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JULY 10, 2002
MICHAEL T. ARD
EXPIRES: 12/31/2023

Technical Memorandum

To: Hearings Officer, Multnomah County

From: Michael Ard, PE

Date: June 30, 2023

Re: Bull Run Water Facility –Traffic Impact Analysis Review Comments

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This memorandum is written to provide a technical review of the transportation analysis materials prepared by Global Transportation Engineering, which addressed traffic impacts associated with the proposed Bull Run Filtration Facility and associated construction work. Since the most detailed analysis provided to date has been the "Bull Run Filtration Facility - Construction Traffic Impact Analysis" dated June 2, 2023, the comments herein primary pertain to that document. However, some additional comments regarding the crash history analysis provided in the "Portland Water Bureau Bull Run Filtration Project Traffic Impact Analysis" dated September 2, 2022, are also included herein. Generally, the review comments are organized to correspond to the headings in the Global Transportation Engineering reports for ease of reference.

Construction Traffic – Project Description

The report states that the filtration facility will be operational by September 30, 2027. However, it also states that construction of the filtration facility and the raw and finished water lines will finish in 2028. It is unclear how the facility can be operational before either the water lines or the facility itself are completed, but assuming this is true it implies that in late year 2027 and 2028 there will be both construction traffic and operations traffic at the facility. This scenario does not appear to be analyzed. Conversely, if the project will be largely complete by September 30, 2027, a reduced construction timeline would result in traffic levels higher than those analyzed for the longer construction timeline. In either case, the described traffic levels may under-represent traffic volumes which will occur during construction.

Physical Condition of Roadways and Intersections

The report addresses the existing condition of area roadways with an evaluation of pavement conditions. However, many of the impacted roadways were neither designed nor constructed with the intention to support high volumes of truck traffic.

Roadways have design lifetimes that can be expressed in ESALs (Equivalent Single Axle Loads). Passenger vehicles have very little impact on pavement, while heavy trucks have massive impacts. In general, the comparative damage done by pavement loading can be described by the "Generalized Fourth Power Law", which says that the damage caused by a particular load is roughly related to the weight of the axle load taken to the fourth power. Since the average passenger car weighs about 4,100 pounds while trucks have

Exhibit H. 8

weights of up to 80,000 pounds, the damage done by a single loaded truck is often equivalent to the damage done by more than 10,000 passenger cars.

The prior May 8, 2023, version of the report stated that *"An evaluation of the potential for pavement degradation caused by the Project traffic is being conducted under a separate analysis and memorandum."* However, this reference has been removed from the latest version of the report and it is unclear whether such an analysis is forthcoming. The absence of this analysis in the record is a significant omission which makes it impossible to quantify the expected impacts of the project on area roadways. The omission also makes it impossible to determine or impose proportionate mitigation requirements for the expected impacts on affected roadways.

Looking at the trip distribution maps, the proposed project will directly result in truck impacts on SE Carpenter Lane, SE Cottrell Road, SE Lusted Road, SE Oxbow Drive, SE Hosner Road, SE Bluff Road, and SE Altman Road. It will also divert traffic during construction activities resulting in increased traffic volumes on SE Dodge Park Boulevard. The analysis of the physical condition of the roadways omits analysis of several of these roadways, and incorrectly indicates that there will be no impacts on others. A summary of the impacts and roadway conditions is provided in Table 1 below.

Table 1- Pavement Condition Impacts and Conditions Summary

Roadway	From	To	Truck Route(s)	Detour Route(s)	PCI	Mitigated?
SE Carpenter Lane	SE Altman Road	SE Cottrell Road	N/A	Local Traffic	**22.48**	No
SE Carpenter Lane	SE Cottrell Road	Site Access "A"	1, 2	Const. 1 & 2	**22.48**	Yes
SE Cottrell Road	SE Lusted Road	SE Dodge Park Blvd.	N/A	Const. 1 & 2	55.46	Maintain*
SE Cottrell Road	SE Dodge Park Blvd.	SE Carpenter Lane	1, 2	Const. 1 & 2	65.03	Yes
SE Lusted Road	SE Cottrell Road	SE Altman Road	N/A	Const. 1 & 2	**28.44**	Maintain*
SE Oxbow Drive	NW of SE Altman Rd.	SE Altman Road	2	Const. 2	60.36	No
SE Oxbow Drive	SE Altman Road	SE Hosner Road	N/A	Const. 2	78.84	No
SE Hosner Road	SE Oxbow Drive	SE Lusted Road	N/A	Const. 2	**40.53**	Maintain*
SE Bluff Road	W of SE Altman Road	E of SE 362nd Ave.	3, 4	N/A	**???**	No
SE Dodge Park Blvd.	W of SE Altman Road	SE Cottrell Road	1, 2	N/A	86.43	No
SE Altman Road	SE Oxbow Drive	SE Lusted Road	2	N/A	**43.59**	Maintain*
SE Altman Road	SE Lusted Road	SE Dodge Park Blvd.	2	Const. 1	**20.06**	Maintain*

*The report text does not describe improvements, but does indicate that "..the Portland Water Bureau is committed to maintaining [these routes] in servicable condition throughout project construction."

Only two of the above road segments were explicitly identified in the text as requiring improvement at the onset of the project despite the fact that 6 of the road segments currently fail to meet county standards and

all the above segments experience additional traffic as a result of construction activities. Four additional roads were identified as needing to be maintained in "serviceable condition"; however, it is unclear what this means since three of the four roadways are already below the minimum PCI score of 50 identified in the report as requiring mitigation. Based on their PCI scores, these three road segments require immediate rehabilitation rather than merely potential maintenance at some point in the future.

Given that the project anticipates over 300,000 truck trips and each loaded truck trip may have structural impacts 10,000 times greater than that of a passenger vehicle, the structural impacts of construction trips may be equivalent to adding more than a billion passenger vehicles to area roadways, most of which already fall below the minimum structural standards. Even roads which currently meet county standards may experience degradation from heavy truck traffic which results in unacceptable pavement conditions.

If this project is approved, it is critical that appropriate mitigation be provided for all impacted roadways. The mitigation plan should account not only for existing pavement conditions but also the massive impacts of the very high volume of truck trips that would be accommodated during construction and ongoing operation of the proposed facilities, ensuring that affected road segments meet county standards during and after construction.

Traffic Data Evaluation

The report states that year 2022 (and 2023) traffic count data was compared to year 2019 data to determine whether traffic volumes showed decreases which may be attributable to the COVID-19 pandemic. While the report acknowledges that "Some of the intersections showed a drop of up to 10% in the total number of vehicles moving through the intersection between 2019 and 2022", it also states that "...many of the main arterial and collector roadway commuter route volumes remained relatively consistent for both count periods, and some intersection volumes increased between 2019 and 2022."

This description misrepresents the traffic count data. In fact, several intersections showed decreases of more than 10%. In particular, the intersection of SE Bluff Road at SE Altman Road (which is on a commuter route) showed a decrease of more than 14 percent during both peak hours. The average decrease was 7.12 percent at the study intersections. Comparing the historical turning movement counts, only the intersection of SE Dodge Park Boulevard at SE Cottrell Road showed an increase, and only during the morning peak hour. Traffic volumes there increased from 81 to 89 vehicles during the morning peak hour. This was a low-volume intersection and is not representative of "main arterial and collector roadway commuter route volumes." All other intersection turning movement counts showed a decrease in traffic as compared to the year 2019 turning movement volumes.

The observed decreases in traffic volume are even more concerning when we consider that traffic volumes

generally increase over time. Using the 2 percent per year growth rate assumed in the study and projecting over the three-year period between 2019 and 2022, we would have expected an average increase of about 6 percent. The actual decrease of about 7 percent therefore represents a deficiency of 13 percent. From this analysis the year 2022 "existing conditions" volumes show a meaningful and unexplained decrease from the historical count levels. It may therefore be appropriate to utilize historical count data along with an appropriate growth factor to assess background traffic levels at the study intersections.

Project-Generated Trips

To provide a conservative analysis, the Global Transportation Engineering report assumed that all trips associated with construction of the filtration facility and the pipelines arrive and depart from the filtration facility site. On its face, this approach indeed appears conservative. However, several concerns remain:

1) Where will commuter trips destined for the pipeline project park? If the parking facilities are located within the filtration facility site, then these commuters will indeed arrive and depart from the filtration site. But they will also need to travel from the parking facilities to the work sites as additional shuttle trips. If this is the case, the modeled volumes may underestimate actual site trips.
2) Where will pipeline trips actually travel? Are the actual impacts of these trips on affected roadways adequately captured in the analysis?
3) Commuter trips were assumed to be inbound only during the morning peak hour and outbound only during the evening peak hour. **However, there are no land uses in the ITE Trip Generation Manual which exhibit this travel pattern**. The assumed commuter travel pattern implies that no employees will be dropped off or picked up from work, no errands will be run, no visitors will stop by the site, no short-term meetings will occur including off-site personnel at the beginning or end of the day, and no other miscellaneous passenger vehicle trips to or from the site will occur. This is unrealistic. Consequently, the commuter trip projections are not credible.

Additional information is required from the contractor and the transportation engineering consultant to address the first two questions.

To address the third, it was noted that general office buildings (which similarly have employees arrive in the morning and depart in the evening) have 12 percent exiting trips during the morning peak hour and 17 percent entering trips during the evening peak hour. Similarly, Light Industrial developments average 12 percent exiting trips during the morning peak hour and 14 percent entering trips during the evening peak hour. In the absence of detailed data for construction site uses, it is recommended that 15 percent of the total peak hour commuting trips be assumed to be contra-flow trips to maintain a conservative analysis. For peak construction traffic conditions, this equates to 79 contra-flow commuter trips for the filtration facility and 23 contra-flow commuter trips for the pipeline facilities.

It was noted that the analysis also assumed zero passenger vehicle trips in and out of the project site outside the morning and evening commute hours. As such, the daily traffic volumes reported in Table 2 reflect only the incoming trips in the morning and outgoing trips in the evening, inaccurately omitting both the contra-flow commuter trips during the peak hours and the miscellaneous passenger vehicle trips which occur outside the morning and evening peak hours. As a result, both the peak-hour commuter trips and the daily commuter trips are underestimated in the construction traffic impact analysis provided for the project.

Traffic Impacts Analysis – Intersection Performance

Per the analysis provided by Global Transportation Engineering, all study area intersections currently operate at level of service "B" or better, with most operating at level of service "A". Accordingly, all study area intersections currently meet the relevant performance standards.

The future conditions analysis that was provided in support of the project is unusual in several ways. It omits a "background conditions" analysis which identifies how the area intersections would operate absent the proposed project. It also omits diagrams showing the future year background traffic volumes which account for the projected 2 percent per year growth. These omissions make it significantly more difficult to follow the calculations and verify that appropriate traffic volumes are analyzed at the study area intersections.

Even without detailed diagrams showing precisely how future traffic volumes were calculated, the analysis appears to underestimate future traffic volumes in four ways:

1) The analysis used year 2022 traffic volume counts which were demonstrably lower than the historical 2019 traffic volumes, indicating that current traffic levels are depressed by an average of more than 7 percent even when we ignore the fact that we would normally expect increases in these traffic volumes over the three intervening years.

2) The analysis considered traffic conditions for the year in which construction is projected to start (year 2025). However, the construction project will continue for several years. Traffic growth during the interim was not considered. Since the project is expected to continue through year 2027 or 2028, the analysis should address operation through those years to ensure that any operational concerns are identified and appropriate mitigation is recommended to address problems that may arise during the duration of construction.

3) Since the commuter trip estimate for the project did not include any contra-flow trips, commuter traffic impacts are underestimated, and the full impact of the project is not captured by the analysis.

The future conditions analysis should account for commuter trips departing during the morning peak hour and arriving during the evening peak hour.

4) The analysis utilized the same peak hour factors for existing and future traffic conditions. This means that the relative variation in traffic volumes that occurs during the peak hour is projected to be similar either with or without construction traffic. However, typical construction projects have a common start time for most employees. This concentrates most arrivals and departures to the periods immediately prior to the start of work and immediately after "quitting time". This phenomenon results in increased delays, worsened levels of service, and increased queue lengths at area intersections during the morning and evening peak hours. These spikes in traffic demand are not captured in the analysis provided.

Even with the underestimated traffic volumes and impacts, Table 6 of the June 2, 2023, report prepared by Global Transportation Engineering demonstrated that none of the four analysis scenarios results in acceptable operation for all study intersections. Addressing the above concerns would likely result in further degradation to operation of problem intersections and may result in additional intersections failing to meet the required performance standards. A delay increase of just 10 percent would cause the intersections of SE Dodge Park Boulevard at SE Cottrell Road and SE Bluff Road at Orient Drive to fail to meet the performance standards under some analysis scenarios.

The Global Transportation Engineering report opines that the operation of the intersection of SE Carpenter Lane at Cottrell should be acceptable despite not meeting the performance standard because there are very few vehicles on the eastbound approach which are subject to long delays and level of service "F" operation. It is notable that operation of this intersection is projected to worsen from level of service "A" under existing conditions to level of service "F" with the addition of construction traffic. As such, the impacts will be very noticeable to affected residents. Additionally, SE Carpenter Lane was identified as a local traffic detour route to be used during road closures, and it is the closest and most direct detour route for traffic navigating around a road closure on SE Dodge Park Boulevard west of Cottrell Road. Accordingly, traffic volumes would not be projected to remain low throughout construction. Additional comments regarding operation under detour conditions are provided later in this memorandum.

Pipeline Construction Lane and Roadway Closures

The operational analysis results provided in Table 7 on page 17 of the Construction Traffic Impact Analysis indicate that the study intersections will fail to meet performance standards under future conditions absent mitigation. The closure scenario analysis again used traffic volumes which under-represent both background traffic and site traffic volumes as previously described on pages 5 and 6 of this memorandum. However, again the result of the analysis was that several study intersections will fail to meet performance

standards absent mitigation. As such, an examination of the recommended mitigation measures is appropriate.

Pedestrian and Bicycle Accommodation During Construction

The report indicates that "Pedestrians and bicycles will be accommodated through work zones during project construction, equivalent to or exceeding the current accommodations." This report then details the minimal to non-existent accommodations currently provided along area roadways, including only "the roadway and narrow gravel shoulders" along most roadways, and a 2-foot paved shoulder along SE Dodge Park Boulevard.

It should be noted that providing similar dimensions for pedestrians and cyclists during project construction is in no way "equivalent to or better than current accommodations".

Under existing conditions, many area roadways accommodate very low volumes of traffic. This is evident both from the traffic counts and from the intersection performance analysis which shows all area intersections operating at level of service "A" or "B" under existing conditions.

The proposed project will result in massive increases in traffic on many area roadways. As reported by Global Transportation Engineering, the proposed project would result in 749 added trips during the morning peak hour and 749 added trips during the evening peak hour under peak construction traffic conditions. Accounting for contra-flow commuter trips as recommended in this memorandum results in a more accurate projection of 851 new trips during each of the peak hours. Ignoring for a moment the fact that more than 20 percent of the added trips are large trucks, this volume is greater than that of building 900 new single-family homes in the site vicinity.

Currently, SE Carpenter Lane carries just 14 vehicle trips during the morning peak hour and 11 trips during the evening peak hour east of SE Cottrell Road. It likely carries fewer than 150 vehicles per day. Although the roadway lacks sidewalks, the volume and speed of traffic on the roadway is generally compatible with the ability to back out of a driveway, comfortably walk or bicycle on the roadway, or cross the road to get to a mailbox. However, with the addition of site traffic the roadway volumes will be far in excess of levels permissible for local residential streets, and well beyond the level compatible with shared use of the roadway. At minimum, dedicated facilities will be needed to accommodate people walking and biking on the roadway to address the increased traffic loads.

Given the massive impact of construction traffic, significant improvements can and should be required to area roadways and intersections. Since the project scale is greater than the impact of 900 new homes even without considering the additional impacts resulting from high percentages of the traffic consisting of heavy

trucks, large-scale improvements can be required without the mitigations becoming disproportionate to the actual impact of the proposed use.

Road closures will further exacerbate concerns regarding traffic volumes, since pedestrians and cyclists will need to divert to the same roadways which accommodate diverted traffic. Where roadway volumes increase to levels incompatible with cyclists sharing the lane it is insufficient to simply state that "During lane closures, bicycles will continue to share the road in the same manor."

Mitigation Analysis

In lieu of suggesting operational or safety enhancements for area roadways and intersections, the construction traffic impact analysis suggests several Transportation Demand Management (TDM) strategies to address site impacts.

The first suggested TDM measure is to direct half of the commuter traffic to use Access B. While this would distribute project impacts over a larger area, mandating ingress and egress points would require diversion of some drivers from their closest and most convenient point of access to a farther access location. It will also require an enforcement mechanism to ensure that drivers arrive and depart from their assigned access location. There is no mention in the report of any mechanism for enforcement of this mitigation measure, nor do the diverted traffic volumes analyzed show any vehicles needing to travel along either SE Altman Road or SE Cottrell Road to reach their assigned access location. Further, since the analysis underestimates both site traffic and background traffic as previously described, it is unclear whether implementation of this TDM measure could restore acceptable operation at the study area intersections.

The second mitigation measure recommended was to "Provide a commuter shuttle". However, even with a commuter shuttle truck traffic will need to directly access the site, and commuters will still need to arrive at the shuttle and park. There is no indication of where workers would park, or what the traffic impacts will be in the vicinity of potential satellite parking facilities. Accordingly, this mitigation option lacks sufficient specificity to determine whether it can sufficiently improve traffic conditions in the site vicinity and lacks any analysis of the secondary impacts resulting from high volumes of traffic arriving and departing from one or more satellite parking facilities.

The third mitigation measure was to "Offset commuter arrivals to the Filtration Facility". Offsetting commuter arrivals to the facility would result in spreading commute volumes over a larger time period, which would likely reduce peak-hour delays, but would not reduce daily traffic volumes on affected roadways. Additionally, implementation of this type of TDM measure is often problematic for construction sites, where working hours may change seasonally and in response to the needs of construction activities. Generally, construction workers are scheduled to be on the site at the same time for optimal efficiency. The

report indicates that when Access B is unavailable site trips could be limited to 387 or fewer total peak hour vehicles. This may be a more daunting requirement than is initially evident. Assuming that the 174 peak hour truck trips need to be maintained, only 213 additional commuter trips could be accommodated per hour. After factoring for contra-flow commuter trips, 676 commuter trips will need to be accommodated during peak construction activity. This means that the peak construction traffic commute volumes may need to be spread over an arrival period of more than three hours, with a matching departure plan. As discussed further on page 10 of this memorandum, avoiding impacts to area schools further exacerbates this concern.

The other recommended TDM measures ("Develop a ride share program" and "Develop an incentive program to encourage carpooling") lack sufficient specificity to permit evaluation. But even a very robust incentive program typically only reduces traffic volumes by a nominal amount.

Agricultural Business Access

The report indicates that pipeline construction will be sequenced to minimize farm detours and impacts. Additionally, the report stated that the project team will provide information and notification to farmers regarding activities which may impact them. These described measures are unlikely to satisfy most farmers or meaningfully reduce impacts to their operations, however. The nature of farming is that changing weather conditions necessitate responses regarding when to turn or plant a field, when to fertilize or undertake pest control measures, and when to harvest crops. Since these conditions cannot be effectively projected in advance, providing advance notice of closures or other impacts cannot fully accommodate the needs of farmers in ensuring that their crops are planted, protected, and harvested appropriately. Since failure to respond to agricultural needs in a timely manner can result in the loss of crops, there is a potential for extremely significant impacts to farm uses in the site vicinity as a result of the proposed conditional use.

Additionally, farm vehicles often extend across more than a single lane width. Movement of farm vehicles on narrow roadways may require drivers to pull to the side or into driveways to facilitate passing. This operation works awkwardly but effectively on low volume roadways. But with high volumes of traffic on area roadways the movement of farm vehicles and equipment becomes highly problematic, especially when conflicting vehicles include heavy dump trucks and tanker trucks, and when construction further limits the width of roadways (or closes them entirely).

Haul Routes

The report indicates that "For all Distribution Scenarios, no operational or capacity impacts were identified, and no mitigations are recommended with respect to truck routes." However, the analysis results in Table 6 on page 13 demonstrate that each distribution scenario failed to meet the operational standards. Only the

mitigated conditions analysis purported to show adequacy, but that analysis used deflated background traffic volumes, omitted contra-flow peak-hour site trips, was conducted only for year 2025 conditions at the start of construction, and showed no vehicles traveling on likely diversion paths (including no drivers diverting to alternate access locations and no passenger vehicles diverting to use SE Carpenter Lane between SE Altman Road and SE Cottrell Road). Further, the analysis relied on continuous open access to both site access A and B, or implementation of an offset arrival plan which is not practical for addressing the large number of site trips.

The conclusion that "no mitigations are recommended with respect to truck routes" also omits consideration of safety impacts associated with truck traffic. Operation of heavy vehicles on the area roadways exacerbates concerns regarding conflicts with pedestrian and bicycle traffic (as well as passenger vehicles). Heavy trucks also require longer sight distances at intersections than passenger vehicles due to their slower acceleration. However, no analysis of truck intersection sight distance was provided for the site access locations or the affected intersections which will accommodate high percentages of truck traffic. This omission is significant given that several of the area intersections have been identified as high crash locations under existing conditions.

Schools

The school analysis indicated that "To avoid impacting schools and to reduce construction traffic related delays, construction traffic will avoid SE Lusted Road and SE 302nd Avenue in the vicinity of Sam Barlow High School for 20 minutes before and after the start and end times of school; and construction traffic will avoid SE Orient Drive in the vicinity of West Orient Middle School for 20 minutes before and after the start and end times of school." However, no mechanism for achieving this goal is described. Implementation of such a restriction would require limiting the times when commuters could arrive and depart the site and limiting the times and/or haul routes used by trucks. Looking at the schedules for Sam Barlow High School and West Orient Middle School provided on page 21 of the Construction Traffic Impact Analysis, implementation of this suggestion would mean that working commuters could not be scheduled to arrive between 7:15 AM and 7:55 AM on most days (8:15 AM to 8:55 AM on Wednesdays). In conjunction with a limit of 387 total peak hour trips, workers may need to begin arriving at 4:00 AM, or a partial crew may need to begin work very early while other workers arrive after 9:00 AM (10:00 AM on Wednesdays). It does not appear that this recommended restriction is feasible. As such it is anticipated that the proposed use is very likely to impact traffic in the vicinity of the schools during the period of school traffic arrival.

Crash History

Crash history was not addressed in the June 2, 2023, Construction Traffic Impact Analysis, but was included in the "Portland Water Bureau Bull Run Filtration Project Traffic Impact Analysis" dated September 2, 2022. The report acknowledged that two study area intersections have crash rates in excess of 1.0 crashes per million entering vehicles (CMEV); however, no safety mitigation measures were recommended.

Determination of whether an intersection has a crash rate above 1.0 CMEV was commonly used historically to identify high-crash intersections. However, this metric is not typically used for modern traffic impact studies in Oregon. Instead, intersection crash rates are compared to statewide data for similar intersection types, with differentiating criteria including the number of intersection approaches (three-leg "T-intersections" vs. four-way intersections), the intersection control type (stop signs vs. traffic signals), and the character of the surrounding environment (rural vs. urban). For each resulting category of intersection, the Oregon Department of Transportation has calculated average and 90th percentile crash rates to facilitate comparison of relative risks among similar intersection types. Three study intersections had crash rates above the 90th percentile crash rate for their intersection types.

The intersection of SE Oxbow Drive at SE Altman Road had a reported crash rate of 0.507 CMEV. The mean crash rate for rural three-leg stop-controlled intersections in Oregon was 0.196 CMEV, and the 90th percentile crash rate was 0.475 CMEV. Accordingly, this intersection is among the top 10 percent for crash risk for this intersection type.

The intersection of SE Lusted Road at SE Altman Road had a reported crash rate of 1.588 CMEV. The mean crash rate for rural four-leg stop-controlled intersections in Oregon was 0.433 CMEV, and the 90th percentile crash rate was 1.080 CMEV. The crash rate at this intersection was well above the 90th percentile crash rate for this intersection type.

The intersection of SE Bluff Road at SE proctor Road has a reported crash rate of 1.740 CMEV. It should be noted that this intersection has five approach lanes, and there is no statewide data for this unusual intersection configuration. Accordingly, the observed crash rate was compared to the highest crash rate for any intersection classification in Oregon. This corresponds again to a rural, four-way stop-controlled intersection. Again, the mean crash rate for four-leg stop-controlled intersections in Oregon was 0.433 CMEV, and the 90th percentile crash rate was 1.080 CMEV. The crash rate at this intersection was far above the 90th percentile crash rate for any intersection classification in Oregon.

For the two intersections with crash rates in excess of 1.0 CMEV, the report included a more detailed discussion of the crash history, but there was no apparent analysis of whether roadway geometry, sight obstructions, topography or other factors may have contributed to the high crash rates, nor was there any

detailed analysis provided for the high observed crash rate at the intersection of SE Oxbow Drive and SE Altman Road.

In addition to these high-crash locations, there have been several recent crashes at the intersection of SE Dodge Park Road at SE Cottrell Road documented in fire department dispatch records. These crashes are generally too recent to show up in the ODOT crash data. Some of the recent crashes here included:

1. 7/30/2022 – 2 vehicle crash, no medical attention needed
2. 8/16/2022 – pickup vs. motorcycle crash, advanced life support with helicopter evacuation was required
3. 8/17/2022 – 2 vehicle crash with injuries, fire department noted "provide advanced life support"

This is 3 crashes within the span of about a month and a half, with 2 of the crashes resulting in severe injuries.

The above intersections are projected to accommodate increased passenger vehicle and truck traffic from the proposed use. In particular, the intersection of SE Dodge Park Boulevard at SE Cottrell Road serves nearly all vehicles entering or exiting the site via "Access A". It is reasonable to expect that crash risks will increase as a result of the increased traffic volumes. It is also reasonably likely that crash severity will increase since 50 percent of the peak daily construction trips projected in Table 2 of the Global Transportation Engineering analysis are truck trips.

Conclusions

Based on the detailed review of the Bull Run Filtration Facility Construction Traffic Impact Analysis prepared by Global Transportation Engineering:

- Traffic associated with the proposed facility will have significant structural, operational and safety impacts on area roadways.
- Structural impacts to area roadways were understated in the analysis, with no analysis of several area roadways, no recommendations for some roadways affected by construction or detour traffic, and no analysis of the expected structural impacts of hundreds of thousands of truck trips on the area roadways.
- The analyzed traffic volumes underestimate both background traffic volumes and site traffic volumes and therefore cannot be relied upon to determine appropriate operational mitigation measures.
- Providing pedestrian and bicycle facilities physically similar to those currently available on area roadways is inappropriate and unsafe where project traffic causes volumes to increase beyond the level which can accommodate shared use.

- The identified mitigation measures either cannot be continuously implemented, are impractical to implement while maintaining a reasonable construction schedule at the site, or lack a sufficiently detailed plan to enable analysis. Accordingly, they cannot be relied upon to address transportation concerns throughout the duration of the project.
- Agricultural impacts from the project likely cannot be mitigated as proposed since farmers may require access to fields based on changing weather and cannot schedule to avoid conflicts in advance.
- The haul route analysis asserted that operation would be acceptable in the future but relied on reduced traffic volumes and impractical mitigations to reach that conclusion. The analysis also omitted consideration of safety and truck intersection sight distances.
- Avoiding impacts to area schools is not likely to be practical, particularly during times when both site access points are not simultaneously available.
- Several intersections in the site vicinity have been identified as having high crash risks. These intersections are projected to experience increased overall traffic volumes, elevating the potential for crashes as well as accommodating high percentages of trucks which may increase crash severity. Again, no mitigation was recommended to address these safety concerns.

In addition to the technical analysis of the report, it is noted that the above findings raise several significant concerns directly related to the approval criteria found in MCC 36.7515 (A) through (F) for the proposed conditional use. Specifically, the type and volume of traffic generated on several area roadways is not consistent with the character of the area, the proposed use may force a significant change in or significantly increase the cost of accepted farm practices on surrounding lands devoted to farm use, public services other than those existing or programmed for the area are likely to be required in order to sufficiently mitigate for the actual impacts of the proposed development, and the addition of high volumes of traffic including high volumes of heavy truck traffic is likely to create hazardous conditions. For these reasons, the transportation analysis provided for the project is insufficient to meet the conditional use approval requirements for the project.

Appendix

Historical Turning Movement Count Data - Total Intersection Entering Volume Comparison

		Thurs	Thurs	Wed	Wed	
Historical Volume Comparison - Turning Movement Count Data						
(Highlighted volumes were used for comparison since both 2019 and 2022 data is available)						
AM Volumes		28-Feb	7-Mar	23-Feb	15-Mar	
Intersection	Name	2019	2019	2022	2023	% Decrease
1	Oxbow at Altman			163		
2	Oxbow at Hosner			117		
3	Lusted at Altman			146		
4	Lusted at Cottrell			86		
5	Dodge Park at Altman	159		144		9.43%
6	Dodge Park at Cottrell	81		89		-9.88%
7	Carpenter at Altman	80		67		16.25%
8	Carpenter at Cottrell	58		52		10.34%
9	Bluff at Altman	267		228		14.61%
10	Bluff at Cottrell	240		226		5.83%
11	Bluff at Proctor	368		366		0.54%
12	Dodge Park at Lusted			88		
13	Lusted at Hudson			93		
14	Lusted at 302nd				489	
15	Bluff at Orient				443	
		Total Year 2019		**Total Year 2022**		
		1253		1172		
	Average Traffic Volume Decrease:			**6.5%**		

Historical Turning Movement Count Data - Total Intersection Entering Volume Comparison

		Thurs	Thurs	Wed	Wed	
Historical Volume Comparison - Turning Movement Count Data						
(Highlighted volumes were used for comparison since both 2019 and 2022 data is available)						
PM Volumes		28-Feb	7-Mar	23-Feb	15-Mar	
Intersection	Name	2019	2019	2022	2023	% Decrease
1	Oxbow at Altman			216		
2	Oxbow at Hosner			135		
3	Lusted at Altman			207		
4	Lusted at Cottrell			101		
5	Dodge Park at Altman		224	203		9.38%
6	Dodge Park at Cottrell		104	93		10.58%
7	Carpenter at Altman		104	97		6.73%
8	Carpenter at Cottrell		62	54		12.90%
9	Bluff at Altman		343	294		14.29%
10	Bluff at Cottrell		274	270		1.46%
11	Bluff at Proctor		259	252		2.70%
12	Dodge Park at Lusted			83		
13	Lusted at Hudson			86		
14	Lusted at 302nd				392	
15	Bluff at Orient				704	

	Total Year 2019	**Total Year 2022**
	1370	1263

Average Traffic Volume Decrease: **7.8%**

	AM & PM Total Year 2019	**AM & PM Total Year 2022**
	2623	2435

Average Traffic Volume Decrease(AM plus PM): **7.2%** *

* An average decrease of 7.2% was pbseved in the count data. Assuming 2% growth per year, a 6% increas should have been observed. The apparent deficit is therefore 13.2 percent.

Trip Generation Calculation Worksheet

Land Use Description: Single-Family Detached Housing
ITE Land Use Code: 210
Independent Variable: Dwelling Units
Quantity: 905 Dwelling Units
Setting: General Urban/Suburban and Rural

Summary of ITE Trip Generation Data

AM Peak Hour of Adjacent Street Traffic
Trip Rate: 0.70 trips per dwelling unit
Directional Distribution: 26% Entering 74% Exiting

PM Peak Hour of Adjacent Street Traffic
Trip Rate: 0.94 trips per dwelling unit
Directional Distribution: 63% Entering 37% Exiting

Total Weekday Traffic
Trip Rate: 9.43 trips per dwelling unit
Directional Distribution: 50% Entering 50% Exiting

Site Trip Generation Calculations

905 Dwelling Units

	Entering	Exiting	Total
AM Peak Hour	165	469	634
PM Peak Hour	536	315	851
Weekday	4267	4267	8534

← Matches project AM & PM peak w/ contra-flow traffic

Data Source: *Trip Generation Manual, 11th Edition* , Institute of Transportation Engineers, 2021

FDID: 00144 **Incident Date:** 07/30/2022 **Incident Number:** RG22-14393 **Exposure:** 0

NFIRS Record Requests

NFIRS - 1 Basic

Incident Location Type: 1-Street address
Street Address: SE-Southeast COTTRELL RD / SE DODGE PARK BLVD-Boulevard
City, State, Zip Code: Multnomah County, OR 97080
Incident Cross Street: 33501-34899 SE DODGE PARK BLVD/6600-7598
Incident Type: 300-Rescue, EMS incident, other
Aid Given or Received: None

Alarm Date Time: 07/30/2022 15:05:30
Arrival Date Time: 07/30/2022 15:10:53
Last Unit Cleared Date Time: 07/30/2022 15:41:43

Shifts or Platoon: B
District: 7672

Primary Action Taken: 86-Investigate
Resource Used: Y-Yes

Property Use: 960-Street, other
Officer In Charge: G1852 Lickteig, Daniel Captain
Member Making Report: G1852 Lickteig, Daniel Captain

NFRIS - 9 Apparatus or Resource

Apparatus

Apparatus or Resource ID	Apparatus or Resource Type	Apparatus or Resource Dispatch Date Time	Apparatus or Resource Arrival Date Time	Apparatus or Resource Clear Date Time	Apparatus Action	Apparatus Narrative
C7	92-Chief officer car	15:07:27		15:13:00	93-Cancelled en route	cancelled by E76
E72	11-Engine	15:07:27		15:12:52	93-Cancelled en route	E72 cancelled enroute.
E76	11-Engine	15:05:30	15:10:53	15:41:43		E76 called for vehicle accident. Two vehicles involved with no one wanting medical attention.,
R74	70-Medical & rescue unit, other	15:07:27		15:13:03	93-Cancelled en route	R74 cancelled.
T71	12-Truck or aerial	15:07:27		15:12:53	93-Cancelled en route	T71 cancelled.

NFIRS - 10 Personnel

Apparatus

Apparatus or Resource ID	Apparatus or Resource Type	Apparatus Action	Apparatus or Resource Dispatch Date Time	Apparatus or Resource Enroute Date Time	Apparatus or Resource Arrival Date Time	Apparatus or Resource Clear Date Time	Apparatus or Resource In Service Date Time

C7	92-Chief officer car	93-Cancelled en route	15:07:27	15:08:17		15:13:00	15:13:00
E72	11-Engine	93-Cancelled en route	15:07:27	15:08:39		15:12:52	15:12:52
E76	11-Engine		15:05:30	15:06:39	15:10:53	15:41:43	15:41:43
R74	70-Medical & rescue unit, other	93-Cancelled en route	15:07:27	15:10:40		15:13:03	15:13:03
T71	12-Truck or aerial	93-Cancelled en route	15:07:27	15:10:43		15:12:53	15:12:53

Investigation

Electric Company Name: PGE

NFIRS - 1S Supplemental

Additional Narratives

Additional Narratives

CAR ACCIDENT, MED NEEDED, 2 CARS

Apparatus Narratives

Apparatus or Resource ID	Apparatus Narrative
C7	cancelled by E76
E72	E72 cancelled enroute.
E76	E76 called for vehicle accident. Two vehicles involved with no one wanting medical attention.,
R74	R74 cancelled.
T71	T71 cancelled.

FDID: 00144 **Incident Date:** 08/16/2022 **Incident Number:** RG22-15680 **Exposure:** 0

NFIRS Record Requests

NFIRS - 1 Basic

Incident Location Type: 1-Street address
Street Address: SE-Southeast COTTRELL RD / SE DODGE PARK BLVD-Boulevard SE-Southeast
City, State, Zip Code: Multnomah County, OR 97080
Incident Cross Street: 33501-34899 SE DODGE PARK BLVD/6600-7598
Incident Type: 321-EMS call, excluding vehicle accident with injury
Aid Given or Received: None

Alarm Date Time: 08/16/2022 17:26:49
Arrival Date Time: 08/16/2022 17:32:51
Last Unit Cleared Date Time: 08/16/2022 18:26:35

Shifts or Platoon: B
District: 7672

Primary Action Taken: 33-Provide advanced life support (ALS)
Resource Used: Y-Yes

Property Use: 962-Residential street, road or residential driveway
Officer In Charge: G2461 Hardie, Craig Lieutenant
Member Making Report: G3132 Abbasov, Rustam Firefighter

NFRIS - 9 Apparatus or Resource

Apparatus

Apparatus or Resource ID	Apparatus or Resource Type	Apparatus or Resource Dispatch Date Time	Apparatus or Resource Arrival Date Time	Apparatus or Resource Clear Date Time	Apparatus Narrative
C7	92-Chief officer car	17:34:08	17:44:14	18:23:36	
E72	11-Engine	17:34:28	17:46:02	18:26:35	
E76	11-Engine	17:26:49	17:32:51	18:25:50	
T71	12-Truck or aerial	17:36:15	17:48:45	18:18:52	established landing zone, assisted with loading patient to the helicopter

NFIRS - 10 Personnel

Apparatus

Apparatus or Resource ID	Apparatus or Resource Type	Apparatus or Resource Dispatch Date Time	Apparatus or Resource Enroute Date Time	Apparatus or Resource Arrival Date Time	Apparatus or Resource Clear Date Time	Apparatus or Resource In Service Date Time
C7	92-Chief officer car	17:34:08	17:34:08	17:44:14	18:23:36	18:23:36
E72	11-Engine	17:34:28	17:35:35	17:46:02	18:26:35	18:26:35
E76	11-Engine	17:26:49	17:28:24	17:32:51	18:25:50	18:25:50
T71	12-Truck or aerial	17:36:15	17:36:15	17:48:45	18:18:52	18:18:52

Investigation

FDID: 00144 **Incident Date:** 08/16/2022 **Incident Number:** RG22-15680 **Exposure:** 0

Electric Company Name: PGE

NFIRS - 1S Supplemental

Additional Narratives

Additional Narratives

PU VS MC. MC DOWN IN DITCH.

Apparatus Narratives

Apparatus or Resource ID	Apparatus Narrative
C7	
E72	
E76	
T71	established landing zone, assisted with loading patient to the helicopter

FDID: 00144 **Incident Date:** 08/17/2022 **Incident Number:** RG22-15743 **Exposure:** 0

NFIRS Record Requests

NFIRS - 1 Basic

Incident Location Type: 2-Intersection
Street Address: SE-Southeast DODGE PARK BLVD / SE COTTRELL RD-Road SE-Southeast
City, State, Zip Code: Multnomah County, OR 97080
Incident Cross Street: 33501-34899 SE DODGE PARK BLVD/6600-7598
Incident Type: 321-EMS call, excluding vehicle accident with injury
Aid Given or Received: None

Alarm Date Time: 08/17/2022 15:15:51
Arrival Date Time: 08/17/2022 15:22:15
Last Unit Cleared Date Time: 08/17/2022 15:54:09

Shifts or Platoon: A
District: 7672

Primary Action Taken: 33-Provide advanced life support (ALS)
Resource Used: Y-Yes

Property Use: 960-Street, other
Officer In Charge: G2461 Hardie, Craig Lieutenant
Member Making Report: G2461 Hardie, Craig Lieutenant

NFRIS - 9 Apparatus or Resource

Apparatus

Apparatus or Resource ID	Apparatus or Resource Type	Apparatus or Resource Dispatch Date Time	Apparatus or Resource Arrival Date Time	Apparatus or Resource Clear Date Time	Apparatus Action	Apparatus Narrative
C7	92-Chief officer car	15:20:04		15:23:37	93-Cancelled en route	Canceled enroute
E72	11-Engine	15:20:04		15:29:43	93-Cancelled en route	Canceled enroure
E76	11-Engine	15:15:51	15:22:15	15:54:09		See med chart
T71	12-Truck or aerial	15:20:04		15:26:53	93-Cancelled en route	Canceled enroute

NFIRS - 10 Personnel

Apparatus

Apparatus or Resource ID	Apparatus or Resource Type	Apparatus Action	Apparatus or Resource Dispatch Date Time	Apparatus or Resource Enroute Date Time	Apparatus or Resource Arrival Date Time	Apparatus or Resource Clear Date Time	Apparatus or Resource In Service Date Time
C7	92-Chief officer car	93-Cancelled en route	15:20:04	15:20:29		15:23:37	15:23:37
E72	11-Engine	93-Cancelled en route	15:20:04	15:20:43		15:29:43	15:29:43

E76	11-Engine		15:15:51	15:17:15	15:22:15	15:54:09	15:54:09
T71	12-Truck or aerial	93-Cancelled en route	15:20:04	15:21:41		15:26:53	15:26:53

Investigation

Electric Company Name: PGE

NFIRS - 1S Supplemental

Additional Narratives

Additional Narratives

2 VEH'S ... SEE RELATED CP#: PM22-33751

Apparatus Narratives

Apparatus or Resource ID	Apparatus Narrative
C7	Canceled enroute
E72	Canceled enroure
E76	See med chart
T71	Canceled enroute