Question #1: The application states that “current capacity is not projected to meet the future demand especially when the New Arena at Seattle Center (Arena) opens.” Please elaborate on the current capacity and projected demand; how many riders are tourists vs. commuters?

Answer #1:

**Increasing Peak Capacity**

The current peak capacity of the system is 3000 passengers per hour, per direction. System capacity has been halved from its original design capacity due to changes at both Seattle Center and Westlake Monorail stations that occurred first at Seattle Center in the years following the 1962 World’s Fair and again with the construction of Westlake Park in 1988. The proposed Seattle Center station project, together with the privately funded improvements at Westlake station, will restore the Monorail system to its originally designed peak capacity of 6000 passengers per hour per direction.

Current capacity would move 17% of arena attendees per hour. Based on a survey done by NHL Seattle, the initial demand expected is 21% of hockey fans using the Monorail. Our goal would be to move arena attendees in less than an hour after an event. With the proposed upgrades to 6000 per hour, we could carry 35% of attendees an hour after an event.

Today’s ridership is approximately 2,000,000 riders annually, and a 50% increase in ridership is expected when the Arena reopens and if the Seattle Center Station is upgraded. This would equate to 1,000,000 additional riders bringing the total to 3,000,000 annually.

Current conditions notwithstanding, Seattle Center consistently attracts large flows of daily visitors year-round for a variety of daytime and evening cultural attractions, recreation, and open space use. The constraints on capacity become most overwhelming during large spectator events, such as during the annual New Year’s Eve celebration at Seattle Center when the limitations on pedestrian flows at the station create long wait times for patrons eager to use public transit.

Consistent with that experience, we anticipate the largest demand increases to align with event-related surges, when large crowds combine with the typical daily visitor and employee flows to Seattle Center. As evidenced in the 2017 Uptown/Seattle Center Strategic Parking Study, festivals and large spectator events at Seattle Center predictably overwhelm the existing parking supply and cause heavy traffic congestion impacts in the neighboring communities, creating a desire for alternatives to driving, primarily transit. The Seattle Center Arena Renovation Project Final Environmental Impact Statement (Arena EIS) conservatively predicted that without interventions, as few as 8% of Arena patrons would ride transit to events in the first
year of operations. More recent and targeted analysis and data, however, point to a significantly higher demand for transit among future Arena patrons:

- NHL Seattle fan surveys indicate that by opening day in 2021, transit ridership will be in the range of 20% of fans, a larger transit mode share than any other Seattle sports teams except UW football. Fan survey data recently published by The Athletic Media Company recently corroborated those figures, with 23% of respondents saying they plan to use light rail and Monorail in 2021. For reference 23% of a full Arena is between 3,500-3,800 people, depending on event configuration.
- Between 2021 and 2024, that share is likely to increase as more communities gain access to regional transit. Planned light rail expansion will put almost two-thirds of NHL Seattle’s 32,000 season ticket deposit-holders in the Puget Sound Region within a one-hour transit ride of the Arena by the year 2024.
- NHL Seattle estimates that of attendees who drive, approximately 1,500 people per game will choose to purchase parking downtown at $5-10 per event (compared to $50-$70 per event to park in Uptown). This arrangement will mitigate event congestion in Uptown and increase demand on the Monorail as a last-mile solution.
- NHL Seattle is committed to investing in programmatic and technology improvements, including an app, social and digital communication, Monorail customer service experiences and subsidized transit rides for home games, to increase the incentive to use transit.
- Transit is a critical part of the plan to extend Arena access more equitably. NHL Seattle will offer an affordably-priced ticket tier and by subsidizing a door-to-door transit ride coupled with these affordable tickets, NHL Seattle can put the all-in cost of sports and cultural experiences within reach of working fans and families throughout the region.

As stated in the Arena EIS, improvements to the Monorail ingress and egress have the potential to reduce boarding delays and make the Monorail a more attractive option for first/last mile connections, “thereby mitigating some of the traffic congestion impacts caused by private autos and ride hailing.”

For most transit systems commute trips represent peak demand. While the Monorail is an important transit component for many commuters, its peak ridership periods are driven by events – to which most attendees come from within the region.

Other Seattle Center Visitors and Commuter Ridership

Data are not available to precisely determine how many Monorail riders are tourists versus commuters, however, the following is relevant information.

The mode share benefits will extend far beyond Arena sports and entertainment fans to serve relatively low-wage service employees working at the Arena and other Seattle Center venues and other Seattle Center visitors including patrons attending the many free and subsidized cultural events produced year-round at Seattle Center. These open and accessible events include the 23-event annual Festál cultural festival series, Winterfest, Folklife, the Pride Festival, the Seafair Torchlight Parade, the Women’s March, and Bite of Seattle.

The City of Seattle and Gates Foundation have CTR programs, and although currently there is no CTR for the entire Seattle Center campus that could provide detailed data for its 30+ resident organizations, there is significant use by those employees, and by students and staff of the Seattle Public Schools Center School in the Armory. Use is expected to increase as Sound
Transit service to Westlake expands. The Economic Impact Study of Seattle Center in King County (2016) led concluded that business activity at Seattle Center conducted by City of Seattle, and for-profit and non-profit businesses directly employed about 7,450 employees annually.

Seattle Monorail Services reports that prior to the Monorail being added to the ORCA system, approximately 420 weekday commuters were counted using data from passes only among riders from the Gates Foundation, Center School, Seattle Center staff, campus resident organizations, and Uptown and Downtown commuters. Other commuters who did not hold passes may have purchased tickets.

It is projected the Arena will have about 1,000 or so part-time employees for all major events and another 100 or so regular building maintenance arena staff in the building every day.

The Economic Impact Study also reported that Seattle Center is a major regional destination, with about 42% of visitors coming from King County, 14% from other areas of Washington and 44% from out of state.

**Reducing Area Street Congestion**

Doubling Monorail peak capacity is key to offering Seattle Center visitors transit options that are potentially faster and cheaper than driving and parking, particularly during peak crowd events. This will directly increase transit use and decrease area street congestion.

Peak demand events will greatly increase with more than 150 annual Arena events with capacity between 17,000-19,000, depending on the event. Post event, attendees will attempt to leave the Arena over a very short period of time creating street congestion and spiked transit demand.

Seattle Center is surrounded by South Lake Union, Downtown, and Belltown which have grown significantly during the last decade. As a result, main arterials, including routes connecting Seattle Center to the downtown core and I-5, are often clogged with commuter traffic during peak travel times.

Curb space near Seattle Center is extremely limited while demand for ride hailing services is great. Moving patrons downtown via the Monorail to catch rides will both benefit those riders while reducing Seattle Center area congestion.

Parking prices may be raised to premium rates during major events. The time to exit garages may frequently exceed 20 minutes and even 45 minutes. This coupled with long travel times to I5 and Downtown create disincentives for driving and incentivize transit use.

Increasing Monorail capacity will provide a fast, efficient boarding and when coupled with the 90-second trip to Westlake to expanded regional light rail and bus connections it will make transit a much more appealing transportation alternative to driving reducing congestion particularly during peak events at Seattle Center.

Arena attendees post event demand for transportation, together with event promotion of transit use, will heavily utilize the addition Monorail transit capacity. Further, the capacity improvements will serve to make transit use a comparatively more attractive choice verses other
modes because the fast Monorail connection will provide immediate and convenient access to the expanding regional transit network, offering a seamless experience.

**Question #2:** Are there any other current barriers for increasing ridership capacity on the system beyond those described in the project scope, such as available vehicles or track maintenance needs?

**Answer #2:**

The stations constrain the capacity more significantly than other aspects of the system. The Monorail trains can carry over 400 people based on weight, but in practicality, a very full train is typically around 375 people. A trip from one station to the other is about 90 seconds, but the with the current configuration, the load and unload time can take 3 or more minutes. Therefore, creating a 5.5-minute cycle time. If the load/unload time is decreased through station improvements, the number of trips that can be accommodated during an hour increase. The study showed that with the proposed station improvements, optimal passenger load is 250 with a dwell time of 60 seconds. This shows that the trains have more than sufficient capacity and speed, with the greatest gains coming from making the boarding process more efficient. Station improvements to reduce the dwell time at Westlake Center are being done through $6.6 million private investment and is already underway. The work needed at Seattle Center is necessary to fully optimize the efficiency of the system.


> The best value for investment will be achieved by maximizing capacity within the constraints of the current guideway alignment, train cars, and platform locations. Within these constraints, there is still room for a significant capacity increase. The proposed operational scenario moves 6,000 people per hour, per direction, a doubling of the current capacity. This is achieved by moving 250 people per train at 2.5-minute headways. Each train takes 90 seconds to travel between stations and spends 60 seconds at the platform. This goal can be achieved by the following operational practices, supported by improvements to vertical circulation, platform capacity, and passenger flow at both stations:

- The time the train spends at the station platform is known as ‘dwell time’. The dwell is set at 60 seconds which will allow all riders to get off the train and most passengers waiting on the platform to board. This time is rigidly set to maintain consistent headways. See Appendix E for calculations on how a one-minute dwell time maximizes system throughput.

- Although the functional maximum capacity of the trains is over 300, the operations goal is set at 250 passengers per train. This is because the boarding rate decreases as the train nears maximum capacity.

- A 250-passenger train load is achievable in 60 second dwell times and helps maintain operational efficiency, reliability, and passenger comfort.

Short and consistent headways assure riders that the next train is not far away. The outreach survey results indicated that shorter wait times for trains was a very popular choice for improving the Monorail, (Appendix C).
With operational procedures common to mass transit systems, such as synchronized train operations, the system can operate at maximum efficiency even within the constraints of the narrow guideway beam offset and single platform at Westlake. The security sweep by the train driver will happen simultaneously with the passenger alighting and boarding during the 60-second dwell time. Operations practices, rather than rebuilding the guideway and Westlake platform, is the more cost-effective solution to reach the capacity goals. Synchronized train operations can ensure that neither train is required to wait to enter Westlake platform.

Question #3: The funding application states that $400,000 will be funded using farebox revenues. Can you provide documentation of the farebox revenue, or of past years’ annual farebox revenue?

Answer #3:

To fulfill the goal of keeping the Monorail running indefinitely, the Concession Agreement between the City of Seattle and Seattle Monorail Services stipulates that 7.5% of farebox revenue be automatically set aside for capital investment and be the source for local matching funds. Annual contributions for this purpose have averaged $327,000 per year for the five years between 2015-2019. The FTA formula funds available to the Monorail have been approximately $1,000,000 per year, which requires matching of $250,000. Since this project is proposing to use $800,000 of 5307 and 5337 formula funds, the $200,000 match needed for that is already programmed for the next five years. The additional $200,000 would come from remaining fare box revenue reserved for capital projects that is not currently assigned to match a grant.