Memorandum

Date: June 18, 2021

To: Honorable Mayor, Members of City Council, and City Manager, Bob Harrison

From: Scott Schafer, Public Works Director
Joe Rosenlund, Streets & Traffic Operations Division Manager
Bill Preston, City Engineer

Subject: **Top Ten Collision Locations**

Based on accident data from 2017 – 2020, ten intersections within the City have been identified as having the highest number of collisions. The high number of collisions is not unexpected at these intersections due to the high volumes at each location. While each of these intersections is signalized, conflicts still occur due to the turning movements.

The installation of a traffic signal cannot be expected to eliminate all collisions but usually change the predominant types of collisions from broadside and head-on/turning collisions to generally less severe rear-end and angle collisions.

It must also be recognized that environmental conditions also play a part when looking at contributing factors to collisions such as weather conditions and whether or not it is day or night.

Traffic safety is founded on the “Three E’s”: Education, Enforcement and Engineering.

Education – Education may occur through signs, media, social messaging or through safety campaigns such as “Click it or Ticket”, “Drive sober or get pulled over” and “Don’t text and drive” campaigns.

Enforcement – Driver behavior is a major contributing factor in the vast majority of vehicle accidents. Law enforcement officers work diligently to prevent accidents by enforcing traffic laws such as speeding, texting while driving, distracted driving, seat belt usage and impaired driving (DUI). Studies have shown that increased enforcement paired with educational campaigns can have a significant impact on changing driver behavior.

Engineering - Traffic engineers utilize various tools and equipment such as street lighting, signage, striping, alignment, better left-hand turn lanes and improved traffic signals as a foundation for improving traffic safety.

The following are types of safety improvements previously implemented at several intersections by the City:

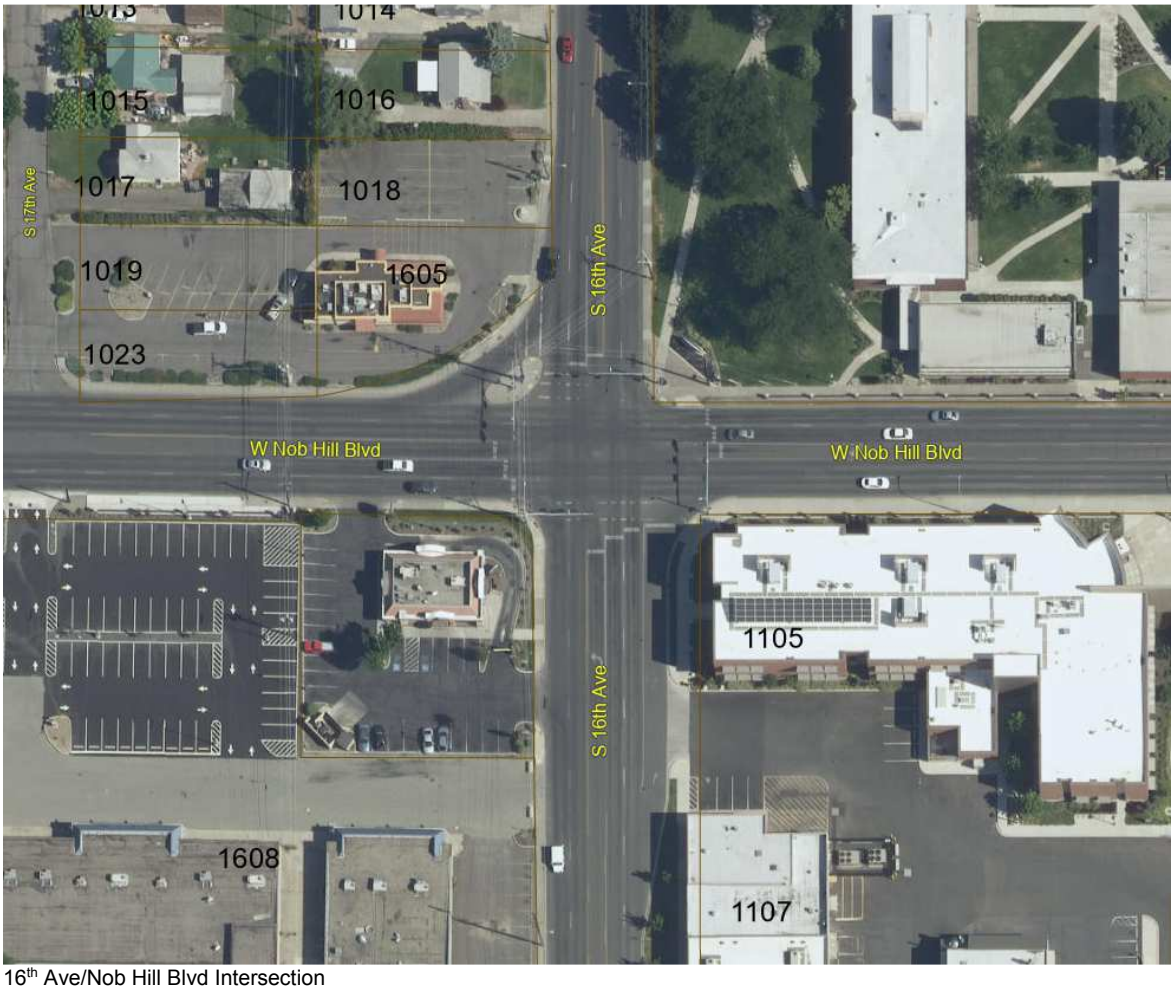
- Protected-permitted left turn signals (Improves safety for turning traffic)
- Upgrading to all 12-inch LED indicators (Increases visibility of the signal head to the driver)
- Installation of battery backup systems. (Ensures the signal functions as designed even during a power outage)
- Curb medians for access control (Reduces turning movement too close to an intersection)

The number of collisions reported at each of the following ten intersections is based on data provided from the Yakima Police Department (YPD) from 2017-2020.

16th Avenue/Nob Hill Boulevard – 51 Collisions

The 16th Avenue/Nob Hill Boulevard intersection has 5 lanes on each leg plus a right turn lane northbound and a “free” right turn lane southbound. It has a controlled pedestrian crossing on each leg. The travel lanes are narrower than the preferred eleven foot minimum and the southbound left turn lacks adequate vehicle storage.

The predominant surrounding land uses are Yakima Valley Community College and two fast food restaurants.



16th Ave/Nob Hill Blvd Intersection

Of the listed 51 collisions at 16th Avenue and Nob Hill Boulevard, 48 collisions were intersection related. The remainder were tied to driveways or were not related to the intersection operation.

	Angle	Turning	Rear End	Sideswipe	Pedestrian
Collisions	10	13	21	3	1
Injury	4	7	3	0	0

Although this intersection ranks at the highest for total number of collisions, it did see a decrease in collisions starting in 2020. 9 collisions in 2020 versus 19 in 2019 and 20 in 2018. Some of this may be related to decreased traffic volumes with the college not in session due to COVID but the City did make recent improvements that may have helped as well. Protected-permitted left turn signals were installed along with upgrading to all LED indications and installation of a battery backup system.

Recommendation: While it appears that accidents are going down at this location, further analysis of options is warranted. Existing geometry of the intersection limits what can be done, without a large capital expense, to probable lighting, striping, signing, and/or educational efforts. Increased enforcement is another an option, but that is most effective for accidents not predominantly seen at this intersection. Staff will also continue to evaluate our previous intersection improvements.

3rd Avenue/Nob Hill Boulevard – 37 Collisions

The 3rd Avenue/Nob Hill Boulevard intersection has 5 lanes on each leg with controlled pedestrian crossings. The travel lanes are narrower than the preferred eleven foot minimum and both the northbound and southbound left turn lane lacks adequate vehicle storage. There are several driveway approaches within close proximity to the intersection that create additional conflict points within the intersection's operational area. The predominant surrounding land use is commercial.

Of the listed 37 collisions at 3rd Avenue and Nob Hill Boulevard, 35 collisions were intersection related. The remainder were tied to driveways or were not related to the intersection operation.

	Angle	Turning	Rear End	Sideswipe	Fixed Object
Collisions	11	10	11	2	2
Injury	4	1	4	0	0

The collision numbers at this intersection have been a little sporadic. Eleven in 2018, sixteen in 2019 and eight in 2020. Curb medians are installed on the east and west legs of the intersection to control driveway access. Some of the 2020 decrease may be related to decreased traffic volumes due to COVID but, like 16th Avenue and Nob Hill Boulevard, the City previously made improvements that may have helped as well. Protected-permitted left turn signals were installed along with upgrading to all LED indications and in May 2021, the City conducted a grind and overlay project; improving the road surface within the intersection which will assist with vehicle control and braking.

Aerial photo of the 3rd Ave./Nob Hill intersection is provided on the next page.

3rd Ave/Nob Hill Blvd. Intersection

Recommendation: Staff will continue to monitor the intersection to see if the reduced number of collisions is a trend related to recent intersection improvements or if further action is needed. Increased enforcement at this location presents the same challenges as 16th/Nob Hill.

16th Avenue/Fruitvale Boulevard – 33 Collisions

The 16th Avenue/Fruitvale Boulevard intersection has 5 lanes on each leg plus has short and narrow right turn lanes on eastbound and westbound Fruitvale. It has controlled pedestrian crossing on each leg. The travel lanes are narrower than the preferred eleven foot minimum on 16th Avenue and both the northbound and southbound left turn lane lacks adequate vehicle

storage. There are several driveway approaches within close proximity to the intersection that create additional conflict points within the intersection's operational area.

The curb radii on all four corners is inadequate for the number and size of commercial vehicles traversing the intersection. Pedestrian ramps are needed on all four corners and sidewalk is also needed along the west side of 16th Avenue. The predominant surrounding land uses is commercial.

16th Ave./Fruitvale Blvd. Intersection

Of the listed 33 collisions at 16th Avenue and Fruitvale Boulevard, 29 collisions were intersection related. The remainder were tied to driveways or were not related to the intersection operation.

	Angle	Turning	Rear End	Pedestrian	Fixed Object
Collisions	8	10	8	2	1
Injury	5	3	5	2	0

The collision numbers at this intersection increased dramatically in 2020. Five in 2018, seven in 2019 and seventeen in 2020. Protected-permitted left turn signals have been installed along with upgrading to all LED indications and the installation of a battery backup system. The accident types appear to point towards drivers trying to beat the red light, either at the end of a protected permitted left turn or on the through movement phase. The higher number of injury accidents also points to speed being a major factor.

There is a project currently out for advertisement to install the needed sidewalk on the west side of Fruitvale from the intersection at 16th to the existing sidewalk just south of the DSHS Building. The sidewalk project is being funded by Yakima Transit.

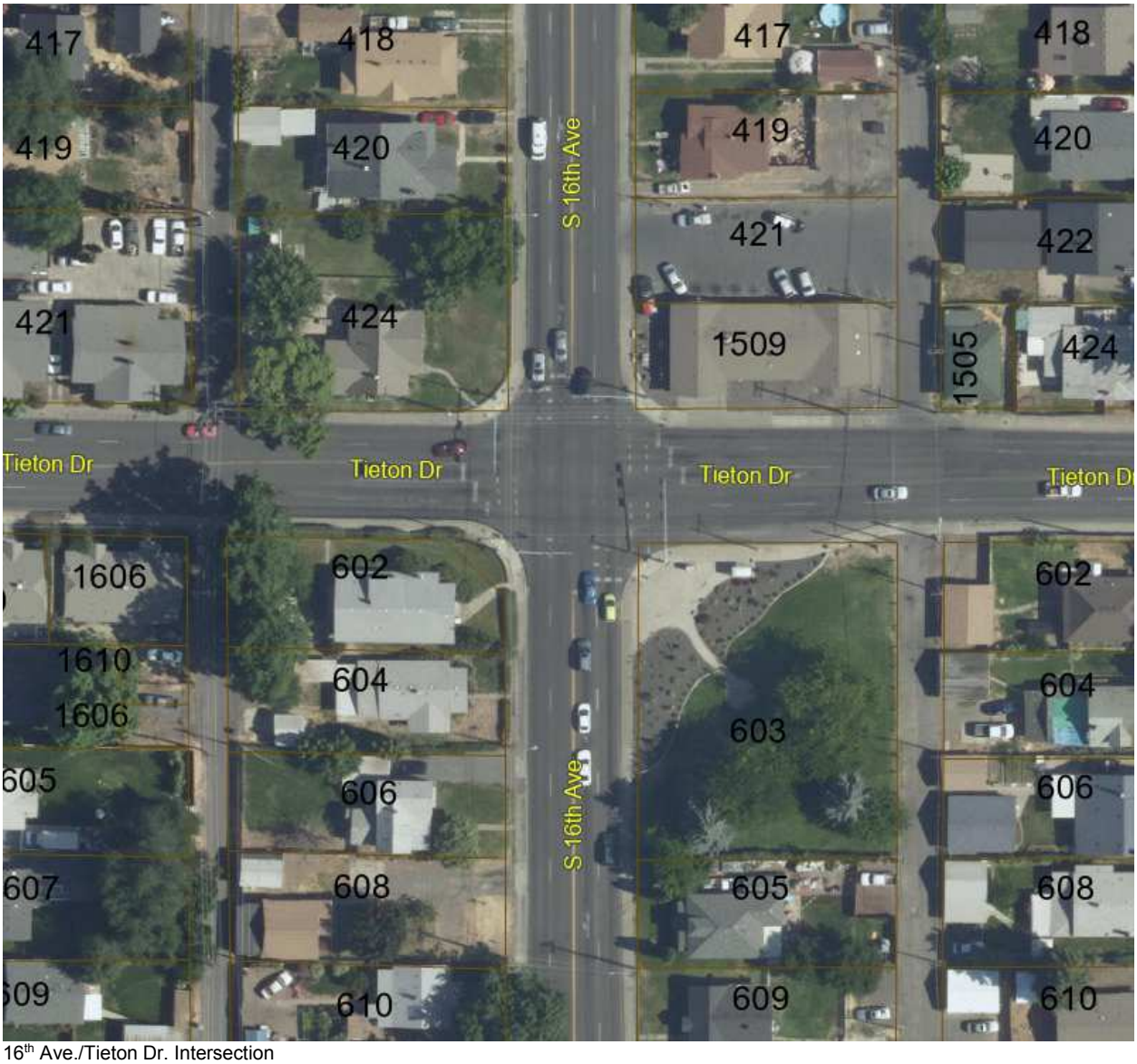
Recommendation: Staff will review the signal timing to evaluate adequate yellow and all-red timing to minimize drivers trying to beat the red light. The review may result in eliminating the protected permitted left turn phasing during part or all of the day. It is also highly recommended that traffic enforcement by YPD be conducted at this intersection for red-light violators.

16th Avenue/Tieton Drive – 31 Collisions

The 16th Avenue/Tieton intersection has five lanes on each leg of Tieton Drive and four lanes on each leg of 16th Avenue. All traffic lanes are much narrower than the preferred eleven feet. It has controlled pedestrian crossing on each leg. The eastbound and westbound left turn lane lacks adequate vehicle storage. The left turn lanes on 16th Avenue were eliminated several years ago because of the number of reported sideswipes, fixed objects and other types of collisions that were occurring. There are several driveways along 16th Avenue near the intersection that create additional conflict points.

The curb radii on all four corners is inadequate for larger turning vehicles. Pedestrian ramps exist on all four corners but the narrowness of the existing sidewalk and adjacent traffic lanes, can make standing at the corner uncomfortable for pedestrians. Franklin Middle School is located two blocks away. The intersection is heavily used by students walking to and from school. The predominant surrounding land uses is residential with one corner commercial and another a pocket park.

All 31 collisions listed at 16th Avenue and Tieton Drive were intersection related. The high percentage of rear end and sideswipe accidents is indicative of the traffic congestion experienced at the intersection and the narrowness of the travel lanes.



16th Ave./Tieton Dr. Intersection

	Angle	Turning	Rear End	Sideswipe	Fixed Object
Collisions	8	0	15	7	1
Injury	2	0	5	2	0

The collision numbers at this intersection are consistent. Eight in 2018, twelve in 2019 and eleven in 2020. Any uptick in collisions appear to be rear end collisions due to increased traffic congestion. Work to install protected-permitted left turn signals on Tieton Drive along with upgrading to all LED indications and installation of a battery backup system, was done a few years ago to help relieve traffic congestion. Those efforts helped during off-peak hours, but recent traffic growth has since reduced some of those recognized improvements.

There is a project identified in the Six Year Transportation Program to widen 16th Avenue and Tieton Drive to provide left turn lanes on all approaches and restore adequate lane widths. The estimated cost is $3.7M. The project has been submitted for consideration as part of the State's

"Forward Washington" transportation package sponsored by Sen. Hobbs, Chair of the Senate Transportation Committee.

Recommendation: Staff will continue to monitor the intersection and adjust signal timing as needed to minimize traffic congestion as much as possible. Reduced congestion should help with the rear end collisions. Geometric constraints will limit what further improvements can be made without the capital improvements indicated above. Any educational efforts city wide can provide additional focus at this intersection.

40th Avenue/Nob Hill Boulevard – 31 Collisions

The 40th Avenue/Nob Hill Boulevard intersection has 5 lanes on each leg and controlled pedestrian crossings across each approach. What is different in comparison with the other intersections, is that this one contains a double-left turn lane for southbound 40th Avenue. The travel lanes widths are adequate but the southbound turn lanes lack enough storage through most of the day. There are a few driveways in close proximity to the intersection but do not appear to have an impact to general traffic flow.

The predominant surrounding land use is commercial. Eisenhower High School is one-quarter mile north and Whitney Elementary School is one-quarter mile west.

All 31 listed collisions at 40th Avenue and Nob Hill Boulevard were intersection related.

	Angle	Turning	Rear End	Sideswipe	Fixed Object
Collisions	7	6	11	6	1
Injury	1	3	7	1	0

Collisions have been consistent over the last three years. Eleven collisions in 2018, eight in 2019, and twelve in 2020. The higher number of sideswipe collisions is related to vehicles not staying within their lanes as they travel through the double-left turn movement. LED signal heads were installed last year and an updated controller and battery backup system is scheduled for later this summer. These upgrades will improve the reliability and allow more flexibility in signal operations.

There does not appear to be any design or operational issues that can be tied to collisions other than drivers not maintaining within their lanes through the double-left turn movement.

Recommendation: Many of the standard improvements have already been made at this location. As staff continues to monitor the intersection we will look for other options such as striping/signing which may help. As with the others, enforcement and education may help some.

Aerial photo of the 40th Ave./Nob Hill intersection is provided on the next page.

40th Ave./Nob Hill Blvd. Intersection

1st Street/Nob Hill Boulevard – 29 Collisions

The 1st Street/Nob Hill Boulevard intersection has 5 lanes on each leg plus a "free" right turn lane southbound. It has controlled pedestrian crossing on each leg. The left turn lanes are narrower than the preferred eleven foot minimum but the through lanes are adequate. Vehicle storage in the left turn lanes is lacking on all but the westbound approach. It is possibly the highest peak hour traffic location in the City.

The intersection has three design challenges that may lead to an increased chance of a collision.

1. The curvature of the westbound approach can reduce sight distance for drivers as they approach the intersection and may have limited opportunity to react to traffic conditions.

2. The eastbound approach is on a grade due to the railroad overpass. The road can become slick during inclement weather; increasing stopping distance significantly. There is also limited sight distance as vehicles crest the overpass and may have reduced reaction times if traffic is queued up from the intersection.

3. 1st Street and Nob Hill Boulevard intersection is at an angle. This may lead some drivers to misidentify which signal indication applies to them. It also makes the northbound to eastbound turn challenging for large trucks due to the inadequate curb radii.

There are several driveways and one intersection at Ranch Rite Road, within the intersection's operational zone that significantly impact traffic. Drivers often make illegal or unsafe maneuvers to access or egress these driveways. The surrounding land uses commercial with several high-volume driveways.

All 29 listed collisions at 1st Street and Nob Hill Boulevard collisions were intersection related.

	Angle	Turning	Rear End	Fixed Object
Collisions	4	5	19	1
Injury	3	2	9	1

The annual number of collisions at this intersection has been decreasing. Thirteen collisions in 2018, ten in 2019, and six in 2020. Curbed medians were installed on 1st Street to limit access to some driveways at or within the intersection. These were modified and extended with the Starbucks development and remodel of McDonald's. Signal indications were upgraded to LED and a battery backup system has also been installed. These measures appear to have had a significant impact towards reducing collisions.

1st St./Nob Hill Blvd. Intersection

A high percentage of the collisions that have occurred have involved injuries. Excessive speed through this intersection may be a major factor.

Recommendation: Upgrade the current traffic signal, which is a span wire design, to that of poles and mast arms, to better position the signal indications and remove some of the visual clutter will provide a better view of the indicators to driver. The cost of upgrading the traffic signal is approximately $500,000. It is also recommended that an emphasis on traffic enforcement by YPD on excessive speeding at this intersection may help reduce the frequency and severity of collisions. A more in depth analysis of the cause may provide additional alternatives given the cost of a new signal.

1st Street/Washington Avenue – 28 Collisions

The 1st Street/Washington Avenue intersection is probably the busiest intersection throughout the day. It has 5 lanes on each leg plus a right turn lane southbound on 1st Street. Washington Avenues lane configuration is not typical in that each approach has one left turn lane, one through lane and one right turn lane. The intersection has controlled pedestrian crossing on each leg. Lane widths are adequate all around. Left turn lane storage is good in all directions. However, eastbound Washington and northbound 1st Street could benefit from double-left turn lanes. Access to the right turn lanes on Washington Avenue is limited due to through traffic stacking beyond the entrance to those lanes.

The intersection has three design features that may lead to an increased chance of collisions.

1. The curvature of both Washington approaches can reduce sight distance for drivers as they approach the intersection and may have limited opportunity to react to traffic conditions.

2. The 1st Street and Washington intersect at an angle. This sometimes may lead to drivers misidentifying which signal indication applies to them. It also makes the northbound to eastbound turn awkward for many drivers; particularly large trucks.

3. The traffic signal heads are mounted on span wire. During periods of high winds, the signal heads have a lot of movement which can block view of the indicators and can become misaligned.

There are several driveways near the intersection's operational zone where drivers make unsafe maneuvers to access or egress these driveways. The surrounding land uses are commercial with several high-volume driveways.

All 28 listed collisions at 1st Street and Washington Ave collisions were intersection related.

	Angle	Turning	Rear End	Sideswipe	Fixed Object
Collisions	5	6	13	3	1
Injury	3	2	2	0	1

1st St./Washington Ave. Intersection

The annual number of collisions at this intersection has decreased since 2018. Thirteen collisions in 2018, seven in 2019, and eight in 2020. Protected permitted left turns were installed at about that time. In addition, the eastbound through and left turn lanes were separated to provide better vehicle storage and eliminate abrupt lane changes. These measures appear to have had a significant impact towards reducing collisions. However, the most severe accidents appear to be due to drivers trying to get beat the red light on either through or left turn movements.

The intersection is listed within the Six Year Transportation Plan. The project consists of realigning the intersection, widen E. Washington Avenue to accommodate an additional lane, replace curb, gutter and sidewalk and install a new traffic signalization system. The estimated cost is $2.5M and was designated as a Transportation Benefit District (TBD) project by City Council.

Recommendation: Staff will plan the necessary improvements as TBD, or other, funding becomes available. It is also recommended that an emphasis on traffic enforcement by YPD on red light running at this intersection may help reduce the frequency and severity of collisions. Due to the unusual lane distribution on Washington, additional signing may help ensure traffic is in the correct lane.

1st Street/Yakima Avenue – 25 Collisions

The 1st Street/Yakima Avenue intersection has 5 lanes on each leg. There is a parking lane on each side of both streets. If clear, drivers use the parking lanes as right turn lanes. There are controlled pedestrian crossings on each leg. The travel lanes are of adequate width and all left turn lanes have adequate vehicle storage. There are driveways and alleys within close proximity to the intersection that create additional conflict points within the intersection's operational area.

The predominant surrounding land use is commercial.

1st St./Yakima Ave. Intersection

Of the listed 25 collisions at 1st St. and Yakima Ave., 23 collisions were intersection related. The remainder were tied to driveways or were not related to the intersection operation.

	Angle	Turning	Rear End	Sideswipe	Fixed Object
Collisions	8	3	9	2	1
Injury	4	1	2	0	0

The collision numbers at this intersection dropped slightly after 2018. Eleven in 2018, seven in 2019 and seven in 2020. Protected-permitted left turn signals have been in operation for several years. A battery backup system and LED signal indicators were also installed in to keep the signal operational during power outages.

Recommendation: The accident types appear to point towards drivers trying to beat the red light on the through movement phase. An emphasis on traffic enforcement by YPD to monitor red light running and an evaluation of signal timing is recommended.

1st Street/I Street – 25 Collisions

The 1st Street/I Street intersection has 5 lanes on the 1st Street legs and three lanes on the I Street legs. The intersection has controlled pedestrian crossing on each leg. Lane widths are adequate all around and left turn lane storage is good in all directions. The curb radii on the east side of the intersection are too small making it difficult for school buses and delivery vehicles making right turns on and off of East I Street.

The surrounding land uses are commercial. Barge Lincoln Elementary is two blocks to the east.

1st Street curves within the center of the intersection. This curvature can create issues for some drivers as they make their turn in the intersection. The turn makes the lanes operationally narrower than they are; and may also miss direct the drivers' view of the signal indicators.

There are several driveways, and the J Street intersection, within the operational area of the 1st St/I St. intersection. As a result, drivers make unsafe maneuvers to access or egress these driveways.

21 of the 25 listed collisions at 1st Street and I St. collisions were intersection related.

	Angle	Turning	Rear End	Sideswipe	Pedestrian
Collisions	1	2	14	3	1
Injury	0	0	5	0	0

The annual number of collisions at this intersection has been slightly increasing. Four collisions in 2018, five in 2019, and eight in 2020. The increase has been in sideswipe and rear end accidents. Signal indicator heads were realigned several years ago to help reduce driver confusion. In addition, a curb island was installed on the north side of the intersection to limit driveway access as part of a state traffic safety grant.

1st St./I St. Intersection

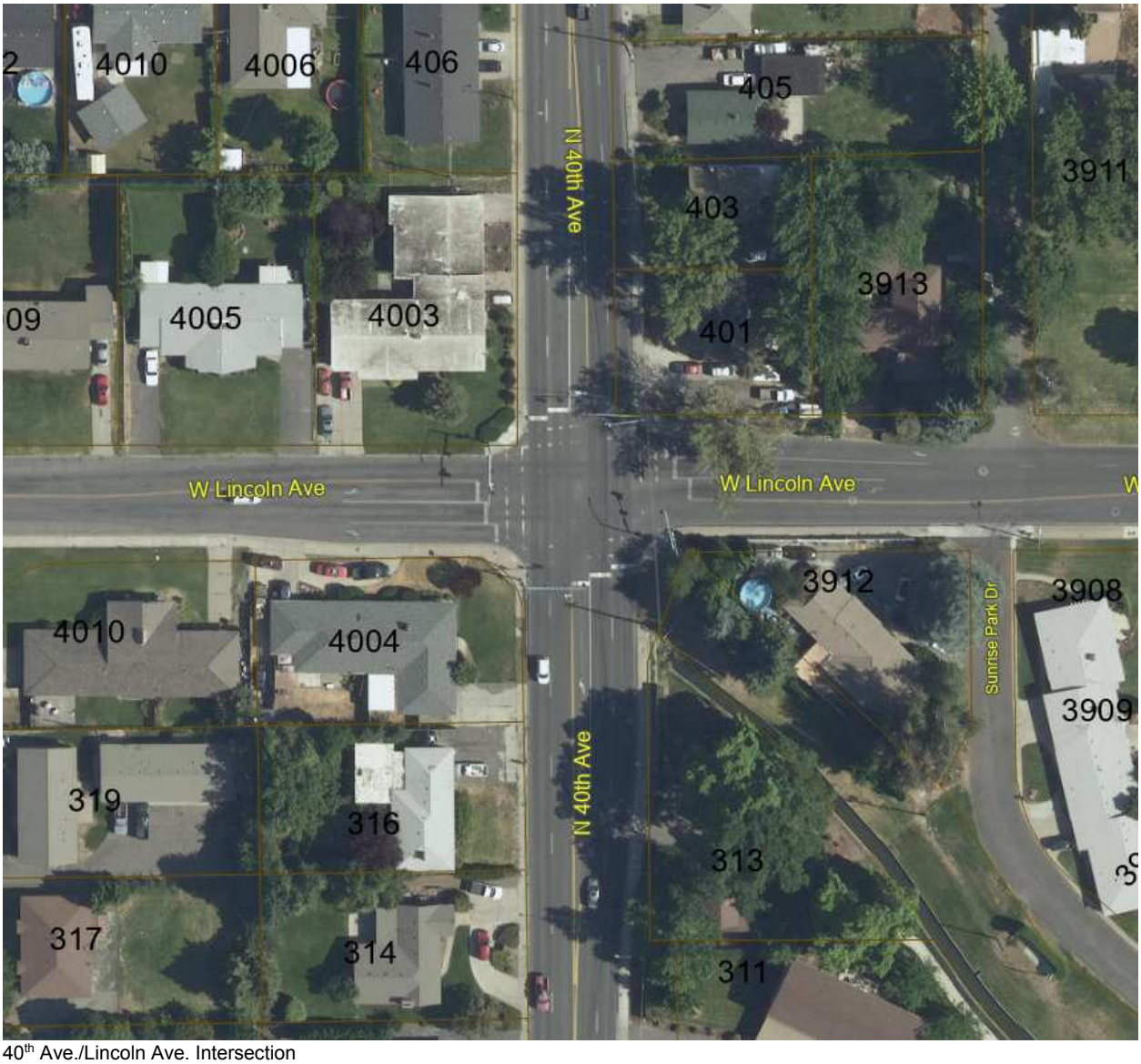
N 1st Street improvements are in the Six Year Transportation Plan and scheduled for construction next year as part of the estimated $12M N. 1st St. Revitalization Phase 3 project.

Recommendation: The intersection will be realigned to reduce the curvature along with new signal poles, lighting, pedestrian crossings, and striping. The improvements are anticipated to significantly improve the operational and safety issues that exist today. Staff will monitor the effectiveness of the safety improvements when completed.

40th Avenue/Lincoln Avenue – 25 Collisions

The 40th Avenue/Lincoln Avenue intersection has 5 lanes on the 40th Avenue legs and four lanes on the Lincoln Avenue legs. The intersection has controlled pedestrian crossing on each leg. Lane widths on 40th Avenue are narrow as are the lanes on Lincoln as they divide into left, through and right turn lanes at the intersection. Left turn lane storage is less than ideal for all directions. Given the narrowness of the lanes, the curb radii on each corner could be improved to accommodate larger vehicles. The surrounding land uses are primarily residential.

The general terrain on 40th Avenue has a slight curvature. Adding the left turn lane at the intersection, increased the curvature. It is not severe, but may contribute to some of the sideswipe accidents occurring away from the intersection. Lincoln Ave. drops in elevation from the intersection eastward. This slope along with residential landscaping at the corners, limits sight distance for westbound vehicles. There are several residential driveways within the operational area of the intersection; impeding traffic as they access the properties.



40th Ave./Lincoln Ave. Intersection

23 of the 25 listed collisions at 40th Ave. and Lincoln Ave. collisions were intersection related.

	Angle	Turning	Head On	Rear End	Sideswipe	Pedestrian	Fixed Object
Collisions	8	7	1	4	1	1	1
Injury	2	1	1	1	0	1	0

The annual number of collisions at this intersection has been variable. Eight collisions in 2018, eleven in 2019, and five in 2020. The intersection has had protected permitted left turns for several years. What is unusual at this intersection is the high number of angle and turning collisions versus rear end and other types of collisions possibly due to individuals running red lights.

Recommendations: The signal pole at the northeast corner is being relocated later this year after being hit several times. In addition, signal indicators are scheduled to be replaced this year as well, eliminating the 8-inch incandescent signal indicators and converting them to 12-inch LED. Staff will monitor the effectiveness of the safety improvements when completed.

Further analysis is needed to evaluate if removing the right turn lanes on Lincoln would be beneficial. The advantage would be to widen the other traffic lanes and reduce the number of right turn on red movements that can be hazardous due to sight line limitations. The disadvantage would be some additional delay to vehicles which could increase traffic congestion.

Traffic enforcement by YPD may also help with drivers attempting to beat the red light.

Summary

Although the total number of collisions may seem high, when looked at on an annual basis for most locations, the number of collisions is in the range that could be anticipated for the high volume of traffic at signalized intersections. Regardless, staff continues to work towards solutions to improve both the safety and operational efficiency of these intersections.

It should be noted that many of the locations have narrow lanes and inadequate left turn storage. These are a result of trying to address the needs of the intersection without purchasing costly right of way. We will need costly widening projects to correct these deficiencies in the future.

While not really discussed in this report, weather and driver impairment are also contributors to some of the accidents. It should be noted that these are difficult to correct. However, increased YPD enforcement and educational efforts, as described above, do provide a benefit and are a valuable tool for the City.

The following intersections are identified projects within the Six-Year Transportation Plan or have upgrades scheduled that will further improve the safety and operation of those intersections. Note that they do not all have secured funding.

- 16th Avenue at Fruitvale Boulevard
- 16th Avenue and Tieton Drive

- S. 1st St at Washington Avenue
- N 1st Street at I Street
- 40th Avenue at Lincoln Avenue

The intersections located at 16th Ave. and Nob Hill Blvd., and at 3rd Ave. and Nob Hill Blvd., have had recent upgrades that appear to be working. More time is needed to determine the effectiveness.

There are five intersections on this list where speed and/or red light running appear to be major contributors to the collision rate and severity of the collisions:

- 16th Ave. at Fruitvale Blvd.
- 1st St. and Nob Hill Blvd.
- 1st St. and Washington Ave.
- 1St St. and Yakima Ave.
- 40th Ave. and Lincoln Ave.

It is recommended that an emphasis on traffic enforcement by Yakima Police Department be employed to help modify driver behavior.

Streets & Traffic is as much about Public Safety as Fire and Police. We will continue to make the necessary investments into safety improvements to reduce the number and severity of collisions occurring at the intersections. Good collaboration exists between YPD and Public Works as we are constantly evaluating and looking for opportunities to enhance traffic safety utilizing the “Three E’s” of traffic safety.