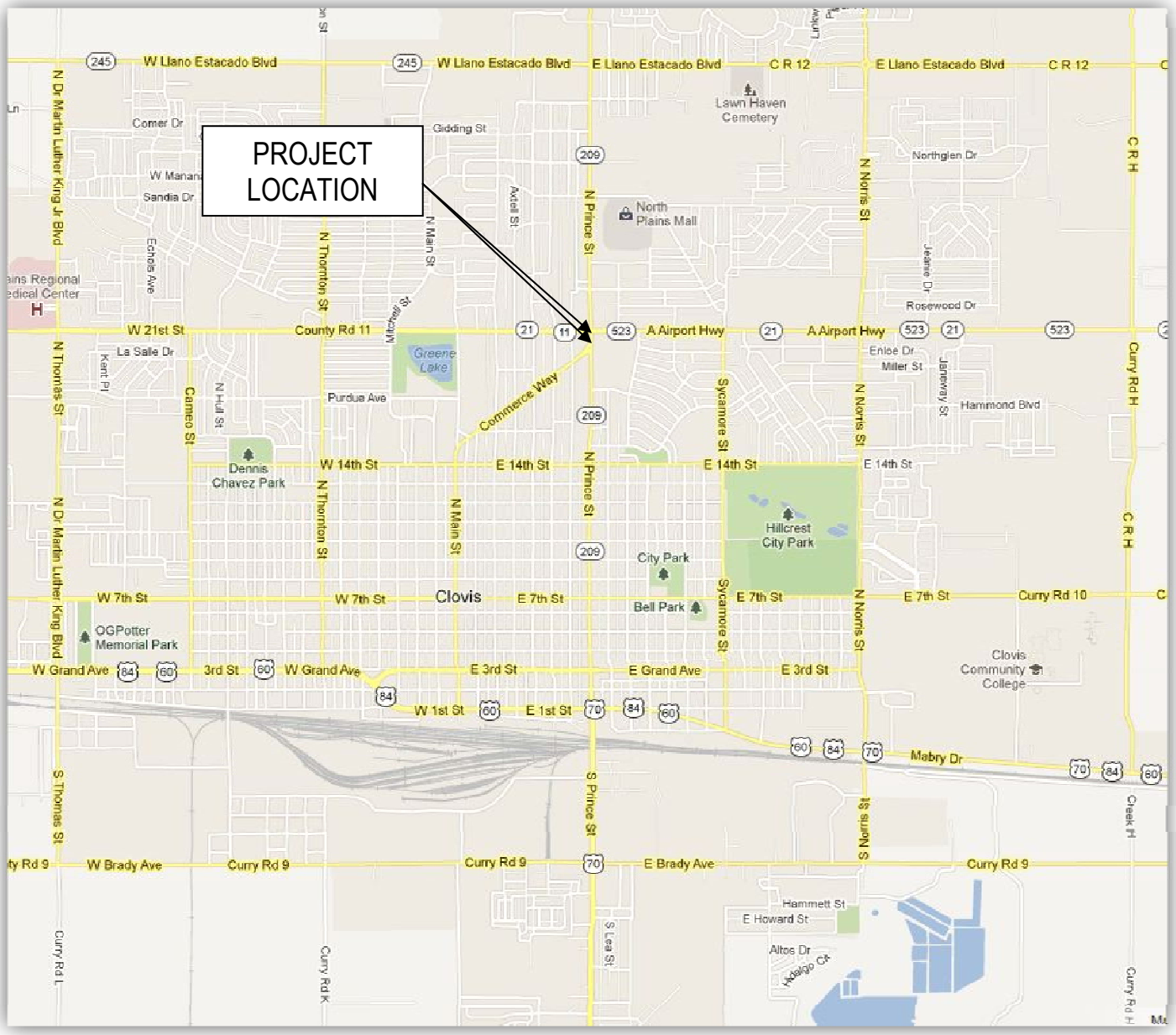
- Each of the Build Alternatives would provide acceptable operations during each of the Peak Hour periods. For each alternative there would be movements that would operate deficiently (LOS ≤ E).
- Only Alternative 2 would address most of the insufficient queue storage at the intersection. However, storage improvements could be incorporated into each of the Alternatives (including the No Build) for the southbound and eastbound left-turn movements.
    - None of the Alternatives will address the queue storage issues for the northbound left-turn movement which is directly tied to the proximity to the N Prince Street/Commerce Way intersection. Access changes to the N Prince Street/Commerce Way intersection may result in the ability to lengthen the turn lane which would provide adequate queue storage.
- None of the alternatives would result in changes to the functionality of the intersection that would result in a redistribution of traffic through the local area.
- Alternative 1 and Alternative 2 would impact private driveways that would occur within the new dedicated right-turn lanes. Typically it is not desirable to have a driveway located within a turn lane and there do not appear to be any feasible options to provide alternative access to the properties along the southern and western approaches.
- Alternative 1 and Alternative 2 would require the acquisition of right-of-way in the northeast, southwest, and southeast quadrants of the intersection to allow for the construction of the right-turn lanes. Furthermore, the widening of the roadway to accommodate the lanes and the reconstruction of the curb and gutter and sidewalk will extend into portions of the drive-through area of the Citizen's Bank of Clovis (northeast corner) and pump area of the Allsup's service station (southeast corner) where vehicular traffic operates. Impacts on these areas would negatively affect the functional operations of the properties and would likely not be well received.
    - There would also be utility relocations associated with the construction of a northbound right-turn lane.

- Reconstruction of the intersection to accommodate increased capacity through additional turn lanes would necessitate the reconstruction of the traffic signal.

In summary the construction of additional capacity at the N Prince Street/E 21st Street intersection to provide additional capacity does not seem feasible due the cost of construction, right-of-way impacts and impacts to the vehicular movement within several properties at the intersection. Simple queue storage improvements can be cost effectively implemented at the north and west approaches. Acceptable operations can be achieved through changes to signal timing at the intersection however this improvement would be dependent upon modifications to the N Prince Street/Commerce Way intersection that modify access and allow for the N Prince Street/E 21st Street intersection to operate independently.

Appendices

Appendix A: Study Area


PROJECT LOCATION
W Llano Estacado Blvd
E Llano Estacado Blvd
C R 12
Lawn Haven Cemetery
Gidding St
North Plains Mall
Northglen Dr
N Norris St
N Prince St
N Main St
N Thornton St
Axtell St
Mitchell St
Echols Ave
Rosewood Dr
Jeanne Dr
W 21st St
County Rd 11
A Airport Hwy
La Salle Dr
Kent Pl
Greene Lake
Purdue Ave
Commerce Way
Enloe Dr
Miller St
Janeway St
Hammond Blvd
Curry Rd H
N Thomas St
N Dr Martin Luther King Jr Blvd
Cameo St
N Hull St
Dennis Chavez Park
W 14th St
E 14th St
Sycamore St
Hillcrest City Park
City Park
Bell Park
W 7th St
Clovis
E 7th St
Curry Rd 10
OG Potter Memorial Park
W Grand Ave
3rd St
E 3rd St
E Grand Ave
Clovis Community College
W 1st St
E 1st St
Mabry Dr
S Thomas St
S Prince St
S Norris St
Creek H
W Brady Ave
Curry Rd 9
E Brady Ave
Hammett St
E Howard St
Altos Dr
Hidalgo Ct
S Lea St
Curry Rd L
Curry Rd K