

**Comprehensive Transportation Corridor Study and Plan for NM502**  
**Public Questions and Staff/Consultant Responses in *Italics***  
**6.23.2011**

**A. What version of SIDRA did the modeler use? What are the variations in the newest SIDRA release?**

- A1. What version of SIDRA code did you use for your modeling calculations? *3.2*
- A2. We have performed SIDRA vers. 5.1 calculations using the HCM2010 Standard Model, with results that indicate that your calculations are quite optimistic. What SIDRA version have you used in your study? *3.2*
- A3. Discuss the differences between a demo version of the simulation code, SIDRA, and the full-blown, professional version. Can the default constants for roundabout design be modified in a demo version in any way? *Please contact SIDRA for a list of differences.*
- A4. MIG has reported using SIDRA as their roundabout modeling code and Los Alamos county staff has an expert SIDRA trained modeler (according to Eugene Dougherty, Chairman Transportation Board). *County does not have a SIDRA expert.*
- A5. Why not use the new version of SIDRA (5.1) that is advertised to model US roundabouts and to use the new computational equations specified for use in the United States by the US DOT in Manual HCM-2010? He public modelers have no problem changing geometry parameters etc. in version 5.1 in spite of what is said in The Monitor. *The SIDRA 3.2 version is acceptable by industry standards and was accepted by County staff when contracting the NM 502 project.*

**B. What input assumption and variables are in the model?**

- B1. What will be the design speed for cars traveling in the roundabout? *20-25 mph*
- B2. Can you please list the geometric values that you entered for the roundabouts. *See input data.*
- inscribed diameter, 136'*
- central island diameter, 100'*
- circulating road width, 18'*
- entry lane width, 17'*
- entry angle, 30'*
- entry radius, Not a required input under the HCM 2000 model version (which is used for roundabout analysis in the US). These are options under the FHWA 2000 Roundabout model which is not recommended for US analysis.*

and flare length. *Not a required input required under the HCM 2000 model version (which is used for roundabout analysis in the US). These are options under the FHWA 2000 Roundabout model which is not recommended for US analysis.*

What are the inscribed (curb-to-curb) diameters, island sizes, and entry radii/angles you currently use? *See question B2 and input data.*

a) *What are your traffic data sources? CDM, the traffic engineering consultant, performed traffic studies in fall, 2010. Also county staff provided some historical data.*

B3. Please specify any non-standard parameters and assumptions you made, and provide us with the input and output from your calculations. *See Question B2, results in the draft report and input data provided in the Appendix D of the draft report.*

B4. SIDRA ver 5.1 requires many input parameters (in addition to traffic counts) that specify the geometry and other input requested by Joel Williams. The public modelers need the values used by MIG/CDM and the corresponding values that are accepted by County Staff and the Transportation Board. Why should these input parameters required to use the SIDRA code properly be denied to the public modelers? *Input parameters are provided.*

B5. Why is the traffic count data supplied to MIG and the public modelers (under Freedom of Information Act) not appropriate for use in the computational models? (Kyle Zimmerman-June 2<sup>nd</sup> Transportation Board meeting)? Please provide the proper peak hour traffic data from SR502/Trinity where roundabouts are proposed to both the public modelers and MIG/CDM. *See results in the draft report and input data provided in the Appendix D of the draft report.*

Please send me their modeling inputs (input flows and exit dimensions; etc; and any other non-default they would use in SIDRA for each intersection they have modeled by 5pm MDT on July 6<sup>th</sup> or before. *See results in the draft report and input data provided in the Appendix D of the draft report.*

B6. What will be the posted speed limit on Trinity Drive? *Any changes in speed limit on Trinity will be set at the 85% percentile, in conformance with County code.*

B7. For rush hour and noon time traffic on Trinity, did you use the measurements for the maximum number of vehicles per hour, or the maximum number per 15 minutes, x 4? (Reason for question: are we designing to avoid saturation over the average rush hour traffic over 1 hour, or over the 15-minute peak period?) *In the SIDRA model, we used the hourly volume and adjusted the hourly volume using a peak hour factor which takes into consideration the peaking characteristics over a one-hour period. This is an accepted practice in traffic engineering.*

B8. What value did you use for follow-up headway / driver response time? Why did you select this value? (Reason for question: This is an important parameter that describes how closely together

cars will travel when the traffic is heavy, and its value affects the degree of saturation. We should ascertain what value the designers used, and if that value is suitable for Los Alamos traffic.) *The default value was used.*

- B9. How many pedestrians per hour did you consider in your calculations? (Reason for question: We would like to encourage more pedestrian traffic on Trinity. But if pedestrians need 10 to 20 s to cross the roundabouts, and vehicles are spaced 2-3 s apart, then at peak traffic each pedestrian will create a 3 to 10 car queue.) *The number of pedestrians is not entered in the SIDRA model. The pedestrian effect entered in the model is the time for pedestrians to clear the lane.*
- B10. What is the assumed rate of pedestrian traffic (walking across Trinity) when calculating the possible maximum throughput of vehicular traffic along Trinity, for both the current and proposed scenarios? *In SIDRA, the "pedestrian effects" is used for signalized intersections. Pedestrian volumes were not entered in the SIDRA analysis and if pedestrian volumes are low, there is minimal impact to capacity. In addition, the pedestrians would not be crossing at the yield line of the roundabout but on the approach 25 feet back from the yield line. This would have much lower impact on traffic operation.*
- B11. How many trucks, busses, and County heavy equipment vehicles did you allow for in your calculations? (Reason for question: Large vehicles will also need more time to transit each roundabout.) *2% heavy vehicles, based on traffic counts.*
- B12. Does the current conceptual design for the Central/Trinity/4<sup>th</sup> intersection accommodate 18-wheeler semi's exiting west-bound onto Central? *The model input is 2% heavy vehicles; up to a WB-67, a semi-truck with a 67' wheelbase.*
- B13. Are 18 wheel trucks and/or semi trucks able to negotiate the planned road? *See question B12.*
- B14. Will low clearance horse trailers negotiate these roundabouts which still have a problem at the end of diamond drive? *See question B12.*
- B15. Did you apply a saturation flow adjustment factor for population? If so, what value did you use? (Reason for question: This factor seems to adjust for different driver reaction times between small towns versus large cities, so it would be good to ensure that the factor is appropriate for Los Alamos drivers.) *The Saturation Flow Rate is the maximum departure (queue discharge) flow rate achieved by vehicles departing from the queue during the green period at traffic signals. Saturation Headway (seconds) is 3600 / Saturation Flow Rate (vehicles per hour). The Follow-up Headway parameter used in gap-acceptance analysis is a saturation (queue discharge) headway. See SCATS Maximum Flow (MF) and Follow-up Headway. Environment Factor may capture the variability being asked about and is addressed below.*

B16. What value was used for the Environmental Factor in the SIDRA calculations of the Trinity roundabouts, and what were the reasons for choosing this value? I have read (Akcelik, Carmel IN Roundabout Workshop, 2011) that a value of 1.2 is appropriate for the United States because in the US roundabouts are used less efficiently than in other countries. If a value different than 1.2 was used in CDM's calculations, please explain why. *The Environment Factor of 1.0 was used in the analysis. The Environment Factor adjusts the dominant lane follow-up headway at zero circulating flow. As a result, the dominant lane follow-up headway values at all circulating flows are adjusted. This leads to the adjustment of subdominant lane follow-up headway, as well as adjustments of critical gaps for all lanes. Capacity increases with decreasing value of the Environment Factor, e.g. 0.95 will give higher capacities compared with the default value of 1.0, while 1.05 will give lower capacities. This factor represents the general roundabout environment in terms of roundabout design type, visibility, significant grades, operating speeds, size of light and heavy vehicles, driver aggressiveness and alertness (driver response times), pedestrians, heavy vehicle activity (goods vehicles, buses or trams stopping on approach roads), parking turnover and similar factors affecting vehicle movements on approach and exit sides as well as the circulating road as relevant. These factors should be taken into account in terms of their impact on vehicles entering the roundabout. Higher capacity conditions could be a result of factors such as good visibility, more aggressive and alert driver attitudes (smaller response times), negligible pedestrian volumes, and insignificant parking and heavy vehicle activity (goods vehicles, buses, trams stopping on approach roads). Lower capacity (more restricted) conditions could be a result of factors such as compact roundabout design (perpendicular entries), low visibility, relaxed driver attitudes (slower response times), high pedestrian volumes, and significant parking and heavy vehicle activity (goods vehicles, buses, trams stopping on approach roads).*

*In general, the 1.2 is the Environmental Factor in the US. The "general" value is one that is widely used. Not exclusively, nor average. In many cases, another value is acceptable. It is used "in general" in the US because most parts of the country have yet to be introduced to the modern American roundabout and drive slowly through new construction and traffic controls they are unfamiliar with, artificially decreasing the potential capacity. When drivers become more comfortable driving roundabouts, they slip into shorter gaps, navigate the circulatory lane a bit more quickly and ultimately restore the initial lost capacity. Los Alamos has had a roundabout at Diamond Drive and San Ildefonso for several years. Also, the proposed roundabouts are in series rather than a single roundabout in isolation like in many US cities. For both of these reasons, the learning curve will be less pronounced as in other parts of the country where there are no existing roundabouts or a series of roundabouts on a primary roadway.*

*A study on the roundabouts in Connecticut cautioned that using the SIDRA defaults (such as EF=1.2) underestimates the capacity, resulting in the unnecessary design of multi-lane roundabouts. This study was considered in the decision to use EF=1.*

B17. Lighting at night in roundabouts: I've seen discussion that cost and energy would be saved by not having traffic lights. But it's imperative that roundabouts be brightly lit at night; otherwise you can expect an increased accident rate caused by people hitting the curb or missing an exit. What would be the cost of installing bright lights in each roundabout? What would be the annual cost of electricity and light bulbs? How would these costs compare with traditional intersections with traffic lights? What would be the impact on people who live near brightly lit roundabouts? (Bright lights interfere with sleep, and that has several negative consequences for health.) *Roundabouts have the same lighting requirements as signalized intersections. A critical element is to light the crosswalks on approaches so that pedestrians are visible to approaching drivers. Light fixtures being used are LED full cut off. This creates a significant reduction in light trespass.*

**C. What is the modeler's experience with other applications of SIDRA and other models? Are there examples when the SIDRA models failed?**

- C1. Based on your experience, what is the expected variability between your model calculations and the results you would have obtained with other models? *In the experience of the consultant team, SIDRA is a relatively conservative modeling tool as compared to other modeling tools. As such, the expectation would be for higher level of service output from another model.*
- C2. Can you present us with an example of an existing roundabout that has configuration parameters and peak traffic conditions close to those expected for the proposed roundabouts on the corridor? What physical data exists to indicate how well it performs? What are peak traffic queues and delays for that example? *The consultant team could provide detailed case studies, but it is not in the existing scope of work. Several examples are suggested below in number 4.*
- C3. Can you provide analogous calculations and data for existing roundabouts that would serve to validate your modeling? *The consultant team could provide this, but it is not in the existing scope of work.*
- C4. Do you know of any existing four-legged 1-lane roundabout similar to that proposed for Los Alamos that is in the United States, and that handles similar or higher peak-hour traffic flow? If so, where is it and where can we get the detailed traffic count data? *Golden, CO; Sedona, AZ; Bird Rock (San Diego), CA – traffic data are available from the cities.*
- C5. For the program they used for Los Alamos, has it ever been found completely wrong in another application? Is so, where, and why? *Consultant team is not aware of any examples.*
- C6. A number of examples have been provided to support the traffic circle concept. Where have traffic circles been tried and failed? Or, where have they been tried and they have not fully produced the advertised goals and why? *Traffic circles are not proposed, modern roundabouts are. Consultant team is not aware of any examples that have not produced the expected results.*
- C7. Based on your experience, what is the expected scatter between your model calculations and the actual performance of the roundabouts once they are built? (Reason for question: One report by Lenters shows data that suggest actual saturation values are only 50% of the calculated ones! If

the model calculations show that we are at or close to saturation at peak traffic, then it is very important to know what uncertainty to assign to them.) *We have not performed this type of research. See previous questions.*

Based on your experience, what is the expected variability between your model calculations and the results you would have obtained with other models? (Reason for question: One paper by the developer of the Aasidra code indicates a range of 1100 to 1700 for saturation, or a scatter of +/- 300 vehicles/hour. If the model calculations show that we are at or close to saturation at peak traffic, then it is very important to know what uncertainty to assign to them. *One lane roundabouts generally have a capacity (entering plus conflicting flow) of 1,400 passenger cars per hour (pcph).*

C8. Has MIG/CDM ever designed a roundabout project of this magnitude and if so where? *The team has many examples of completed projects, but every project and every community is unique.*

C9. Please tell us the roundabout saturation (in vehicles/hour) used in the simulations of the current roundabout designs for Trinity Drive during peak traffic conditions.

a) How does the %saturation compare to other installed roundabouts nationwide? *The consultant team was not scoped to measure the percent saturation at other roundabouts.*

b) The traffic load during peak times was measured early on in the study-can the current design sustain these loads? *An aggressive growth rate of 1% per year was applied to the existing traffic volumes and modeled for the year 2030.*

#### **D. Technical questions about the SIDRA model and Transportation Engineering**

D1. What are the lane capacities of the Trinity roundabouts predicted by the CDM calculations using the SIDRA code, and why do these differ from the HCM-model lane capacities?

a) What are the resulting V/C ratios? *See SIDRA outputs in draft report.*

D2. What is the difference between “peak hour factor” and “peak flow factor”? *Peak hour factor sums the 15 minutes in the highest hour, divides the sum by 4 x the highest 15 minutes. Peak Flow Factor is the Ratio of the average demand flow rate in the Total Flow Period (e.g. one hour) to the demand flow rate in the Peak Flow Period (e.g. 15 minutes). This is equivalent to the more traditional term Peak Hour Factor (PHF) when the Total Flow Period is one hour.*

a) How does the “average daily traffic” (ADT) volume relate to “hourly peak traffic” (HPT) volume? Does the model use ADT or HPT? *Average daily traffic is the number of cars that pass a point in a day. Hourly peak traffic is the traffic in the highest hour*

b) It appears that you use ADT to assess and design roadways and roundabouts instead of HTP? *The model uses peak hour traffic*

c) How do you ensure that the roadway or roundabout can provide good service at peak flow times? *By using the projected peak traffic volumes in the model*

- D3. If they didn't model Trinity Street, what did they model? *Trinity Dr intersections were modeled.*
- a) Avenue length and LOS with the number of intersections and roundabouts without actual geometry? *SIDRA models intersections*
  - b) Is GIS data used in the simulation? *No*
- D4. Does SIDRA model incorporate the whole street or just individual roundabouts? *SIDRA models intersections*
- a) Is there a way to calculate a LOS for Trinity from Diamond to the Airport and compare to a calculation on the present configuration? *Yes, but not with the existing model or within the existing scope of work for this study*
- D5. Page 13 also indicates a current volume to capacity ratio of 76% at the east end of the corridor, where the speed limit is 50 mph. Queues are already seen during the morning commute where the speed limit decreases from 50 to 35 mph on this two-lane segment of the corridor. What physical evidence do you have that inserting one or more roundabouts in this section of the corridor with circulating speeds of 20 mph would not lead to inadequate capacity and larger queues? *Higher speeds require a bigger gap*
- D6. Do you agree that the 110' curb-to-curb roundabouts currently proposed would have an average circulating speed of approximately 20 mph under optimum conditions? *Roundabouts are proposed at 136' to accommodate large trucks. This will provide a 20mph operation speed for a passenger car.*
- a) If not, what speed do you expect and why? *See SIDRA inputs in Appendix D or draft report*
  - b) At what circulating traffic volume (veh/hr) would you expect the speed to decrease to 15 mph? *Sensitivity analysis not included within current contract*
- D7. We are familiar with the performance of the 90' roundabout at the intersection of Diamond Drive and San Ildefonso. We observed the behavior of the circle, ignoring traffic on the bypasses (which are irrelevant to the proposed installations on NM502). Queues with wait times up to 40 seconds develop during the morning commute, at a peak entry volume of about 1100 vehicles per hour (peak entry volume for S. San Ildefonso Rd. only is ~700 veh/hr). We have traffic counts that show about 1350 vehicles per hour near the west end of Trinity. *The roundabout on San Ildefonso is 110'. Prior to the roundabout installation at San Ildefonso the wait times were 4-6 minutes at peak hour.*
- a) What delays do you expect at each roundabout at peak flow? *See LOS analysis*
  - b) What evidence do you have that the delays will be as predicted? *SIDRA is the most commonly used model for roundabout analysis in the US.*
  - c) What do you predict for corridor travel times under typical weekday and maximum flow volumes? *Similar to existing travel time with traffic signals*

- D8. Reserve capacity must handle the short term loads above, and also longer-term effects due to changing patterns and growth. In particular, LANL has indicated that Pajarito Rd. might be closed, which would significantly increase the load on NM501 and NM502. What reserve capacity have you designed into the proposed roadway? *The intersections are modeled to 2030 at 1% growth per year; DOE representative to TAC reported no impacts to Trinity from Pajarito Rd project*
- D9. There is one additional critical item. That is predicted flow out into the future. MIG has used two different numbers in the past. One is 1% per year. The other is a factor of q.26 on the present flow. The way this is handled is critical and MIG/CDM need to specify what they do.  
*See question D8.*
- D10. How have the requirements for throughput been modified when taking into account probable changes in the future such as:
- a) a new "anchor" type store being established along Trinity as part of the Trinity Revitalization Project. *Access to Trinity Site is considered in study.*
  - b) Pajarito road being closed. *DOE representative to TAC reported no impacts to Trinity from Pajarito Rd project.*
  - c) increasing population. *See question D8.*
- D11. Since it is agreed that proposed Los Alamos roundabouts can handle the present ADT and AADT traffic counts, why not limit discussion to the peak-hour traffic modeling? *The roundabouts are modeled for peak hour.*
- D12. Why is the intersection of SR502/Trinity and Oppenheimer Drive not appropriate for detailed computation by the different parties? *Analysis of every intersection is provided.*
- D13. What are the uncertainties on their model for any set of input conditions, i.e., is a LOS B actually plus or minus one unit, i.e. A-B-C? *At intersections LOS are based on calculated delays; Los Alamos County and New Mexico Department of Transportation design to LOS D at peak hour.*
- D14. The White Rock revitalization simulation videos showed the geometry of the evaluated designs with White Rock landmarks. Can similar movies be made from the Trinity simulations? *Yes, but not in the current model, and the Council would have to direct/approve change in the scope of work.*
- D15. Can the unusually high number of slow-speed drivers found in Los Alamos be factored into the simulation? *Traffic data shows no evidence of unusually high number of slow speed drivers.*
- D16. MIG has stated in their earlier presentations that all the A options are approaching peak capacity conditions during the rush hours as determined from the actual NM502 traffic data. Exactly what does it mean to approach peak capacity? *Early presentations were based on SYNCHRO, which is planning level analysis is from SIDRA. The ADTs are at the threshold where high level analysis is required.*



What happens to actual traffic when the roundabouts are at their peak capacity or nearing peak capacity? *When at or near peak capacity, the roundabout operates at the level of service predicted by the model. Above capacity, the queues can be longer and/or entering speeds drops. However, research has demonstrated that drivers adjust to conditions and the roundabout operates at expected LOS.*

What are the expected vehicle speeds and travel times along the NM502 corridor during such conditions? *Travel speeds can drop adding to travel time. However, research has shown that drivers typically adjust to unexpected volumes and the roundabout operates at expected LOS.*

D17. Actual traffic count data during 2009 and 2010 shows morning rush hour with 1500 vehicles/hour. Most of the traffic is westbound at this time. If roundabouts starting at Airport Rd., what the MIG analysis show for how long (in feet or miles) will the queue of traffic be to get through the first and other roundabouts during the morning rush hour period? *See queue length output for all intersections*

a) What if the traffic is a bit more, say 1800 vehicles/hour, then what is the estimated queue length? *See queue length output data in projected growth conditions.*

b) What are estimated vehicle speeds and travel times? *Expected speeds between roundabouts are 30-35 mph; travel time to be similar to existing. The model assumes a cruising speed of 40 MPH. A lower cruising speed will actually improve the LOS.*

D18. Actual traffic count data during 2009 and 2010 shows afternoon rush hour with 1500 vehicles/hour. Most of the traffic is eastbound at this time. if there are roundabouts starting near the Hospital, what does MIG analysis show for how long (in feet or miles) will the queue of traffic be to get through all the roundabouts during this pm rush hour period and how far will traffic be backed up when leaving the laboratory crossing the bridge getting through the first roundabout on Trinity? *See queue length output for all intersections*

a) Same question if the traffic rate is a bit more, say 1800 vehicles/hr. *See queue length output data in projected growth conditions*

b) What are estimated vehicle speeds and travel times under these conditions at rush hours? *Expected speeds between roundabouts are 30-35 mph; travel time to be similar to existing.*

D19. For a major intersection at worst-case peak traffic, what are your calculated results for: *These are provided in the draft report for all the intersections.*

(a) degree of saturation,

(b) driver queue reaction time,

(c) queue discharge speed,

(d) 95% vehicle queue length,

(e) control delay,

(f) geometric delay,

(g) critical gap,

(h) Level of Service.

D20. Could you please discuss the adequacy of the traffic volume data used as a basis for the NM502 Corridor Study?

a) How do you account for possible data collection errors and for real traffic variations in evaluating design requirements for the proposed scheme? *The data collected by CDM conformed to staff expectations and observations.*

b) What assurance can you offer that the design you are advancing can adequately meet current and future needs for the corridor? *The output shows levels of service for existing and future conditions within the target range of both the County and NM DOT; the study has provisions in the proposals if future traffic conditions exceed the roundabout capacities.*

#### **E. How do roundabouts affect gaps and allow vehicles to access Trinity from side streets?**

E1. Will delays increase for cars trying to turn onto Trinity Drive (not at roundabout locations) during rush hour due to the continuous flow? *While the platooning affect created by the existing signals will be lost, the traffic will have more frequent, but shorter gaps. Average delay is expected to be similar to existing conditions since the slower speeds allow drivers to use shorter gaps.*

E2. At peak hour, will cars be able to merge onto Trinity at roundabouts? *Yes, the LOS at intersections is calculated at D or above.*

E3. Access to Trinity between intersections: With no stop lights to halt traffic, especially during peak traffic hours, what is the expected wait time for a vehicle attempting to make a right turn onto Trinity (between Diamond and the eastern-most roundabout)? *See question E2.*

a) A left turn? My concern is that anyone attempting to make a turn, especially a left turn, will be blocked by a continuous flow of traffic. *Gaps will be similar to what is existing except only one gap is required to enter the street.*

b) If no left turns onto Trinity are allowed, will people attempting to go left find going to the next roundabout and making a U-turn acceptable? *Perspectives are personal; however research and studies show a high level of satisfaction with similar treatments.*

c) Will a "no left turn" sign be placed at every driveway? *Only as necessary.*

#### **F. Are roundabouts safe for pedestrians and cyclists?**

F1. My question has to do with pedestrian safety. I live on the South side of Trinity and have to cross at Trinity and Oppenheimer to get to the library or anywhere downtown. How are you going to provide pedestrian safety if the traffic light at this corner is removed? At least I have a traffic light now. Even crossing with the traffic light is dangerous because the pedestrian crossing is synced

with the green turn arrows. Cars usually do not yield to pedestrian traffic. *The following information about pedestrians is from the Federal Highway Administration (FHWA) website: Pedestrians are accommodated at pedestrian crosswalks around the perimeter of the roundabout. By providing space to pause on the splitter island, pedestrians can consider one direction of conflicting traffic at a time, which simplifies the task of crossing the street. The low vehicular speeds through a roundabout also allow more time for drivers and pedestrians to react to one another and to reduce the consequences of error. As a result, few crashes involving pedestrians have been reported at roundabouts.*

F2. Are pedestrian underpasses with boutique shopping in the plan? If not why as this would help solve your perceived pedestrian problem? *Overpasses and underpasses were considered in the community workshops but were rejected by most participants.*

F3. Also, how will having roundabouts affect pedestrian's ability to cross the Drive? *See question F1.*

F4. Safety of pedestrians: Where will pedestrian crossings be located? *See draft report.*

With no traffic lights to stop traffic to enable crossings, how will pedestrians be able to cross Trinity, especially at peak hours? *This problem is not anticipated because pedestrians have the right of way in roundabouts and research demonstrates excellent compliance. If a peak hour problem manifests, then pedestrian activated lights will be considered.*

a) What provisions are made for people who cannot walk briskly or are in wheelchairs? *Vehicles must yield to pedestrians in crosswalks; research demonstrates excellent compliance at roundabouts.*

b) For people who are visually impaired? *I do not believe that overhead crossings would be an acceptable solution, because they do not provide crossings for people who cannot climb stairs. Recent research has shown success by grooving the pavement that gives an audible announcement of approaching vehicles.*

F5. Like most designs, the bike lanes they showed the other night terminate abruptly, with the bike lane line solid right up to the very end. In terms of human expectations, that instructs the cyclist to say in the bike lane till the last minute and then shoot out into the roundabout from the bike lane "opening" in the stripe. Why such a bad design, as opposed to something encouraging a smooth and timely merge? *The design shown in the presentation will be revised to show a conceptual design that provides for cyclists to exit the roundabout and proceed as a pedestrian or take the lane and ride through the roundabout.*

## **G. How much traffic will be diverted to other streets such as the Truck Route, Canyon Rd, Central Ave? What will be impacts to businesses on Trinity?**

G1. If the traffic circle design is implemented, what are the unintended consequences of that design? *Surly more traffic will be diverted to East Jemez Road thus loading those intersections more. Modern roundabouts are proposed, not traffic circles; see G2 below.*

- a) Will NM4 and East Jemez Road intersection be improved? *Not part of this study.*
- b) Is a traffic circle in order for NM4 and East Jemez Road? *Not part of this study.*
- c) A traffic circle at the Protection Force training center? At TA53 entrance? Royal Crest trailer park entrance? *Not part of this study.*
- d) The solid waste and concrete plant entrances? Certainly the East Jemez Road and "lower intestine" bottleneck? *Not part of this study.*
- e) Who pays for this? *Modern roundabouts are proposed only on Trinity Dr.; the only portion of the construction that is scheduled is the segment Tewa Loop to Knecht; New Mexico Department of Transportation has 75% of the cost budgeted and the County has 25% budgeted.*

G2. Have any studies been done to determine the effect on canyon road traffic since this side street will probably become the easiest and fastest way through town? *Studies show that between 2-5% of traffic can be diverted on alternative routes after a lane reduction. Improvements will be made to Canyon Road as part of the project (i.e., realigned intersection, crosswalks, left-hand turn pocket, etc.) that should minimize the amount of diversion that occurs.*

G3. Will the new road allow peak traffic to flow without being diverted to canyon and/or central due to slowdowns? *Travel time in the corridor will be similar to existing; there may be 2%-5% diversions off Trinity, research indicates that after about six months diversion diminishes.*

G4. Is the use of roundabouts really effective, if the drivers just avoid them? *See questions G2 and G3*

G5. Has MIG calculated the effect on Central Avenue and Canyon Road of the additional traffic which will divert to these roads to avoid congestion on Trinity during the morning, afternoon and lunch time rush hours if there are numerous roundabouts? *See questions G2 and G3.*

- a) What are the results of these calculations for additional congestion on these roads? *Minimal change is expected.*
- b) Will these alternate routes have higher accident rates than currently? *Minimal change is expected.*

## **H. Questions about the Transportation Corridor Study Plan presentation on the project web site**

H1. Our experience with NM502 suggests a higher fraction of through traffic than indicated on your plot on p. 14. What definitions, data, and analysis led to the results shown? *Section 2.4 of the Baseline Conditions Report details the License Plate Survey that determined the percentages of through and destination traffic.*

H2. It appears that the Accident/Crash analysis you present on p. 15 is not representative of the corridor. The number of accidents between Oppenheimer and the junction of Trinity and Central 2007-2009 on Trinity (33) is comparable with that on Central Ave. (28). Our estimate of the number of accidents per 100 million miles over the whole NM502 corridor is lower than you show by a factor of about 4. How did you arrive at 528 accidents per 100 million vehicle-miles for the

Knecht-Tewa segment? *Crash analysis is presented thoroughly in Section 2.3 of the Corridor Baseline Report.*

- H3. Where will the land come from to build the roundabouts? *Approximately 1.04 acres of additional right of way is required to build the roundabouts.*
- H4. Why did the consultants and the Transportation Board not notice that the accident rates cited to justify this plan were wildly off because the state had punched in the wrong numbers? Patricia Max an interested citizen figured it out very quickly. *Section 2.3 of the Baseline Conditions Report has a thorough Crash Analysis. The ratio of the rates in comparison to one another were correct. The representative unit was mislabeled. Correction of this oversight did not change the interpretation or application of the data.*
- H5. Why did the consultants not even present a plan to Council which would have included a straight-away four lane road with bike lanes? Were they under the impression that the county wanted the presentation to be tilted toward the A options? *The consulting team presented three, four, and five lane options to the community and the Council. Documentation of the process of presentation to the community and to Council and selection of preferred alternative is on the project website.*

#### **I. How would Trinity Dr accommodate an evacuation, emergency vehicle access, accidents, snow removal, school buses, poor drivers, and other adverse conditions?**

11. Evacuation is a concern that should be evaluated by a traffic engineer familiar with Los Alamos. During Cerro Grande the successful townsite evacuation was fostered by the added route through San Ildefonso land. Will the chosen design address a major evacuation where time is critical? *The chosen design is equivalent to the existing conditions for evacuation purposes. The draft report discusses this on page 99, Approach Width.*
12. How will roundabouts affect traffic if we have another emergency evacuation? *See question 11.*
13. With only one lane in each direction, how difficult will it be for emergency vehicles to get through and to clear off accidents? *The widened bike lane will provide a breakdown lane and a pull off lane to allow emergency vehicles to pass.*
- a) *Have the fire and police departments been consulted? Yes, both police and fire staff were on the Technical Advisory Committee for the project.*
  - b) *Where will snow go when removed in the round- about? Snow removal plan will include storing snow in landscaping in the medians and sidewalk buffers that are included in Option A. In addition, snow removal staff will be trained in standard snow removal procedures in roundabouts.*
14. In light of the budget shortfalls with the schools, how much more time will be needed for the buses to get through their routes with the proposed 502 configurations? *Travel times will be similar.*

15. Two-lane roads and single lane roundabouts are easily clogged. What evidence do you have to show that the effects of hesitant drivers, large trucks and buses, bicycle traffic, day-to-day fluctuations, accidents, adverse driving conditions, and construction would not lead to slow traffic movement on the proposed roadway? *It is true that lane weaving will not be possible on the proposed road and travel speed will be affected by the slowest vehicle.*

#### **J. Are there other, less expensive solutions?**

- J1. I also wonder if the council has looked into triple pane windows as a solution to the noise problem? *This has not been looked into because it does not address the problem outside of homes and in public outdoor spaces; most houses in Los Alamos don't have air conditioning and residents must open their windows in the summer.*
- J2. If the key traffic element for the change to the Central/Trinity/4<sup>th</sup> intersection is to place a "kink" in the west-bound exit from NM 502 onto Central, why hasn't a simpler, less costly approach and design been proposed?
- a) The Central/Trinity/4<sup>th</sup> intersection is currently a wye-intersection (with a "cross-bar" by 4<sup>th</sup> at the open end). The current conceptual design shows the entire interchange and existing landscaped island torn down and the whole area leveled and re-built into another wye intersection where the key change appears to be placement of a "kink" in the west-bound exit from Trinity onto Central. What is the problem being addressed and the estimated cost with justification/benefit for the current proposed design?

*This project is a study, not a design. The Council directed analysis of Option A3, including roundabouts. When the intersection proceeds to the design phase, other intersection controls may be considered.*

*However, the roundabout does address many of the concerns from Central Ave business people and the community at the intersection. A roundabout offers opportunities for a "gateway" to the Historic district and traditional shopping district; it provides opportunities for wayfinding and directional signing; it is aesthetic. Similar to traffic signals, roundabouts calm traffic. But roundabouts are more aesthetic, don't require extra lanes to store stopped cars, and are less expensive.*

- b) The speed limit on NM 502 was somewhat recently raised to 40 mph at Tewa Loop and 50 mph at Airport Road. What is the problem being addressed and its justification/cost benefit of reducing speed via installing 30 mph speed barriers (roundabouts) at Tewa Loop and at Airport Road? *Speed limits are set after a speed study that determines the speed of 85% of vehicles. Speeds different than the 85<sup>th</sup> percentile cannot be enforced per County code.*
- c) If a lowered speed limit is needed for NM 502 at Airport Road and at Tewa Loop, why hasn't that already been implemented via speed limit signs and ordinary enforcement? *See question J2b.*

- d) How hard is it to at least lower the speed limit past this area to 35 mph? What... two bolts and a new sign? *See question J2b.*

**K. What is the purpose of the Transportation Corridor Study Plan? Who initiated the study and why?**

- K1. Why is the County looking into this? I have lived here 15 years and never had a problem/known of lots of accidents/thought it needed to be narrowed? *County Council directed staff to do a Corridor Study because of development occurring on Trinity Dr.*
- K2. What is the primary purpose of Trinity Dr? Is it an efficient route to enter and leave the community bypassing the business district or is it something else? Does it have secondary purposes? *Access to businesses, residences, public open spaces and buildings; commuter route to LANS.*

**L. What stakeholders have been involved in the study?**

- L1. Has the transportation and administration division of the lab been contacted for input? *Both LANL and DOE staff were on the Technical Advisory Committee.*
- L2. Have you contacted the businesses in town to see if they feel that this might adversely effect business? *Several stakeholder meetings were conducted for Businesses on Trinity, Mainstreet businesses, and Chamber of Commerce members. A Trinity Dr business owner was on the Technical Advisory committee.*
- L3. What do the commuters to lab say about the proposed road narrowing *The County has solicited input from County residents and depended on DOE and LANS representatives to the TAC for input from the lab employees who don't live in the County. Additionally, we have seen announcements from citizens posted on LANL blogs and distributions about the project.*

**M. How difficult will it be for users to learn to use any changes on Trinity?**

- M1. Student drivers have difficulties driving in round-abouts. What will be done to help this situation? *Neither staff nor the consulting team has seen studies or research supporting difficulties with student drivers, or any drivers, in roundabouts. See question M2.*
- M2. Has MIG or the Council looked into the psychological effects of this change? It seems the real purpose is to "calm" people. If you have ever told someone who was upset or trying to get something accomplished to "calm down" you know that has little effect and often elevates feelings of frustration, irritation, lack of control, etc. You cannot force people to be "calm"; forcing them to remain single-file behind the slowest driver at any given moment will have the opposite effect. *It is very true that education is vital to the acceptance and success of a roundabout. Navigating a roundabout is easy. But because people can be apprehensive about new things, it's important to educate the public about roundabout use. The Federal Highway Administration has extensive, multi-media materials available for educating the public about roundabout use.*

M3. What training would be provided to the community about how to operate a motor vehicle or bicycle along a street with several successive roundabouts, about the rules of the road in roundabouts? What training would be provided for pedestrians? Surely training and information sessions and/or literature will be planned, will they not? Will the police department receive training, and have an increased presence along Trinity, especially in the first six months after the roundabouts are opened? Is the cost of community training and police presence factored into the budget for reconstructing Trinity with roundabouts?

What kinds of signage would be provided in the vicinity of roundabouts, especially for people who are new to or passing through the community and are unfamiliar with driving through roundabouts? Has the cost of signage been factored into the overall cost estimates? *See question M2.*

M4. I am concerned about the proposal for roundabouts on Trinity Drive because it appears that many people do not know how to use 1 roundabout that we already have in Los Alamos. *See question 2.*

M5. I don't feel that the roundabouts will help the traffic flow at all. They will end up slowing down the traffic that comes and goes to the lab every day. People will get so mad at the pace of traffic flow, that they will avoid coming into town and use the truck route instead. Business in Los Alamos will lose customers during lunch because they will not be able to get into and out of town in a timely matter. How is this going to help the economic growth of the town? *Research and studies demonstrate economic improvements on streets with similar treatments.*

#### **N. Questions for Council or County Staff to consider**

N1. How many people are represented by LA Walks and LA Bikes and how many people actually attended the meetings which ended up favoring a two lane Trinity with many many roundabouts? *Meeting attendance varied with a maximum attendance of approximately 100 people. Staff does not ask attendees group affiliations.*

N2. How welcoming will we be as a community if we have narrow roads? Most people like to move quickly from point A to Point B. *Part of the study is determining whether the 3-lane design is feasible.*

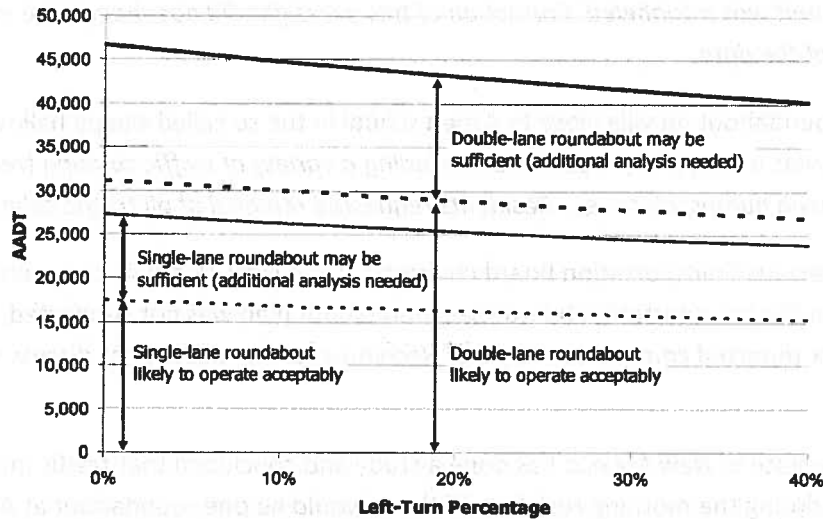
N3. Would the county be willing to consider a referendum (during a general election, no mail ballots) to settle once and for all whether the citizens of Los Alamos actually favor this drastic, disruptive and very expensive transformation of one of the town's main arteries? *This is a Council decision.*

N4. How would the construction be staged? How long would it take? How would traffic be diverted or managed during construction of roundabouts? What would the impact be on residents and businesses along Trinity? (The community should be concerned, especially given the impacts of the past five years' construction on Diamond Dr.) *This is a Corridor Study, not a construction project.*



- N5. Why did the consultants and the Transportation Board not notice that the accident rates cited to justify this plan were wildly off because the state had punched in the wrong numbers? Patricia Max an interested citizen figured it out very quickly. *Section 2.3 of the Baseline Conditions Report is a thorough Crash Analysis. The ratio of the rates in comparison to one another were correct. The representative unit was mislabeled. Correction of this oversight did not change the interpretation or application of the data.*
- N6. Why was the roundabout on villa close to Aspen school in the so called sleepy hallow area of town removed? *This was a temporary installation including a variety of traffic calming treatments: mini roundabout; speed humps; chicanes. Residents requested removal of all traffic calming.*
- N7. Why did the previous Transportation Board chairman at the May 24 public comment state that when he was on the transportation board that roundabout plan was not supported, yet Los Alamos Monitor reported committee support? *Recommend that questioner discuss with parties involved.*
- N8. Apparently, the state of New Mexico has done a study and concluded that traffic queues of over 1 mile will result during the morning rush hour if there would be one roundabout at Airport Rd and the state recommended that the roadway be widened instead. Is MIG aware of these studies and how would MIG respond to the State's analysis? *This was a study to propose access to ABS without any impacts to through movement on NM502, knowing that the Main Hill Road east of the County line would not be changed. A signal would require extra lanes to prevent vehicles stopped at a red light backing up down the hill. High level analysis of a roundabout was not considered in the report, mainly because the point of the study was eliminating any impact to through movements.*
- N9. ROW – we need it anyway for the A2/A3 options so why is this solution so much better than a 4 lane option if we need more ROW anyhow.
- 3 lane option: 1.04 acres; ranging between .06 ac to .21 ac at each intersection.*
  - 4 lane option: this option is not under consideration.*
  - 5 lane multi-modal option: 3.9 acres for a bike lane from Tewa Loop to 35<sup>th</sup>/36<sup>th</sup> plus .72 acres for bus pullouts; total 4.6 acres.*
- N10. ADT graphic used in the 5/24 staff PowerPoint presentation has such a wide range of capacity for a single lane round-a-bout. Ron had another piece of published data that had 15,000 as the capacity of a single lane round-a-bout and you must know the size of the round-a-bout to know the capacity.

Chapter 3 (cont.):  
Updated planning-level capacity figure



*This is a planning level capacity analysis diagram. Up to about 18,000 AADT, depending on left turn percentages, a single lane roundabout is likely to operate. At more than 18,000 AADT, a single lane roundabout may be sufficient.*

N11. The 2005/2006 Wilson study showed a 4 lane road was needed between the airport basin site and DP road...why are we changing the story? *See question N8.*