

MEMORANDUM



Public Works Department

Date: April 8, 2016

To: Tempe City Council

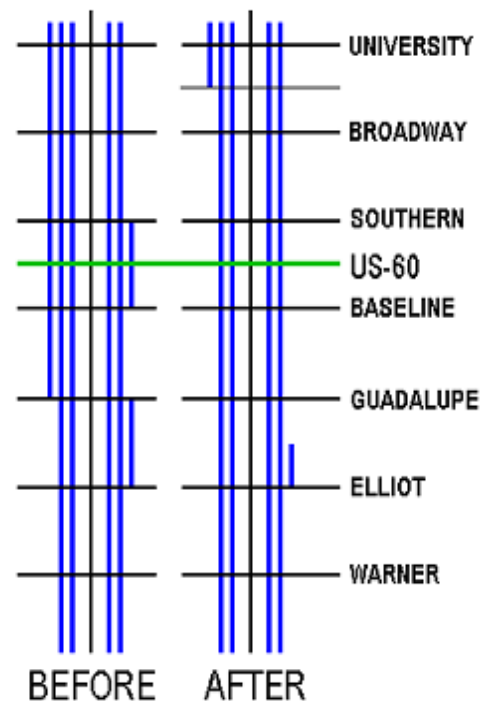
From: Shelly Seyler, Deputy Public Works Director – Transportation (350-8854)
Julian Dresang, City Traffic Engineer (350-8025)

Thru: Don Bessler, Public Works Director (350-8205)

Subject: McClintock Drive Follow-up Information

As requested by the Council as follow-up to the presentation made on March 17, 2016 regarding McClintock Drive, staff is providing the following information:

- Segment travel time analysis
- Review of travel time along the portions that were unchanged
- Level of Service (LOS) analysis
- Historical volumes between 2004 and 2016
- Pros and cons to marking an intersection with “XXX’s” and do not block intersection signs
- Education and outreach plan
- Impact to Fire and Police department response times
- History of bicycling



Travel Time Analysis and review of time along unchanged portions

The diagram above shows the “before and after” lane configuration along McClintock Drive. Staff pulled the available travel time analysis for the McClintock Drive corridor (Table 1) and each one-mile segment (Tables 2-4), which are included for your reference at the end of this memo. The segments of the project north of Baseline Road that remain, for the most part, unchanged are the northbound portions from Southern Avenue

to Broadway Road (two vehicular lanes) and from Broadway Road to University Drive (two vehicular lanes). Because these northbound segments are basically unchanged, they can be used as a reference point for identifying travel pattern changes that are likely independent of the striping changes. A review of these segments indicate that for the portion between Southern and Broadway, the average northbound travel times actually decreased by 13 seconds (9.7%) during the AM peak hour (peak direction of travel) and by 8 seconds (6.3%) during the PM peak hour (off-peak direction of travel). These small decreases are likely a result of the consistent cross-section (removal of a merge zone), improved signal timing and a small decrease in traffic volumes.

For the portion between Broadway and University, the average northbound travel times increased by 17 seconds (9.1%) during the AM peak hour (peak direction of travel) and by 47 seconds (29.7%) during the PM peak hour (non-peak direction of travel). These increases demonstrate increased congestion that would likely have occurred regardless of lane configuration. The increase is especially high in the PM off-peak direction (northbound), which would likely correlate to increases in the peak direction (southbound) of similar or higher values.

As a comparison corridor, staff pulled the available travel time analysis for the Rural Road corridor (Table 5) and each one-mile segment (Tables 6-8), which are included for your reference at the end of this memo. No striping changes were made to this corridor.

Level of Service (LOS) Analysis

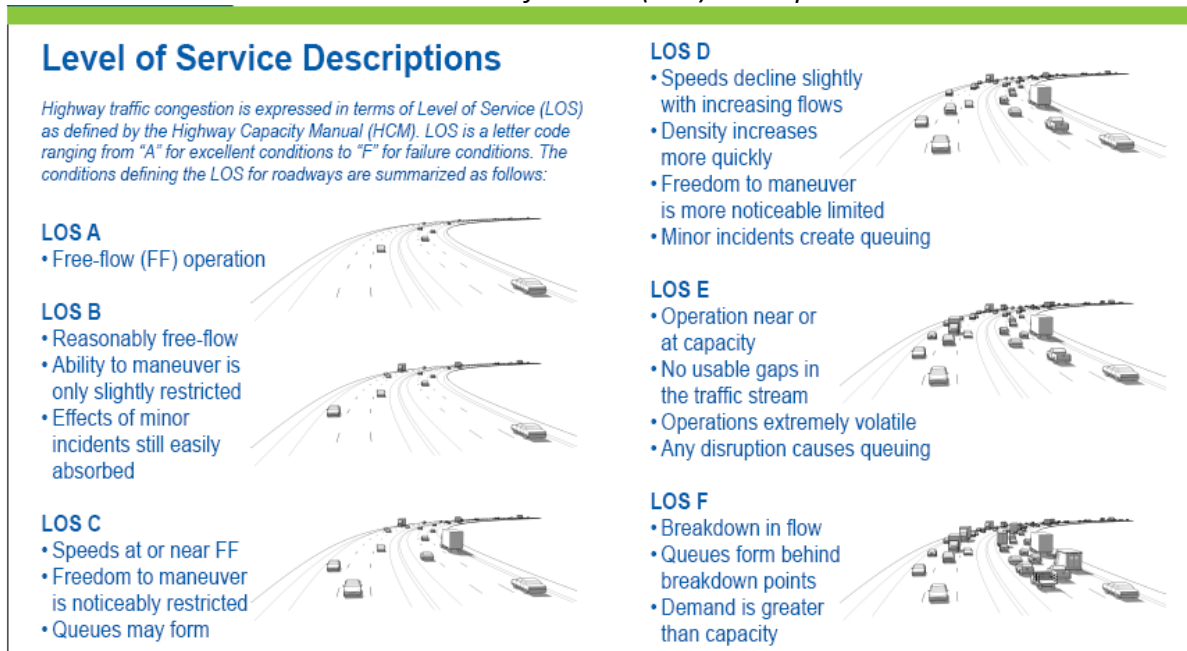
Level of Service is a qualitative measure used to relate the level of vehicular congestion as defined by the Highway Capacity Manual published by the Transportation Research Board of the National Academies of Science. This type of analysis assigns a letter code ranging from "A" to "F" depending on vehicular operating conditions. LOS can be calculated for both intersections and roadway segments. Because intersection turning movement counts were not collected for the "before" condition on McClintock, the information provided for McClintock is an estimate of the LOS by segment and not at the intersections.

While it may be tempting to aim for an LOS of "A," this is generally considered to be unrealistic for most urban arterial streets during peak hour conditions. LOS values in the range of "C" to "E" are very typical, with "F" not uncommon along very congested corridors. Planners generally use LOS as a guideline and not as a standard; as maintaining a strict LOS standard can actually lead to limits on population density and potential for urban development/growth. Staff cautions the use of LOS as an absolute measurement as it can become controversial in the growth/no growth debate and can work against council's desire for economic prosperity.

In recent years, there has been agreement that LOS should include a more multimodal analysis of urban streets to encourage users to consider the needs of all travelers. Researchers are currently developing a calibrated method for evaluating the multimodal LOS (MMLOS). It will be used to evaluate the tradeoffs of various street designs in terms of their effects on the perception of auto drivers, transit passengers, bicyclists and pedestrians. Unfortunately, since MMLOS is still under development, staff is unable to provide this analysis for McClintock Drive.

The chart below provides general descriptions of the six Levels of Service.

Chart 1: Level of Service (LOS) Descriptions



The following table provides the before and after level of service by segment along both the McClintock Drive and Rural Road corridors.

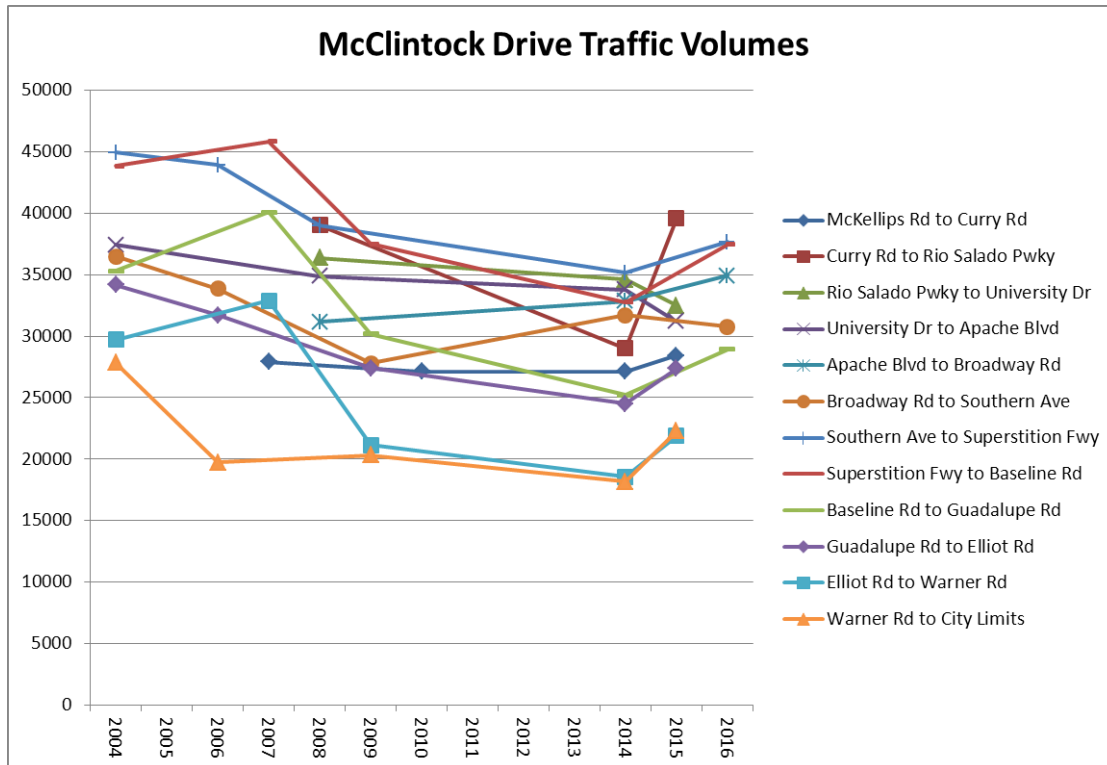
Before/After LOS by segment on McClintock Drive and Rural Road

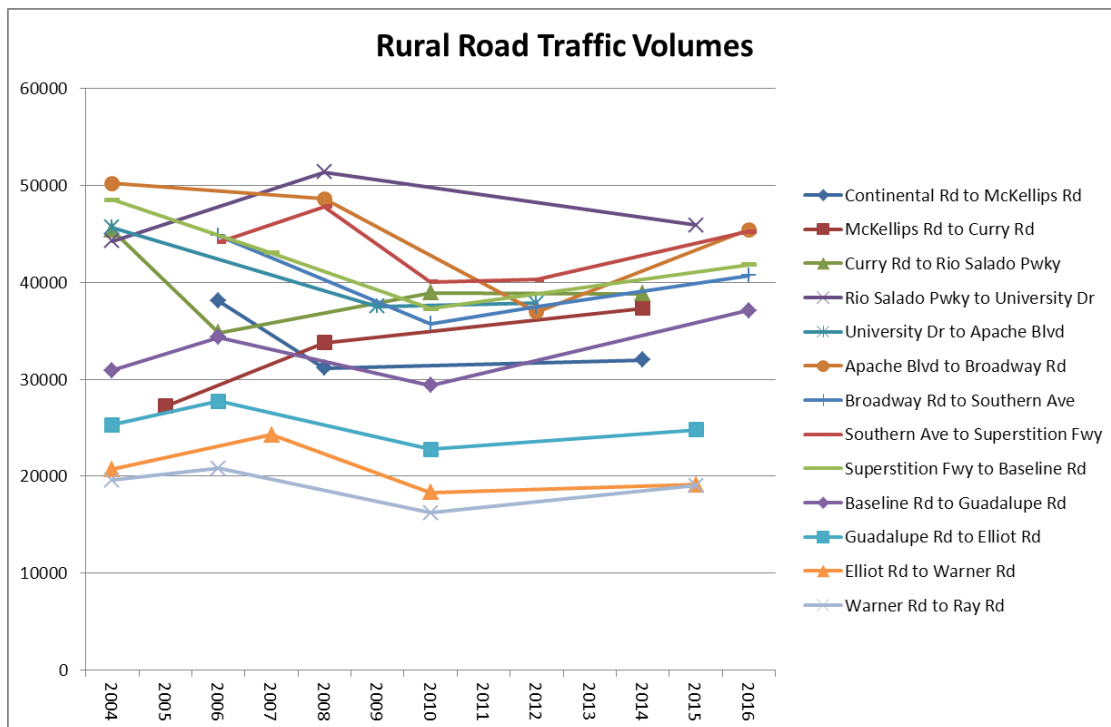
	McClintock		Rural	
AM LOS - Northbound				
Segment	Before	After	Before	After
Broadway to University	D	D	E	E
Southern to Broadway	C	B	C	D
Baseline to Southern	B	C	D	D
Mid-Day LOS - Southbound				
Segment	Before	After	Before	After
University to Broadway	C	C	C	C
Broadway to Southern	B	B	A	B
Southern to Baseline	A	B	C	C
PM LOS - Southbound				
Segment	Before	After	Before	After
University to Broadway	D	F	D	F
Broadway to Southern	C	D	D	D
Southern to Baseline	B	D	D	C

LOS along the McClintock Drive and Rural Roads corridors was basically unchanged during the AM and mid-day peak periods, with decreased LOS in the PM peak period.

Historical volumes between 2004 and 2016

As requested by the Council, the line graphs below provide historical volume data by segment for the period from 2004 through 2016. As can be seen in the graphs, limited data was collected between the years of 2010 and 2014. This is due to a reduction in budget for data collection as the City went through efforts to balance the Highway User Revenue Fund (HURF) budget.





Do not block intersection analysis

Council also requested that additional information be provided on the possibility of implementing pavement markings “XXX” along the corridor that indicate to drivers the area where intersections should not be blocked. Currently it is prohibited by state law and city code for a person operating a vehicle to stop within an intersection; although this may not be well understood by the traveling public especially in an urban area. The City has installed “Do Not Block Intersection” signs in locations where this tends to occur. There are pros and cons to the installation of such large pavement markings some of which include increased maintenance without guarantee that the current situation will change. For these reasons, staff recommends a stepped approach to addressing the issue. The first step would be to study and identify the exact intersections where this is a concern. This would then be followed with increased outreach and awareness. If it is determined that installation of additional traffic control signs/markings would help mitigate the issue, Transportation staff would work with Neighborhood Services staff to coordinate a public meeting and/or outreach materials. Staff may consider using temporary materials to test the effectiveness of any changes prior to installation of permanent pavement markings. For reference, the state statute and city code is provided below.

Arizona Revised Statute

28-873. Stopping, standing or parking prohibitions; exceptions; definition

A. Except if necessary to avoid conflict with other traffic or if in compliance with law or the directions of a police officer or traffic control device, a person shall not stop, stand or park a vehicle in any of the following places:

- 3. Within an intersection.

Tempe City Code

Sec. 19-42. Entering an intersection.

No person shall enter an intersection or a marked crosswalk unless there is sufficient space on the other side of the intersection or crosswalk to accommodate the vehicle he is operating without obstructing the passage of other vehicles or pedestrians, notwithstanding any traffic control indication to proceed.

Sec. 19-91. Stopping, standing or parking prohibited; no signs required.

No person shall stop, stand or park a vehicle, except when necessary to avoid conflict with other traffic or in compliance with law or the directions of a police officer or traffic-control device, in any of the following places:

(3) Within an intersection;

Tempe staff also reached out to the City of Phoenix regarding their implementation of marking intersections. Phoenix indicated that they have not performed an analysis regarding the striping beyond their observation of traffic conditions. They have found that these types of requests are becoming more frequent and they may implement a system of warrants later this year. They also indicated that while they have seen general compliance, they do not feel that implementation of these markings should be universal and they may lead to other types of crashes.



Aerial of "XXX" on Ray Road near 48th Street, Phoenix

Education and Outreach Plan

During the City Council discussion there were concerns regarding communication and outreach for the McClintock Drive pavement preservation/stripping project and other CIP projects like the streetscape projects recently completed on University Drive, Broadway Road and Hardy Drive. These streetscape projects are multi-year planning efforts with significant alternatives analysis and numerous Federal environmental requirements. McClintock Drive was a pavement preservation project that included the striping changes identified in the Tempe Transportation Master Plan (which had a significant public outreach process). City staff plan on improving its process for notifying the City Council and residents about ongoing efforts on McClintock Drive and any future projects.

Listed below are the new items for future and ongoing communication and outreach.

Status/update following March 17, 2016 Council Work Study Session

- Web site: www.tempe.gov/mcclintockdrive (ongoing)
- News release (March 21 – completed)
- Outreach to Tempe Chamber of Commerce (March 22 – completed)

Six-month update to City Council (fall 2016)

- Update web site: www.tempe.gov/mcclintockdrive
- News release (two weeks prior to Council meeting)
- Postcards to residents within a half mile of the project area (three weeks prior to Council meeting)
- Email to Neighborhood, Homeowners' and Affiliate Association contacts (three weeks prior to Council meeting)
- Ongoing education re: bicyclist/motorist behavior, share the road, 3-foot law, bicycle safety
- Tempe Today (monthly May – October 2016)
- Connecting Tempe (every other issue May – October 2016)
- Facebook (boosted posts every other week March 25 – October 2016)
- Twitter (posts every other week March 25 – October 2016)
- Instagram (photo posts monthly March 25 – October 2016)
- Tempe 11 slide (ongoing beginning April 1, 2016)
- Pandora ads (May, July, September 2016)
- BikeLife Tempe magazine (fall 2015 – completed – and fall 2016 issues)

Impact to Fire and Police department response times

Response from the Fire Department: The information provided is in response to Council's request to research response times in relation to the addition of bike lanes on McClintock Drive. The question was asked if the new bike lanes have had any impact on response times by Fire Medical Rescue Department apparatus. This is a difficult question to answer as there are many different factors affecting response times that are dynamic and are often not a part of the data collection. It is unknown if minor construction was in place, traffic accidents occurred that caused congestion, what the actual travel paths for each incident were, or where the apparatus was at time of dispatch. However, Fire Medical Rescue did look at response times for all incidents responded to by apparatus from Fire Station 3 between July 1 and the end of February the following year. This was done for each year starting between 2012 and 2015. This information is contained in the table below. Station 3 is located on McClintock Drive approximately one-quarter mile south of Baseline Road. From this location, Station 3 units travel along McClintock Drive in both north and south directions. There are two Fire Medical Rescue crews operating from this station. This data includes all calls responded to by these crews and it is unknown how far along McClintock each of the units traveled for these incidents. Bike lanes have been in place since July 2015.

Travel Time E273, L273, LT273

July 1 through end of February	Average Travel Time
2012/13	4:31
2013/14	4:26
2014/15	4:25
2015/16	4:31

Travel time is the portion of total response time that begins when the apparatus leaves the station and ends when the apparatus arrives on scene. Times have remained relatively consistent throughout the sample period. The middle two years of the period are slightly lower than the first and last years. The first and last years are equal.

Response from the Police Department: We cannot say that McClintock Drive has had an impact either way on response times. An analysis of CAD calls would require identifying when officers specifically utilized McClintock as part of the route to the call. Even then, the general response time analysis would be compromised because responding units could be coming from any direction and from any route, and it wouldn't take into account officers traveling through the search area. As the Fire Department noted, there are many factors that go into response time calculation, but "route taken" is not one of them.

History of bicycling

The City of Tempe has a long standing commitment to encouraging bicycle and pedestrian travel through the provision of a comprehensive network of safe and efficient facilities. The system includes more than 175 miles of bicycle facilities which are generally divided into the following five categories: bicycle lanes, bicycle routes, paved multi-use paths, unpaved multi-use paths and paved shoulders.

The Transportation Master Plan builds upon this commitment and outlines a strategy for improving biking conditions in Tempe, and raising interest in bicycling as a form of transportation and recreation. The intent is to make bicycling safer, more convenient and more accessible to all members of the community regardless of their bicycling level. In addition, 4.2 percent and 3.7 percent of Tempe residents bike and walk to work, respectively. *Source: American Community Survey*

*Table 1: McClintock Drive Before/After Travel Time Comparison from corridor - **University to Baseline** (Data Collected February 18-20 and February 26, 2014 & January 26-28, 2016) in minutes and seconds.*

AM Peak	Minimum	Maximum	Average
NB – Before	4:04	9:27	6:53
NB – After	5:13	12:43	9:47
NB – Change	1:09 [+28.3%]	3:16 [+34.6%]	2:54 [+42.1%]
SB – Before	3:29	7:29	5:36
SB – After	5:34	6:14	5:50
SB – Change	2:05 [+59.8%]	1:15 [-16.7%]	0:14 [+4.2%]
Mid-Day	Minimum	Maximum	Average
NB – Before	4:42	7:48	5:44
NB – After	4:48	7:58	5:51
NB – Change	0:06 [+2.1%]	0:10) [+2.1%]	0:07 [+2.0%]

SB – Before	4:23	7:40	5:45
SB – After	4:47	8:26	6:22
SB – Change	0:24 [+9.1%]	0:46 [+10.0%]	0:37 [+10.7%]
PM Peak	Minimum	Maximum	Average
NB – Before	5:36	7:34	6:39
NB – After	5:45	8:55	7:14
NB – Change	0:09 [+2.7%]	1:21 [+17.8%]	0:35 [+8.8%]
SB – Before	5:19	9:00	7:26
SB – After	5:57	19:44	10:47
SB – Change	0:38 [+11.9%]	10:44 [+119.3%]	3:21 [+45.1%]

Table 2: *McClintock Drive Before/After Travel Time Comparison – Segment (University to Broadway)*
(Data Collected February 18-20 and February 26, 2014 & January 26-28, 2016) in minutes and seconds.

AM Peak	Minimum	Maximum	Average
NB – Before	1:50	4:06	3:07
NB – After	1:39	5:29	3:24
NB – Change	-0:11 [-10.0%]	+1:23 [+33.7%]	+0:17 [+9.1%]
SB – Before	1:48	2:29	1:58
SB – After	1:49	2:15	2:03
SB – Change	+0:01 [+0.9%]	-0:14 [-9.4%]	+0:05 [+4.2%]
Mid-Day	Minimum	Maximum	Average
NB – Before	1:33	3:05	2:15
NB – After	1:35	3:12	2:06
NB – Change	+0:02 [+2.1%]	+0:07 [+3.8%]	-0:09 [-6.7%]
SB – Before	1:23	3:10	2:07
SB – After	1:34	3:40	2:23
SB – Change	+0:11 [+13.3%]	+0:30 [+15.6%]	+0:16 [+12.6%]
PM Peak	Minimum	Maximum	Average
NB – Before	1:52	3:34	2:38
NB – After	2:06	3:51	3:25
NB – Change	+0:14 [+12.5%]	+0:17 [+7.9%]	+0:47 [+29.7%]
SB – Before	1:51	5:03	3:11
SB – After	2:13	7:15	4:43
SB – Change	+0:22 [+19.8%]	+2:08 [+42.2%]	+1:32 [+48.2%]

Table 3: *McClintock Drive Before/After Travel Time Comparison – Segment (Broadway to Southern)*

(Data Collected February 18-20 and February 26, 2014 & January 26-28, 2016) in minutes and seconds.

AM Peak	Minimum	Maximum	Average
NB – Before	1:40	3:23	2:14
NB – After	1:36	3:10	2:01
NB – Change	-0:04 [-4.0%]	-0:13 [-6.4%]	-0:13 [-9.7%]
SB – Before	1:44	2:14	1:56
SB – After	1:42	2:27	2:11
SB – Change	-0:02 [-1.9%]	+0:13 [+9.7%]	+0:15 [+12.9%]
Mid-Day	Minimum	Maximum	Average
NB – Before	1:31	3:06	1:49
NB – After	1:33	2:59	1:58
NB – Change	+0:02 [+2.2%]	-0:07 [-3.8%]	+0:09 [+8.3%]
SB – Before	1:08	2:59	1:58
SB – After	1:07	3:08	2:08
SB – Change	-0:01 [-1.4%]	+0:09 [+5.0%]	+0:10 [+8.5%]
PM Peak	Minimum	Maximum	Average
NB – Before	1:54	3:22	2:08
NB – After	1:43	3:19	2:00
NB – Change	-0:11 [-9.6%]	-0:03 [-1.5%]	-0:08 [-6.3%]
SB – Before	1:50	3:16	2:12
SB – After	1:50	5:27	3:05
SB – Change	0:00 [+0.0%]	+2:11 [+66.8%]	+0:53 [+40.2%]

Table 4: McClintock Drive Before/After Travel Time Comparison – Segment (Southern to Baseline)
 (Data Collected February 18-20 and February 26, 2014 & January 26-28, 2016) in minutes and seconds.

AM Peak	Minimum	Maximum	Average
NB – Before	1:29	2:09	1:51
NB – After	1:54	5:19	2:36
NB – Change	+0:25 [+28.1%]	3:10 [+147.3%]	+0:45 [+40.5%]
SB – Before	1:36	1:55	1:45
SB – After	1:23	1:55	1:36
SB – Change	-0:13 [-13.5%]	0:00 [0.0%]	-0:09 [-8.6%]
Mid-Day	Minimum	Maximum	Average
NB – Before	1:11	2:37	1:40
NB – After	1:30	3:03	1:47
NB – Change	+0:19 [+26.8%]	+0:26 [+16.6%]	0:07 [+7.0%]
SB – Before	1:27	2:08	1:39
SB – After	1:30	3:20	1:51
SB – Change	+0:03 [+3.4%]	+1:12 [+56.3%]	+0:12 [+12.1%]
PM Peak	Minimum	Maximum	Average
NB – Before	1:41	2:05	1:53
NB – After	1:34	2:04	1:49

NB – Change	-0:07 [-6.9%]	-0:01 [-0.8%]	-0:04 [-3.5%]
SB – Before	1:36	3:12	2:03
SB – After	1:47	7:09	2:58
SB – Change	+0:11 [+11.5%]	+3:57 [+123.4%]	+0:55 [+44.7%]

Table 5: **Rural Road** Before/After Travel Time Comparison from Corridor - **University to Baseline** (Data Collected September 19 and 26, 2012 & January 26-28 and February 3, 2016) in minutes and seconds.

AM Peak	Minimum	Maximum	Average
NB – Before	4:54	11:39	8:19
NB – After	6:54	19:45	10:06
NB – Change	2:00) [+40.8%]	8:06) [+69.5%]	1:47 [+21.4%]
SB – Before	5:24	7:50	6:02
SB – After	5:34	7:19	5:55
SB – Change	0:10 [+3.1%]	0:31 [-6.6%]	0:07 [-1.9%]
Mid-Day	Minimum	Maximum	Average
NB – Before	5:50	7:30	6:38
NB – After	6:09	9:27	7:32
NB – Change	0:19 [+5.4%]	1:57 [+26.0%]	0:54 [+13.6%]
SB – Before	5:52	7:49	6:43
SB – After	4:50	9:16	6:49
SB – Change	1:02 [-17.6%]	1:27 [+18.6%]	0:06 [+1.5%]
PM Peak	Minimum	Maximum	Average
NB – Before	6:19	8:55	7:34
NB – After	7:20	11:06	8:32
NB – Change	1:01 [+16.1%]	2:11 [+24.5%]	0:58 [+12.8%]
SB – Before	6:44	10:25	8:56
SB – After	6:46	17:20	10:57
SB – Change	0:02 [+0.5%]	6:55 [+66.4%]	2:01 [+22.3%]

Table 6: **Rural Road** Before/After Travel Time Comparison – Segment (**University to Broadway**) (Data Collected September 19 and 26, 2012 & January 26-28 and February 3, 2016) in minutes and seconds.

AM Peak	Minimum	Maximum	Average
NB – Before	1:51	7:11	3:58
NB – After	3:10	7:09	4:05
NB – Change	+1:19 [+71.2%]	-0:02 [-0.5%]	+0:07 [+2.9%]
SB – Before	1:38	1:57	1:48
SB – After	1:44	2:09	1:53
SB – Change	+0:06 [+6.1%]	+0:12 [+10.3%]	+0:05 [+4.6%]
Mid-Day	Minimum	Maximum	Average
NB – Before	2:56	3:12	3:05
NB – After	2:55	4:47	3:18

NB – Change	-0:01 [-0.6%]	+1:35 [+49.5%]	+0:13 [+7.0%]
SB – Before	1:33	3:39	2:12
SB – After	1:40	3:42	2:17
SB – Change	+0:07 [+7.5%]	+0:03 [+1.4%]	+0:05 [+3.8%]
PM Peak	Minimum	Maximum	Average
NB – Before	2:05	3:49	3:08
NB – After	2:24	7:06	4:00
NB – Change	+0:19 [+15.2%]	+3:17 [+86.0%]	+0:52 [+27.7%]
SB – Before	3:12	3:34	3:23
SB – After	3:13	12:12	5:26
SB – Change	+0:01 [+0.5%]	8:38 [+226.2%]	2:03 [+60.6%]

Table 7: **Rural Road Before/After Travel Time Comparison – Segment (Broadway to Southern)**
(Data Collected September 19 and 26, 2012 & January 26-28 and February 3, 2016) in minutes and seconds.

AM Peak	Minimum	Maximum	Average
NB – Before	1:38	3:00	2:19
NB – After	1:48	7:33	3:01
NB – Change	+0:10 [+10.2%]	4:33 [+151.7%]	+0:42 [+30.2%]
SB – Before	1:28	1:39	1:34
SB – After	1:32	1:45	1:37
SB – Change	+0:04 [+4.5%]	+0:06 [+6.1%]	+0:03 [+3.2%]
Mid-Day	Minimum	Maximum	Average
NB – Before	1:27	2:14	1:38
NB – After	1:34	3:00	1:52
NB – Change	+0:07 [+8.0%]	+0:46 [+34.3%]	+0:14 [+14.3%]
SB – Before	1:26	2:31	1:42
SB – After	1:27	3:06	2:09
SB – Change	+0:01 [+1.2%]	+0:35 [+23.2%]	+0:27 [+26.5%]
PM Peak	Minimum	Maximum	Average
NB – Before	1:47	1:53	1:51
NB – After	1:35	3:22	2:06
NB – Change	-0:12 [-11.2%]	+1:29 [+78.8%]	+0:15 [+13.5%]
SB – Before	1:55	3:53	2:45
SB – After	1:43	5:11	2:53
SB – Change	-0:12 [-10.4%]	+1:18 [+33.5%]	+0:08 [+4.8%]

Table 8: **Rural Road Before/After Travel Time Comparison – Segment (Southern to Baseline)**
 (Data Collected September 19 and 26, 2012 & January 26-28 and February 3, 2016) in minutes and seconds.

AM Peak	Minimum	Maximum	Average
NB – Before	1:26	4:10	2:47
NB – After	1:36	5:03	3:00
NB – Change	+0:10 [+11.6%]	+0:53 [+21.2%]	+0:13 [+7.8%]
SB – Before	2:12	2:26	2:17
SB – After	2:04	3:54	2:25
SB – Change	-0:08 [-6.1%]	+1:28 [+60.3%]	+0:08 [+5.8%]
Mid-Day	Minimum	Maximum	Average
NB – Before	1:23	2:45	1:58
NB – After	1:28	2:54	2:22
NB – Change	+0:05 [+6.0%]	+0:09 [+5.5%]	+0:24 [+20.3%]
SB – Before	1:38	2:58	2:37
SB – After	1:32	3:09	2:26
SB – Change	-0:06 [-6.1%]	+0:11 [+6.2%]	-0:11 [-7.0%]
PM Peak	Minimum	Maximum	Average
NB – Before	2:01	3:25	2:36
NB – After	1:50	3:35	2:26
NB – Change	-0:11 [-9.1%]	+0:10 [+4.9%]	-0:10 [-6.4%]
SB – Before	1:37	4:40	2:49
SB – After	1:50	3:41	2:40
SB – Change	+0:13 [+13.4%]	-0:59 [-21.1%]	-0:09 [-5.3%]