Keep Those Buses Moving, Safely!

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Paper prepared for the session RS.7 - Road Safety in Construction and Temporary Work Zones
2025 Transportation Association of Canada (TAC) Conference & Exhibition
Québec City, Québec

Acknowledgements

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Abstract

Large scale construction projects can often create major traffic impacts, and in Vancouver, BC, the Broadway Subway Project (BSP) has been no exception. Five new stations are being built along Broadway, a major throughfare that is also used by Canada's busiest bus route, the 99 B-Line. This express bus route saw 17.791 million annual boardings in 2019, and a portion of its route would be replaced by the BSP SkyTrain extension.

To facilitate construction of this extension, seven blocks at key intersections along Broadway were excavated to depths of 60ft and were covered with temporary traffic decks that allowed street operations to continue. However, even with the decks, the needs of adjacent construction meant narrower conditions for wide city buses. It was not long before CMBC (TransLink's bus operating company) started receiving reports of bus damage and other operational concerns.

To address this emerging problem, a working group was formed, consisting of representatives from TransLink, CMBC, The City of Vancouver, Province (project owner), and ProjectCo (project contractor). The group prioritized three key objectives:

1. Improve Overall Safety (for both the Contractor and bus operator)
2. Increase Bus Reliability, and
3. Reduce Bus Damage.

To achieve these objectives, the group took a multi-faceted approach:

- **Ride Alongs** - the group would board a 60ft articulated bus and travel through the Broadway corridor, keenly observing any dangers, risks, or obstacles along the way. Any observed issues were actioned and promptly resolved.
- **Open Houses** – the working group would attend Open Houses at the bus depot, welcoming operators on their shift with coffee and treats, to help create dialogue about the project.
- **Incident Report Code** – a dedicated CIR code for operators to use on any BSP-related issues on Broadway Corridor
- **Opportunity Improvement Tracker** – a list of all issues and concerns raised, along with resolution action for project team to see that work is being done to address issues being raised.
- **BSP Notice Board** - at the bus depot, CMBC established a BSP Notice Board where supervisors would post upcoming traffic changes on Broadway or issue updates on action take to address concerns raised. This notice board significantly improved bus operators' interest and engagement on the project.

These approaches resulted in a significant reduction in reportable damage to buses and construction equipment and related traffic delay. They also resulted in a more trusting and effective relationship between the many stakeholders. Join us as we explore in detail the methods used, the results achieved, and the lessons learned along the way.

Broadway Subway Project

The Broadway Subway Project is a 5.7 km extension of the Millennium Line, from VCC-Clark Station to Broadway and Arbutus. It will provide fast, frequent and convenient SkyTrain service to B.C.'s second largest jobs centre, world-class health services, an emerging innovation and research hub, and growing residential communities.

- 700 metres is elevated, extending from VCC-Clark Station to a tunnel portal near Great Northern Way.
- Five kilometres is tunneled below the Broadway Corridor from Great Northern Way to Arbutus Street.
- Six underground stations will connect communities and the region, including a direct underground connection to the Canada Line at Cambie Street.
- The 99 B-Line bus service will connect from Arbutus Street to the University of British Columbia[1].

The project commenced in 2021 and is slated to finish in 2027. The construction work along Broadway consisted of seven blocks of excavations at key intersections, with hundreds of thousands of interactions between vehicles traveling along Broadway, vehicles crossing Broadway, and pedestrians along the entire corridor (Figure 1).

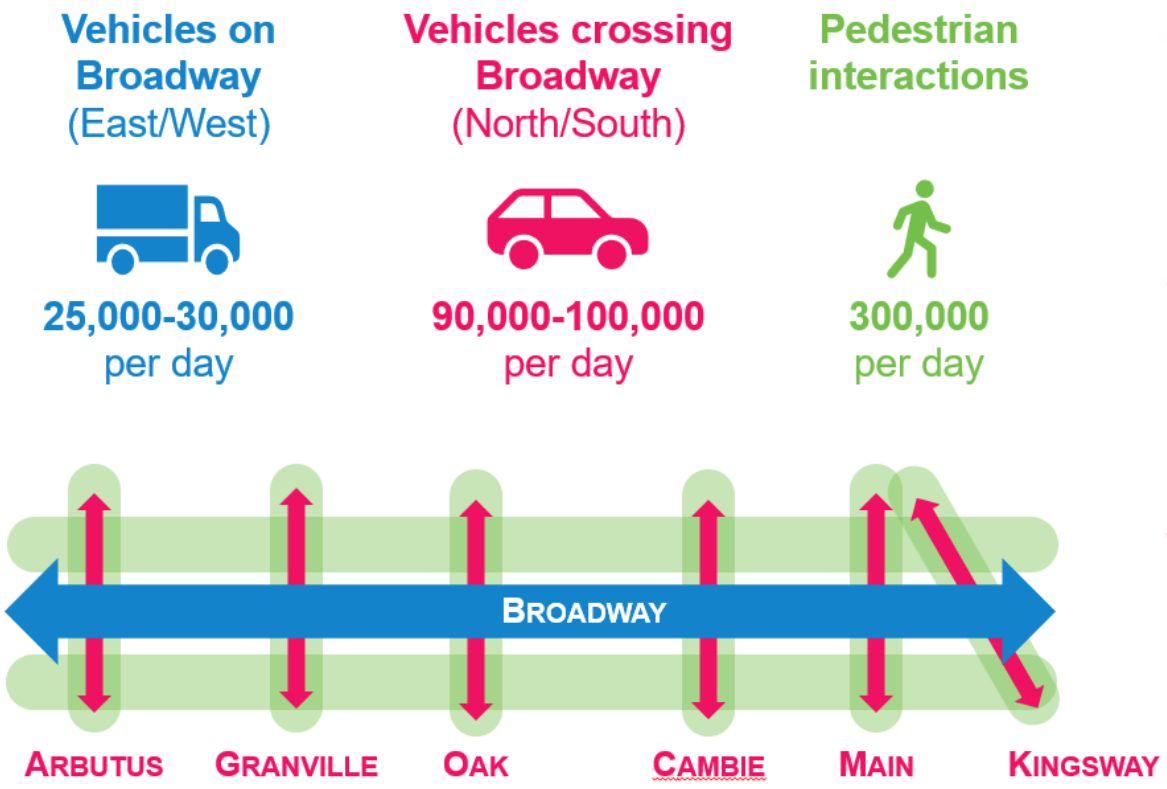


Figure 1. Estimated traffic volumes along the Broadway corridor.

Partner Relationships

The effort to support construction of Broadway Subway Project consists of contributions from eight (8) major organizations:

Transportation Investment Corporation (TI Corp) / "Province": On behalf of BC's Ministry of Transportation and Infrastructure, leads the delivery of project and lead entity in working with key stakeholders such as TransLink and City of Vancouver to ensure their needs are met.

Broadway Subway Constructors General Partnership (BSCGP) / "Project Co": Responsible for design and construction of the project. A Project Agreement (PA) exists between the Province and Project Co to define specifications for the project, and includes elements to ensure the interests of all the partners are protected.

City of Vancouver / "City": Supporting design of station plazas, streetscapes, and Broadway alignment. City also has vested interest to support community stakeholders, and is actively providing support on traffic management and traffic signal modifications

TransLink: Ultimate owner and operator, responsible for coordinating the support and integration of all operating entities.

Coast Mountain Bus Company (CMBC) / Bus Operations: Adapting bus routes to construction conditions and preparing for a new bus loop at Arbutus Station.

Metro Vancouver Transit Police (MVTP) / "Transit Police": Gearing up for two (2) new MVTP Hub Offices. During construction, Transit Police has also performed traffic enforcement duties along Broadway to help keep the bus lanes free of unauthorized vehicles.

British Columbia Rapid Transit Company (BCRTC) / "SkyTrain": Providing support with Systems Integration, Testing & Commissioning, and gearing up for Opening Day.

Canada Line: Responsible for supporting BSP construction adjacent to their active station, and also supporting Systems Integration at Broadway-City Hall Station.

Each of these partners has a dedicated communication channel as shown in Figure 2 below. BCRTC and Canada Line are shown as key partners, but greyed out because they were not a key partner in supporting bus operations at street level.

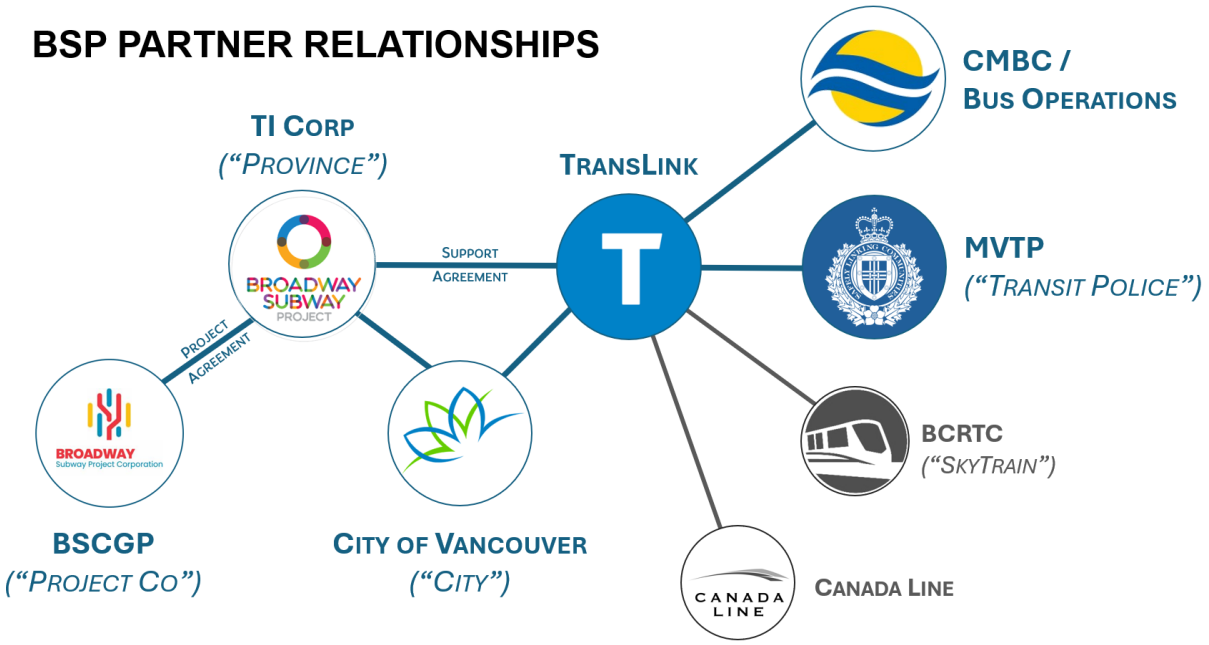


Figure 2. BSP Partner Relationships

Construction on Broadway

An innovative solution to constructing underground stations along the region's busiest corridor is the use of traffic decks. Project Co had excavated a total of seven (7) blocks along Broadway, five (5) for stations and two (2) for rail crossovers. These traffic decks allowed for four lanes of vehicle travel along Broadway, while Project Co continued to excavate and build station platforms 60 ft. beneath.

Despite being designed for four travel lanes, the dense nature of metropolitan Vancouver and constrained geometry at each construction site, one or two traffic lanes had to be used to support material deliveries, equipment lifts, or cement pours. These changing conditions proved challenging for bus operations because the additional traffic signage and portable barriers created hazards for the buses traveling by.

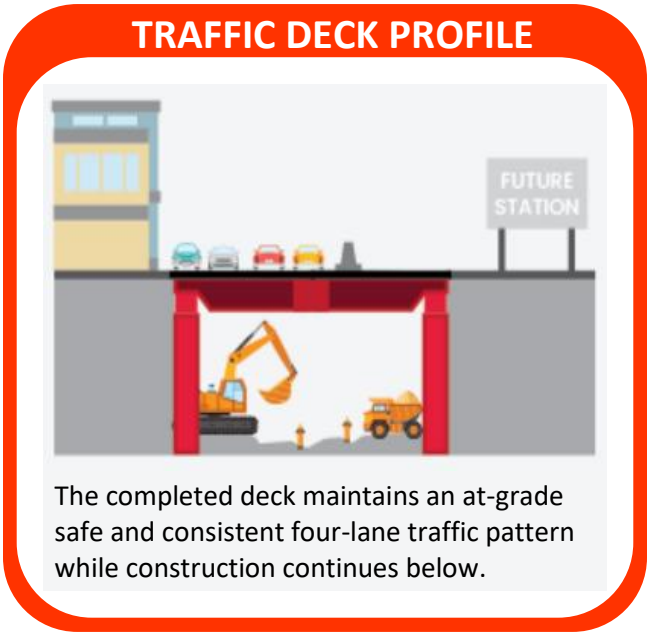


Figure 3. Traffic Deck Profile

Bus Operations on Broadway

In the early stages of planning for BSP, the Province, TransLink, and CMBC all worked to develop solutions for affected bus routes along the Broadway corridor. BSP required for trolley wires along the corridor to be de-energized, and as a result, three (3) bus routes had to be re-routed (Figure4) to ensure they can maintain their preferred trolley operation. Two (2) bus routes remained on Broadway – bus routes # 009 and 099.

99 B-Line

The 99 B-Line is one of Vancouver's most recognized bus routes and is one of North America's busiest bus routes, serving over 11 million passengers in 2023. This express route with select stops at key intersection would continue to operate along Broadway during construction of BSP. TransLink and CMBC worked with the Province to ensure all efforts are made to protected its ridership, so the future transition to a fully operational subway would be justified. The 99 B-Line is also served by 60-foot articulating buses that can be more challenging to maneuver than standard 40-foot buses.

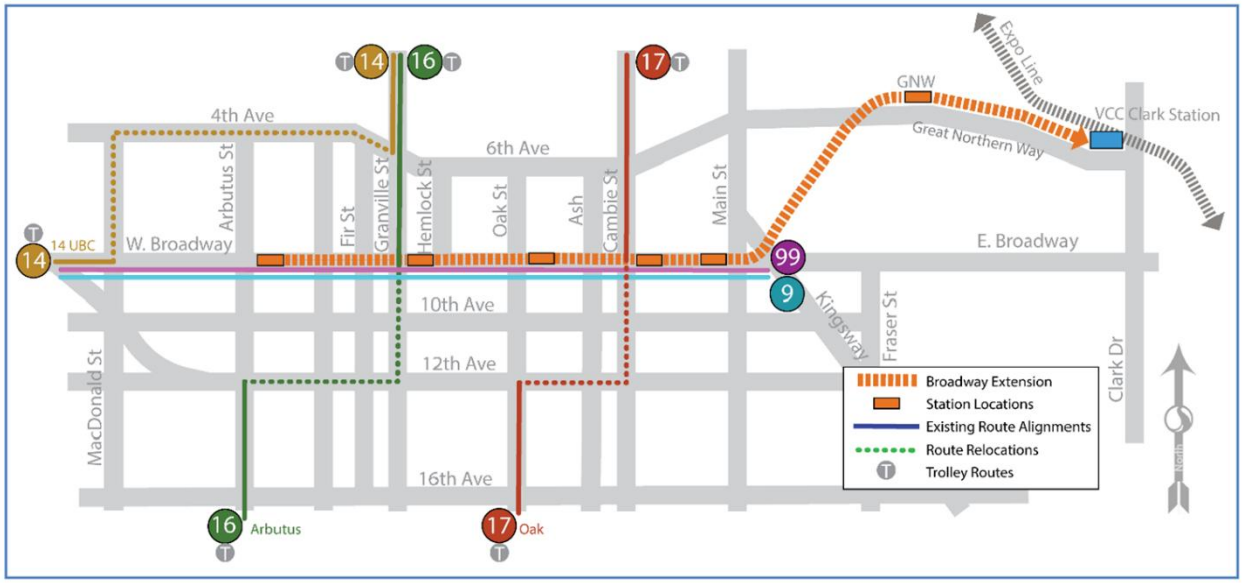


Figure 4. CMBC Bus Routes impacted by BSP Construction

Key Objectives

With increased levels of construction activity on a busy commercial corridor, paired with highly coveted bus routes, it was vital for the project team to explore solutions and implement strategies that would allow for construction to continue while addressing any operational challenges faced by bus operations. The project team implemented a variety of solutions that would prioritize three key objectives:

1. Improve Overall Safety (for both the Contractor and bus operator)
2. Increase Bus Reliability, and
3. Reduce Bus Damage.

Our Approach

The project partners held weekly meetings early in the project to communicate traffic changes along Broadway. Despite the meetings, there are increasing number of reports of preventable incidents in the first year of the project. The team then started exploring new solutions, and implemented a variety of efforts as described below:

Ride Alongs

One of the earliest solutions implemented were organized bus rides along the Broadway corridor. The project partners would board a 60 foot bus and travel along the Broadway corridor in both directions, observing for any new hazards, risks, dangers, and such. The choice for the 60 foot bus is to replicate conditions that the 99 B-Line bus operators would experience. These bus rides were termed “Ride Alongs” and proved to be very effective means for the entire project team to see first-hand examples of issues that could compromise level of bus service quality to customers. The team committed to a quarterly schedule of the Ride Alongs, and after each drive the team identified about a dozen issues that were actioned and resolved.

The Ride Alongs were an effective targeted effort to resolve physical hazards on the Broadway corridor. Over time, the Ride Alongs also proved to be an effective means to build relationships among the partners. They were opportunities for face to face discussions, that allowed different representatives to share experiences and broaden their understanding for each other’s priorities. This also proved to be a very effective, albeit intangible and unquantifiable, benefit to the relationship among partners.

Open Houses

Soon after hosting the first Ride Alongs, and after meaningful discussions between the Project team and bus operators, the collective team realized that many operators were not familiar with the BSP project. There was a clear opportunity to showcase the project, the innovative solutions used to minimize impact to the community, and of course the future improvements it would be bring to the region.

The team collectively agreed to host Open House events at the Burnaby Transit Centre (BTC). This transit centre was responsible for the 99 B-Line route and is where bus operators would begin their shift. The Open House was purposely scheduled in the early hours of the morning to catch the first operators taking the buses out of the depot for the daily shift.

The operators were met with coffee, snacks, and informative material on BSP (Figure 5). With keen interest, the operators participated with questions, comments, and even suggestions on what can be improved. To elevate their engagement, the Project team also brought prizes and held a draw for operators that submitted specific suggestions for improvement.

Figure 5. BTC Open House

Incident Report Code

With more bus operations team members included in BSP project efforts, a manager in the operations team suggested a dedicated Communication Incident Report (CIR) code be dedicated to incidents that are affiliated with BSP on the Broadway corridor. This created a more focused reporting system that could be actioned sooner than if it were reported under other codes.

The CIR system also had the capability to send automated e-mails with selected CIR codes to staff at TransLink. This feature was utilized on BSP, and TransLink's Sr. Project Manager was received BSP CIR's the day before the weekly meeting, which gave the team time to look into incidents and if needed bring them up to the attention of the BSP Project team.

Opportunity Improvement Tracker

As the collaboration between the Project team and bus operations was slowly growing, so were the number of issues actioned and resolved. The Project team then identified an opportunity to keep track of these incidents, and once resolved, showcase the actions that were taken to resolution.

These were presented on one-page templates and the document was called the Opportunity Improvement Tracker. Each item had identified an issue and was usually accompanied with suggested resolution (Figures 7 through 11). The issue was then brought to the Project team, discussed, and actioned accordingly. And the item was then updated with images of the completed solution.

These one-pagers proved to be very effective means to communicate the efforts taken to help improve bus operations along Broadway. They served as useful visual communication tools in variety of BSP related discussions and the BSP Notice Board as explained below.

BSP Notice Board

To further showcase efforts made to improve bus operations along the Broadway corridor, the operations team at BTC decided to create a notice board specifically for BSP related notices and alerts. The one-pagers developed under the Opportunity Improvement Tracker were posted here, along with any construction notices and traffic alerts issued by Project Co. This notice board (Figure 6) was conveniently located at the entry to BTC where all the 99 B-Line bus operators would enter, offering them the convenience to check for any new information pertaining to their shift.

Figure 6. BSP Notice Board

The Results

The methods described above were first implemented in late 2022, and with almost three years since implementation there were three key improvements noticed by bus operations:

1. **Reduced number of preventables** – CMBC has reported 34% reduction in preventables from 2022 to 2024 and 64% in cost savings on damaged vehicles over the same period. Understandably, there were many factors that lead to these improvements, some of which include a more stable and predictable construction pattern after the traffic decks were installed. But the efforts described in this paper, were also widely considered as attributing factors.
2. **Improved customer service** – with reduced incidents, there is always an improved level of customer service as the service is more reliable. There are no clear quantitative statistics to support this claim, but the evidence is in lack of negative comments on the performance of the bus routes affected by BSP.
3. **Increased participation from bus operators** – this is by far the most beneficial improvement to the project, as bus operators are the most effective resource to helping improve the Broadway corridor. Their constant presence and heightened level of engagement allowed for multiple issues to be actioned and resolved in a timely manner. The issues they brought forward avoided many hazardous situations that would otherwise have lead to injuries to customers or pedestrians, or damage to vehicles and assets.

These were just three areas where TransLink was able to identify, and to some extent quantity, their benefits and positive impacts. Undoubtedly there were far greater benefits to the larger community including other road users and those choosing active transportation. However, no data or evidence is available to clearly identify improvements they experienced.

Conclusion

On reflecting on the efforts made to develop processes and implement solutions, three key contributing factors stood out as vital to this story:

1. **Engaged team members** – the team members were highly engaged in understanding their role on the complicated project, and took the time to understand other team member's priorities and needs. This allowed for Project team members to continue to learn from each other, understand each other, and think ahead of ways to help each other. For example, the engagement of the Province in understanding TransLink and CMBC's needs, allowed the Province to add performance criteria into the Project Agreement between the Province and Project Co. And this criteria proved immensely beneficial in the time when action was being taken.
2. **Frequent communication** – frequent communication was vital to the success of this project. There were weekly meetings, but in addition the weekly meetings the project team established direct communication channels with each other, so as incidents came up, they were resolved in a timely manner. One example of this was TransLink's Sr. Project Manager receiving a text late on a Friday night from the BTC Union Representative that bus operators were experiencing a blinding light at one of the construction sites. The PM visited the site at night, found the offending flood lights, took photos to show the problem, sent them to the project team and in 24 hrs, the flood lights were repositioned to be less of a distraction to the operators.

3. **Trusting relationship** – with more engagement and frequent communication, a trusting relationship blossomed. The project team members could trust each other's concerns and issues raised. Not all issues were resolved as desired, but all issues were treated with respect and willingness to find a solution. This built a more trusting relationship and empowered each and every member of the team to have a voice and bring forward issues they thought were important. One example of a trusting relationship was when the bus operations team reported an issue that was known to the project team. Instead of responding to say it cannot be resolved, the project team gathered at the location of the site with the bus operations team to explore possible solutions. The team was not able to find a better solution than what was in place, and decided to keep it as is. They reported back that that issue was investigated again and any changes would lead to more severe negative consequences and that the best solution was status quo. Despite a solution not being implemented, the bus operations team appreciated the effort and knew their voice was heard.

Category: CUSTOMER SAFETY **REPORT # 2022-013**

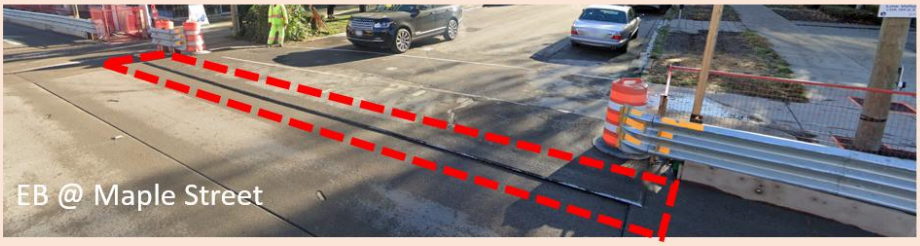
Description: East-bound # 099 buses at Main Street are not able to pull parallel to the curb, leaving a gap at rear doors. This creates a stepping hazard to TransLink customers getting on or off the bus.

Implemented Resolution: CMBC has swapped the EB stops so that # 099 is at NS Kingsway and # 009 is FS Main.

Figure 7. Report # 2022-013

Category: ROADSIDE HAZARD **REPORT # 2023-004**

Description: A steel plate was installed at Maple & Broadway, and the raised edge sticks out onto W Broadway by about a foot. CMBC operators need full width of the lane to travel safely and so would appreciate this plate be made flush with the road.



Implemented Resolution: Project Co re-graded the lip to smooth out the edge of the plate.

Figure 8. Report # 2023-004

Category: PEDESTRIAN SAFETY **REPORT # 2023-007**

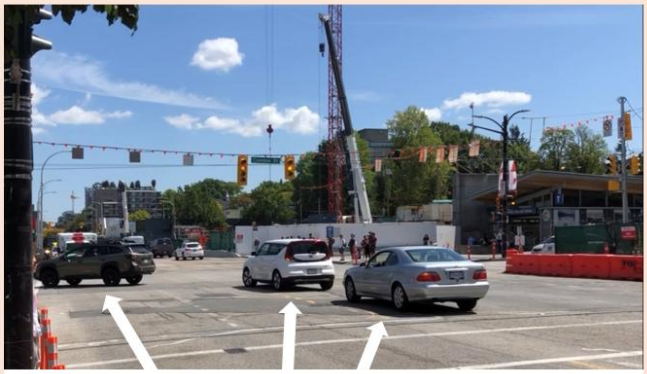
Description: The legs of the Windmaster traffic sign stand create a tripping hazard for customers walking to or from the # 099 bus. This issue was reported by a CMBC Operator directly to the BSP Project team.

Implemented Resolution: Project Co removed the Windmaster sign stand and relocated the "Bus Stop" and arrow signs to the hoarding wall.

Figure 9. Report # 2023-007

Category: BUS SPEED & RELIABILITY **REPORT # 2023-010**

Description: Advanced turn signal for EBLT vehicles on W Broadway at Cambie creates unnecessary congestion. Vehicles try to turn onto NB Cambie but can't because there is no room, blocking the WB Broadway travel lanes. Buses sometimes miss one or two green lights because of this.



Example: Advanced green turn signal allowed the 1st vehicle to move forward, blocking all WB traffic; ambulance missed the whole green light and 2 other turning vehicles are also stuck in intersection.

Implemented Resolution: Project Co reprogrammed signal lights at 4 intersections to improve flow of WB and EB traffic on W Broadway.

Figure 10. Report # 2023-010

Category: ROADSIDE HAZARD **REPORT # 2023-013**

Description: 099 bus operators reported that the construction flood lights at Mount Pleasant Station, between Main St. and Quebec St., are shining bright onto Broadway, blinding the operators as they drive by.

Implemented Resolution: Redirect the flood lights to shine more down into the excavation and less into the street.

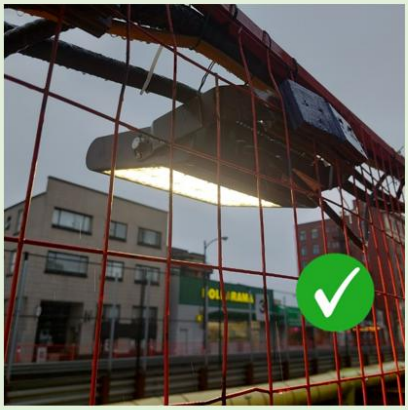


Figure 11. Report # 2023-013

References

[1] Broadway Subway Project, “Home,” accessed April 29, 2025, https://www.broadwaysubway.ca/