Portland's Chinatown Festival Streets

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Abstract. As part of the Old Town Chinatown Streetscape Improvements Project, the City of Portland last year completed construction of two festival streets: curbless streets each a block long, ordinarily open to traffic but designed to be closed to motor vehicles for special occasions and to then function like a beautiful public square. The streets are curbless, but are not truly "shared streets," since there is a dedicated sidewalk area separated from vehicle traffic. Since no one in Portland had built a festival street before, several elements presented challenges in design or construction or both.

INTRODUCTION

On September 29, 2006, dignitaries from the City of Portland, distinguished visitors from China and neighbors and merchants of Portland's Old Town Chinatown district gathered with Buddhist monks and lion dancers to dedicate the Old Town Chinatown Streetscape Improvements. This $5.4M renovation of Old Town Chinatown streets, planned and funded by the Portland Development Commission (PDC) and constructed by the Portland Office of Transportation (PDOT), was six years in the making, from concept to construction. The project reached out to diverse constituencies in the planning stage, published plan documents in both Chinese and English, and promoted support of area businesses and restaurants through eighteen months of construction disruption.

At the heart of the streetscape project are two Festival Streets -- curbless streets each a block long, ordinarily open to traffic but designed to be closed to motor vehicles for special occasions and to then function like a beautiful public square. On the weekend following the dedication ceremony, the first festival, "Under the Autumn Moon," was celebrated on the new streets and in the surrounding neighborhood. More than 35,000 people attended the two-day event.

Figure 1 – Davis Street before (l), and at the opening festival, "Under the Autumn Moon" (r)

The idea for the Festival Streets grew out of the streetscape planning process, when the community identified a lack of public space in the neighborhood. The notion of a curbless street was drawn from a feature of many other Chinatowns around the world, where vehicles,

pedestrians and street vendors share undifferentiated roadway space. The idea took strong hold in the community, and survived several iterations of cost-reductions to be included in the final plan, adopted by Portland City Council in September 2002.

Figure 2 – The Flanders Festival Street

The Portland Office of Transportation, which oversees Portland's streets, was a partner in the planning process from the start. In light of the goals of the project, both the City Engineer and the City Traffic Engineer agreed to the inclusion of unusual features in the public right-of-way. Since no one in Portland had built a festival street before, several of these elements presented challenges in design or construction or both. This paper summarizes a few of the most pressing challenges faced and some of the lessons learned.

OVERVIEW OF FESTIVAL STREET DESIGN

The two festival street bocks are very similar in design. Although they lie less than a thousand feet apart, their surroundings are a little different. The Davis Festival Street is fronted by existing buildings at the lot line with active uses at street level, while Flanders Festival Street shares its north side with a surface parking lot, and the south with a converted historic building that currently holds structured parking and a historic hotel building that is now a residence for people with mental illness. The area around the Flanders Festival Street is expected to undergo redevelopment, and it was hoped that the design of the festival street would be one catalyst.

The following describes the general design of a festival street. At either end of the street a pair of massive elevated granite planters, eight feet wide by thirty feet long, serves to announce the entrance to a special place. The outer ends of these planters have a boat-like prow topped by a crenellated plinth on which is perched a large "festival lantern" by sculptor Brian Goldbloom. With a mere twenty feet separating their rustic stone sides, the two planters create a gateway to the street. Before entering the festival street a motorist first crosses a gently-sloped threshold like a driveway, then must pass between these gateway planters.

Figure 3 – Approach to the Davis Festival Street

When it is not closed for a festival, the interior of the festival street cross-section functions like an ordinary street. There is a sidewalk area for pedestrians only, next to the buildings, and a roadway area with two travel lanes, one each direction, plus on-street parking on both sides. There are streetlights and special festival street bicycle racks. Although the functions of the space are familiar, the type and quality of materials and the attention to detail are those of a lovingly detailed public square. A further departure from a normal street pattern is that, instead of being separated by a curb, the sidewalk is separated from the parking lane by large black granite bollards at approximately eleven-foot intervals.

The curbless nature of the festival street was achieved by raising the roadway area to the same elevation as the sidewalk area; hence the driveway-like vehicular entrance at either end. In everyday use, these are not really shared streets: about the same portion of the cross-section of the right-of-way is allocated to pedestrians, parking and vehicle travel after construction of the Festival Streets as was before.

MATERIALS AND FINISHES

In keeping with the idea of a public square, some unusual and beautiful materials and finishes are used on the festival street, including granite imported from China. First, there are the pairs of massive granite planters at either end of the street, clad in golden granite and each planted with two Chinese windmill palm trees and assorted shrubs and groundcovers of Asian origin. Then, a very large rectangular border, eight feet wide, defines the central area of the street. This frame is made of golden granite pavers 16” square. The long sides of this frame lie in the sidewalk area, while the short sides cross the roadway. Within the frame lies the main central plaza, which is concrete that has been sawn with a “cushion” beveled cut into the appearance of 16” square pavers. Along each side of the festival street, adjacent to the building faces, runs a two-foot wide strip of black granite pavers, each 2” x 12”, laid in a basketweave pattern. Between the golden granite sidewalk and the sawn concrete roadway plaza lies a 30” wide bollard beam, studded every eleven feet or so with a black granite bollard, rough on the sides and polished on the top. At the ends of the festival street, in the sidewalk area of the intersecting street, the concrete finish

is scored into 24” squares. On each festival street there are four street lights with Chinatown red poles and four special festival street bike racks.

THE GRANITE PAVERS

The granite pavers are of three types. The black granite pavers, or building zone pavers, are 2” thick, as are the 16” square golden granite pavers in the sidewalk, called festival walkway pavers. These pavers are set in sand. The building zone pavers have a bush hammered finish, while the festival walkway pavers have a raked finish. The pavers in the roadway (festival traffic pavers) resemble the festival walkway pavers on the surface but are 6” thick. All the pavers were designed to be set butt-tight, with no joint. To avoid chipping, the stones were finished with a 1/8” chamfer at the edge.

Figure 4 – Installing the sandset festival walkway pavers

The section of the festival traffic pavers, intended to be subjected to vehicle loads, was designed based on the idea that a traffic pavement section should either be totally flexible or totally rigid, and should not mix flexible and rigid elements. It was decided to use a flexible system where the festival traffic pavers would be set on a bedding layer of 1/4" minus 10 gravel over 9" of 3/4" minus compacted rock. This section was accordingly installed on the Flanders Festival Street, which was the first to be constructed. During installation, the masonry subcontractor encountered problems with chipping and spalling during compaction. A field decision was made to saw a kerf about 1" deep in the tight joints after setting but before compacting. This seemed to significantly reduce further damage during compaction.

Then Flanders was opened to traffic to facilitate neighborhood circulation during construction of the Davis Festival Street, and within three weeks the festival traffic pavers that lay in the wheel path of traffic showed large spalled and chipped areas.

Figure 5 – Spalling of the festival traffic pavers

Dr. John Knapton, a civil/highway/structural engineer from the UK who specializes in the design and construction of highway pavements and pavement construction materials, was visiting Portland at the time to oversee a test installation of pavers for the Portland Mall project, and he was kind enough to examine the situation on the Flanders Festival Street. He suggested that the main problem was the installation over crushed rock, which allows for very small movements of the granite pavers, on the order of 0.3mm. The open joint created by the saw kerf was allowing small pebbles or particles to get down next to the pavers. As wheels passed over them and the pavers moved, these pebbles were creating spot loads. When the spot loads fell on shear planes, they led to fractures in the granite.

Dr. Knapton's recommendation for an alternate installation was to use a lean concrete base in place of the compacted rock, and a bedding sand layer of ASTM C33 coarse multi-grained sand in place of the 1/4" - 10 bedding layer previously specified. He also recommended using a 1/8" joint between the pavers, filled with the bedding sand, and sealing the sand joints with a heavy-duty joint sand stabilizer.

Figure 6 – Resetting the festival traffic pavers

The recommendation came in time to implement these changes for the Davis Festival Street installation. Silica sand from Unimin Corp. was used for the bedding. The biggest challenge was the 1/8" joint, since the design of the street was so carefully laid out on the 16" module. The joint was accomplished by sawing the outermost row of pavers on either side of the street. This meant the pavers in that row were no longer square, and also that the paver joints did not line up precisely with the sawcut joints of the central plaza. However, the new pavement section has stood the test of traffic, so there are no more broken pavers, and the misalignment is so minor as to go unnoticed by all but the sharpest eye. The pavers on Flanders Street were taken up and reset with the new pavement section.

BOLLARDS AND BOLLARD ATTACHMENT

Black granite bollards serve to separate the parking lane from the pedestrian sidewalks in the central area of the festival streets. The bollards were quarried and shaped in China. They are spaced to minimize interference with doors of parked vehicles, approximately 11' apart. Each bollard rises 30" above ground and is approximately 16" square. The tops of the bollards are intended by designer Lloyd Lindley to reflect the moon as water would, for the autumn moon festival, so they are polished to a mirror gloss, and this smooth finish spills over the edge of each bollard for two inches, below which the sides have a rough split face surface.

Figure 7 – The bollards are useful for more than just separating pedestrians and cars

The challenge presented by the bollards was to find a way to attach them that would minimize future maintenance costs. The bollards must resist being moved or damaged by cars nudging them during parking, so they need to be firmly anchored. The rough-hewn surface won't show minor chips or abrasions, but there was a concern about what would happen if the bollard were hit at a higher speed. In an early stage of the design, the bollards were to be embedded 22" into a reinforced concrete beam, 30" x 30" in section, running below grade. This attachment scheme was discarded on the grounds that if the bollard were hit hard enough, the force would either shatter the granite, break up the concrete beam, or both. Replacing a bollard under these conditions would be expensive and difficult – or even impossible.

The City's structural engineer, Steve Yates, suggested developing an attachment system that would allow a bollard to move or overturn with sufficient force, instead of shattering. He suggested investigating a magnetic assembly. Staff then worked with Pacific Cascade Parking Equipment Corporation to develop a prototype magnet assembly for testing with a test bollard. The magnet assembly, a little more than 13" square and 2" thick, incorporated 48 neodymium magnets, each 1" x 2" x ½" in size, attached and epoxied to a series of steel pole plates welded to a stainless steel back plate. The prototype magnet assembly was bolted to the bottom of a test bollard, and delivered to a testing lab, PSI Inc., where the bollard was successfully detached from a steel base plate by a static lateral load approximately equivalent to a heavy vehicle decelerating at 10 mph, applied at the top of the bollard. The decision was made to proceed with a magnetic attachment system.

The final design called for the granite bollards to be finished with a recess in the base to house the magnet assembly. The assembly protrudes ¼" from the base of the bollard. A 14" square galvanized steel base plate, with four Nelson studs welded to its underside, is embedded flush in the reinforced concrete bollard beam. The magnet assembly is placed into the recess in the bottom of the bollard, where it is attached with four bolts set in epoxy in pre-drilled holes.

Figure 8 – Bollard beam with base plates (l); installation of a bollard (r)

Installation of the bollards was accomplished using a small rolling hoist. A bollard was lifted in slings and lowered onto the steel base plate, where it instantly adhered. Bollards needing adjustment in their placement could be levered with a crow bar while still in the slings, just enough to break the bond so they could be straightened. Although the bollards were not intended to be removable, they could be removed if necessary using this technique.

Since the bollards were installed and the street was opened to traffic, there have been two separate incidents in which a bollard has been knocked over. In each case, the bollard has been undamaged and has been restored to its upright position without incident.

Figure 9 – Bollard down

There was some concern that black granite bollards, only 30" tall, would not be visible enough to motorists attempting to parallel park. However, to date there have been no claims against the City for damage to vehicles from the bollards, and no evidence of damage such as chipping or scraping to any of the bollards.

ACCESSIBILITY

Both festival streets have minimal grade changes throughout. This is in part because of the very flat nature of this district, and in part due the extension of the curb into the parking lane at each cross street, resulting in long, gentle transitions for the driveway approach and curb ramps to the festival streets. The level nature of the streets makes them very easy to navigate in a wheelchair. In fact, on the festival streets, because there are no curbs, a pedestrian using a mobility device has the same opportunity as other pedestrians have on most streets: to cross anywhere they desire (although in Portland, it is a violation of City code to cross outside of the crosswalk).

Although pavers are featured throughout the streetscape project, it is only on the festival street that they are used in the 'through pedestrian zone' of the sidewalk. Because the pavers are set tightly, without a joint, the ride over the pavers is smooth, provided they remain flush and level. One accessibility concern was how well the setting of these granite pavers would hold up over time. In one location on the Davis Festival Street the pavers settled after setting, and the contractor repaired this section and re-compacted the base. The possibility remains that settling will cause unevenness in these pavers in the future.

The nature of the festival streets as something "out of the ordinary" raises the question of wayfinding for pedestrians who are blind or have impaired vision. There are two specific areas where the design team gave considerable thought to these questions. The first was the question of what information to provide at the four places on each festival street where the new design replaced what were originally street corners with a level continuous sidewalk that nevertheless crosses a public vehicular way. The second was what information to provide where the new design replaced what was a continuous curb along the street with a flush surface dotted with vertical bollards eleven feet apart.

In the first case, while there are curb ramps to cross the intersecting street, and the initial design called for detectable warning at these ramps, there are no ramps to cross the festival street itself, because the sidewalk simply continues on the level across the intersection. In the initial design, no detectable warning was called for here. However, after much consideration and discussion, with additional guidance regarding blended transitions provided by the new draft Guidelines for Accessible Public Rights-of-Way issued by the Access Board in November 2005, and with the streets already under construction, the design team concluded that it be prudent to include detectable warning across this line of travel.

The trick was to fit the Cast-IN-Tact detectable warning panels, which are nominally 24" square, into the carefully plotted ashlar pattern of sidewalk scoring that Lloyd Lindley had laid out for this area. In the end, the Lindley went back to the drawing board and substituted a 2' square scoring pattern so that the detectable warning panels fit right in. (At least, they fit right in after the contractor realized that the panels are actually about 3/8" less than 24" on a side, and adjusted the scoring in the field to match the panels, since the panels can't be adjusted to match the scoring.)

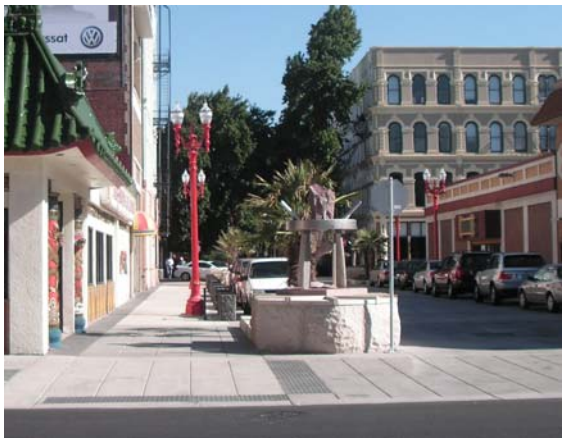

Figure 10 – Detectable warning panels across the sidewalk and on the wide curb ramp

The revised concept for the detectable warning, then, was to create a giant figure "L" of warning panels so that it would be impossible to pass into a vehicle travel lane without crossing the warning. This L extends about twelve feet north-south and fourteen or more feet east-west. With the cost of detectable warning panels, installed, at $45/square foot, this meant a $14,400 change order, which was approved.

The second question was whether to provide some kind of wayfinding information where the new design replaced the curb along the festival street with a flush surface. For a person with unimpaired vision, the change of materials from granite pavers to a concrete bollard beam studded with black granite bollards to the sawcut concrete squares of the roadway plaza area all provided definitive clues to the separation between pedestrian and vehicular areas.

As the construction documents neared completion, the issue was raised of whether a detectable element should be placed somehow along the line of bollards, to provide information to blind pedestrians in lieu of a curb. The new draft Guidelines for Accessible Public Rights-of-Way

issued November 2005 don't discuss the need for detectable warning or a separation when the pedestrian access route is parallel to a vehicular way (and neither do the new ABA-ADA Guidelines, although the old ADAAG required 36" of detectable warning if there wasn't some other kind of separation).

One consideration was that at the back of the sidewalk there would be a continuous shoreline along the block, made by the building faces where there are buildings and by a raised curb where there is a parking lot. Where there is the granite planter, at each end of the festival street, there is a shoreline on both sides of the walk area for about 30 feet; then comes the midblock section, about 140' long, with the intermittent presence of bollards. Four factors weighed against adding detectable warning to the existing contract: no requirement to install them; a lack of clear guidance as to the necessary width of panel for detectability along the path of travel; cost; and the likelihood of parked cars preventing someone from wandering into the street. The decision was made not to install detectable warning along the bollard beam.

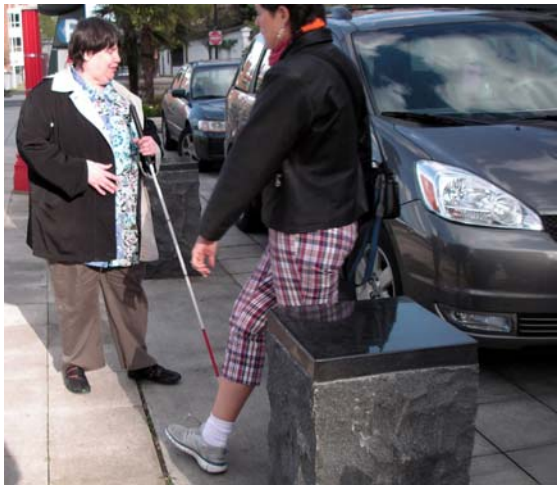

Figure 11 – Kae Madera (l) and Carolyn Bryant test the detectability of bollards

On April 10, 2007, Patricia Kepler and Kae Madera of Guide Dog Users of Oregon and Carolyn Bryant of the Oregon Commission for the Blind visited the festival streets with this author to assess their challenges for blind pedestrians. There were some interesting observations. For example, at the back of the sidewalk along the intersecting street, the detectable warning panels across the sidewalk stop just short of extending the entire width, in order to fit within the designed scoring. However, it was possible to pass through this gap without detecting the detectable warning. Also, Patricia's guide dog was not sure where to stop before crossing the intersecting street. And on the festival street sidewalk, it did seem it might be possible for a blind person to veer into the street without detecting material change, bollard, parked car, or other obstacle, especially guided by an inexperienced dog. Additional visits and observations remain to be undertaken.

OTHER CHALLENGES

On a typical street with curbs and sidewalks there is a conventional location for most street furniture. For the festivals streets it was necessary to choose where to locate and how to protect

such ordinary elements as streetlights, parking pay stations, bike racks, and stop signs. Except for the stop signs, these elements all ended up located so that bollards protect them from vehicles.

Figure 12 – Festival bike rack and street light pole protected by bollards

There was also the question of just how to close the streets for a festival. The City Traffic Engineer approved a traffic control plan that placed the closures between the stone planters, with large signs reading 'Street Closed to Motor Vehicles.' Some time was then spent on a design for pairs of removable stainless steel gates at those locations on which to mount the signs. However, the gates would have been expensive and there was a concern that, if they were ever damaged, there would be no source of funding for repair or replacement. It was decided for the first festival to mount the signs on silver pedestrian channelizing barricades.

Figure 13 – A moveable street closure turned out to work very well

In the end, this inexpensive solution proved flexible and well suited to the changing conditions of a festival. The closure was easily moved from between the stone planters during non-event hours, when a car might be most likely to mistakenly enter the street, to curbside during the event when more space was needed to accommodate pedestrian flow into the festival street.

Electricity is supplied to the festival streets for use during a festival. This presented several challenges. The service had to be metered, and a party identified to be responsible for the meter and to own the electrical system beyond the meter. A privately owned system under the public street requires an encroachment permit. A tamper-proof meter panel and four lockable, weatherproof stainless steel outlet boxes had to be specially commissioned.

Finally, because the elements on the street are not typical, mapping the assets and determining who will have responsibility for cleaning, landscape maintenance, and maintenance of the hardscape required discussion and in some cases special arrangements.

OBSERVATIONS ON OPERATION FOR PEDESTRIANS AND TRAFFIC

The two festival street blocks were chosen for transformation in part because their traffic function is solely for local circulation rather than through travel, and closing them to motor vehicles on occasion does not affect the arterial system. Traffic volumes on the two festival streets are low, less than 3000 vehicles per day on average both before and after the construction of the festival streets. The design of the festival street roadway, which must be entered in a vehicle via the narrow throat between the massive planters, is such that drivers tend to travel quite slowly, and are often observed to wait to exit when other vehicles are entering. The street works wonderfully for bicycles.

Although the City didn't intend to design for this behavior, many pedestrians appear to be comfortable crossing the festival street mid-block, even when the street is open to traffic. The low volume of vehicle travel means there are many gaps. Also, perhaps because the design successfully reads as a public square, a few visitors have been observed walking in the street, apparently oblivious to the possibility of car traffic, but there have been no reports of incidents related to this behavior. What this author has termed “the body language of the street” appears to be promoting a safe shared environment, but any pedestrian who prefers to stay on the sidewalk has an area to walk free of cars.

CONCLUSION

Portland’s Chinatown festival streets are an interesting experiment for the City in how to be responsive to public needs within the public right-of-way. Many aspects of the street are successful, and now there is a desire in some quarters to replicate this success on other projects and in other parts of the City. It would be prudent to resolve some of the remaining outstanding design and operation issues before allowing the Chinatown festival streets to stand as the model for future improvements, but the it appears that the concept of designing to use the right-of-way for more than moving cars has gained strong acceptance.

ACKNOWLEDGMENTS

Portland’s Chinatown Festival Streets are the work of many, many hands, but the following principals in their design and execution deserve acknowledgement here: Ben Ngan of Nevue Ngan Associates, and Lloyd D. Lindley, who conceived and designed the Festival Streets; Todd

Liles, who engineered the project and managed the construction contract for the Portland Office of Transportation; Bill Hoffman, who served as the original project manager for the Portland Office of Transportation; David Davies, who was the project manager for the Portland Development Commission through much of the design and construction; sculptor Brian Goldbloom; artist and designer Suenn Ho, who sustained the project's connection to the Asian community; and Louis Lee and Brian McCarl who chaired the Old Town Chinatown Streetscape Project Steering Committee. Thanks also to Carolyn Bryant of the Oregon Commission for the Blind and Patricia Kepler and Kae Madera of Guide Dog Users of Oregon for permission to report on their visit to the festival streets.

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