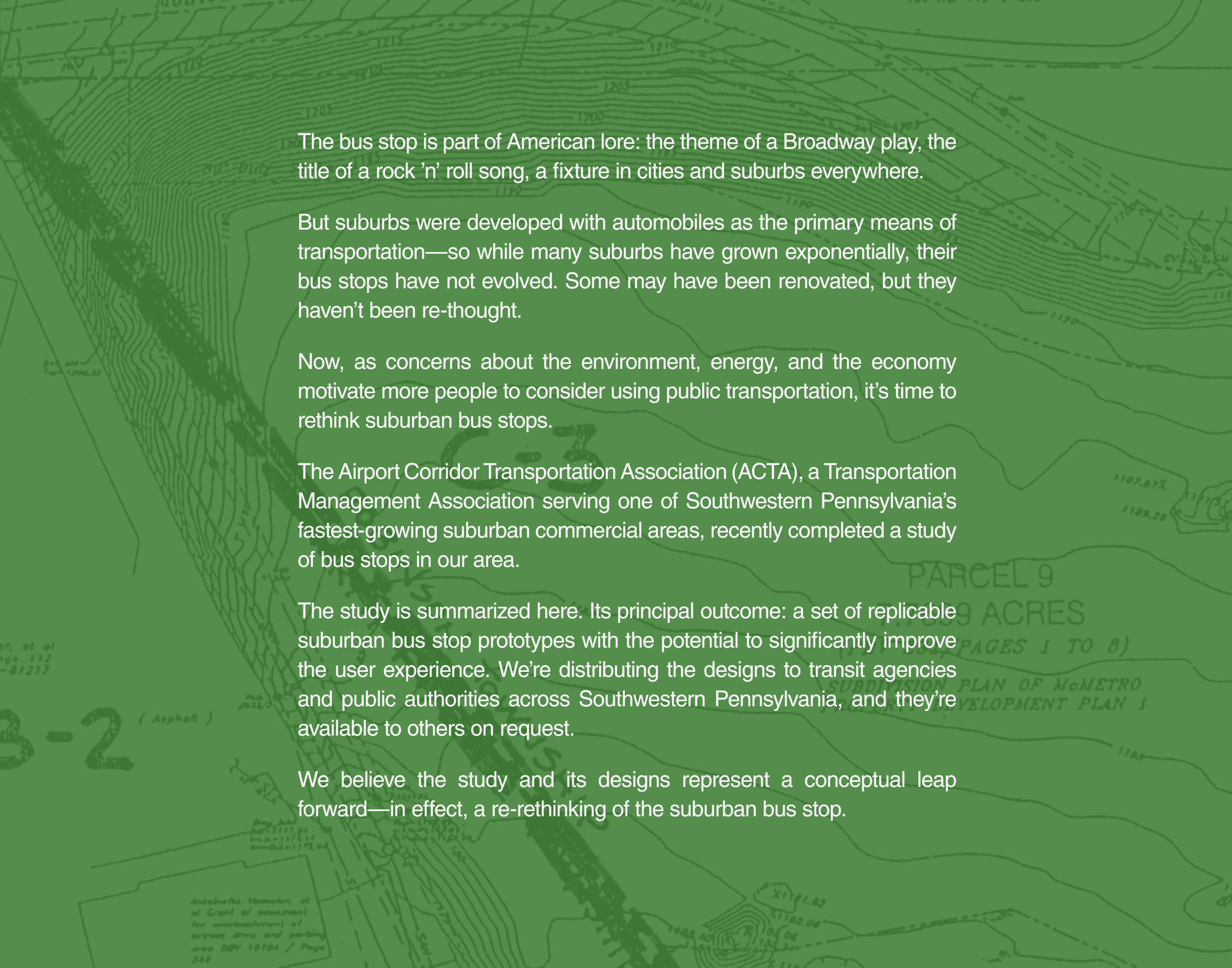


**RE|THINKING**  
**THE SUBURBAN BUS STOP**



The bus stop is part of American lore: the theme of a Broadway play, the title of a rock 'n' roll song, a fixture in cities and suburbs everywhere.

But suburbs were developed with automobiles as the primary means of transportation—so while many suburbs have grown exponentially, their bus stops have not evolved. Some may have been renovated, but they haven't been re-thought.

Now, as concerns about the environment, energy, and the economy motivate more people to consider using public transportation, it's time to rethink suburban bus stops.

The Airport Corridor Transportation Association (ACTA), a Transportation Management Association serving one of Southwestern Pennsylvania's fastest-growing suburban commercial areas, recently completed a study of bus stops in our area.

The study is summarized here. Its principal outcome: a set of replicable suburban bus stop prototypes with the potential to significantly improve the user experience. We're distributing the designs to transit agencies and public authorities across Southwestern Pennsylvania, and they're available to others on request.

We believe the study and its designs represent a conceptual leap forward—in effect, a re-rethinking of the suburban bus stop.



## MAJOR STEPS IN THE STUDY

**1 TAP LOCAL EXPERTISE** by forming a stakeholder committee comprising—for example—local government officials, accessibility experts, economic developers, and transit authority representatives.

*The committee members provided insight, information, and a useful combination of optimism and skepticism.*

*In addition to walking the study area and making specific recommendations for the prototype bus stops, they approved guiding principles—for example, that the designs would prioritize pedestrian safety in order to counteract the lack of pedestrian and transit user amenities in the project area. They also ensured that the designs would optimize accessibility for people with disabilities, and would provide necessary information for all users, including those with and without technology (such as cell phones with web access).*

**2 HIRE A CONSULTANT** with expertise in architecture, landscape architecture, and/or transportation engineering.

*We engaged Maynes Associates • Architects, LLC and as, subconsultant, Mackin Engineering Company.*

**3 GATHER INFORMATION** in multiple ways

*We inventoried the 38 bus stops in the study area, documenting factors including siting, accessibility, structure, features, and amenities.*

*We found many stops—even busy ones—with no shelters. There were few protected paths and sidewalks through vast parking lots or along busy area roadways, and, near the stops, crosswalks and pedestrian signals were sparse and inconsistent. Many stops were only 5 feet from the curbline—and fast-moving traffic. Others were sited along curving roadways with limited views for both motorists and riders waiting for buses. We noted a lack of accommodation and protections for people with physical and cognitive impairments. When shelters were present, they were attractive but small and with limited amenities—and they were all quite similar, with no adaptations to their different contexts and numbers of users.*

ACTA'S SERVICE AREA IN PITTSBURGH'S SOUTHWESTERN SUBURBS INCLUDES 4 TOWNSHIPS, 19 COMMERCIAL AREAS, 11 HOTELS, NUMEROUS OFFICE BUILDINGS AND AN OFFICE PARK, MULTIPLE ENTERTAINMENT VENUES, AND A MALL THAT EACH YEAR ATTRACTS SEVEN MILLION VISITORS.

*The Airport Corridor Transportation Association (ACTA) works in many ways to encourage the use of transit—for example, direct service through free shuttles for workers in our area; outreach; advocacy resulting in new public transit service; and public education.*



A WALKING TOUR OF A STUDY AREA IS A CRUCIAL STEP. UNDERSTANDING INTELLECTUALLY THAT—FOR EXAMPLE—PEOPLE WHO RIDE THE BUS HAVE TO WALK UP A STEEP HILL TO GET TO THEIR JOBSITES, OR CROSS A BUSY STREET TO GET TO THEIR BUS STOPS, IS ONE THING. BUT ACTUALLY WALKING UP THAT HILL OR DODGING TRAFFIC IN THAT STREET MAKES THE REALITIES CLEAR IN NEW AND USEFUL WAYS. AND WE DIDN'T ONLY WALK THE AREA; MANY OF US RODE BUSES AND SAT IN BUS SHELTERS IN GOOD AND BAD WEATHER. THAT EXPERIENTIAL LEARNING PRODUCES REAL-WORLD RESULTS.



# BACKGROUND



We surveyed bus riders in the study area. Among the findings:

- Most take the bus five days each week.
- Most drive to the bus stop.
- At the bus stop, people said these things made them feel uncomfortable:
  - Fast-moving traffic (53%)
  - Short distance between the stop and moving traffic (53%)
  - Other people waiting for the bus (18%)
  - People walking by (24%)
- 81% prefer to wait at bus stops with shelters—but they said shelters offer inadequate seating.
- They told us what bus stop features are important to them:

	Very Important	Neutral	Not Important
Bus schedules at the bus stop	70%	17%	13%
Information on when the next bus is coming	77%	16%	7%
Lighting	66%	24%	10%
An available seat	46%	26%	26%
Move the bus stop back from the road	25%	42%	33%

Funding for the study was provided through a grant from the Pennsylvania Department of Transportation, Bureau of Public Transportation.

We conducted a literature search.

Interestingly, we found that very little has been written specifically about suburban bus stops—which are quite different from their urban counterparts. However, there is literature about bus stops in general, and we reviewed it carefully, dividing it conceptually into five areas: personal and women’s safety; methods of conducting transit stop inventories; bus stop design guidelines; pedestrian roadway safety; and smart transportation.

We reviewed zoning ordinances for the three municipalities in the study area.

Our goals: to determine whether local regulations permit the construction of the kinds of prototype bus stops we were developing and to note any existing criteria for such structures. We found situations common in fast-growing suburban areas: regulations simply haven’t been able to keep up with development; early landowners or tenants are exempt from later, more restrictive standards; and local governments are often too stretched to focus on enforcement of zoning issues. As we worked with representatives of our local municipalities, we were all surprised to learn, for instance, that some well-used bus stops violated local zoning ordinances. Ultimately, regulations and field conditions need to be aligned—but that’s a long-term project.

Only after these backgrounding steps were we ready to proceed with **designing prototype bus stops...**

## RETHINKING

Our information-gathering made clear that there are several types of suburban stops, each common in suburban areas across the country:

1. The busy roadway bus stop
2. The suburban retail center bus stop
3. The hub station bus stop
4. The intermodal transfer center

We therefore decided to design four prototype bus stops, each aimed at heightening user safety and security.

While the designs were tailored to four specific sites in ACTA’s southwestern Pennsylvania service area, they were developed to be applicable, with site-specific adaptations, in similar suburban settings elsewhere.

Two important notes: (1) these designs represent a “retrofit”—an effort to improve the existing built environment, and (2) in the interests of efficiency and cost-effectiveness, the designs did not “reinvent the wheel”—the components of successful bus stops are well defined in the literature. The design challenge was to assemble the components in ways tailored for suburban contexts.

Draft designs were presented to the Stakeholder Committee for review, and modifications made accordingly.

ALMOST ANY RETROFIT IS CHALLENGING, AND BUS STOPS ARE NO EXCEPTION. IN SOME CASES, CONDITIONS IN THE STUDY AREA POSED ADDITIONAL CONSIDERATIONS:

- TOPOGRAPHY (SOUTHWESTERN PENNSYLVANIA IS HILLY)
- CLIMATE (FOUR SEASONS, WITH TEMPERATURE EXTREMES AND, OFTEN, PRECIPITATION)
- POOR SIGHT LINES (BECAUSE OF HILLS AND CURVING ROADS)
- HEAVY AND/OR FAST-MOVING VEHICULAR TRAFFIC
- NARROW, LIMITED, AND VARYING RIGHTS OF WAY
- NON-ACCESSIBILITY AND NON-ADA-COMPLIANCE OF EXISTING SHELTERS
- SMALL BUS STOP PADS (WHERE THERE ARE ANY)
- BURIED UTILITIES AND ABOVE-GRADE OBSTRUCTIONS
- LACK OF AREA LIGHTING
- LACK OF PUBLIC SIDEWALKS AND CROSSING PROTECTIONS
- VOLUME OF USAGE (MANY EXISTING STOPS CAN’T HANDLE CURRENT RIDERSHIP)
- THE SUBURBAN “CAR MENTALITY” (WHICH HAS RESULTED—FOR EXAMPLE—IN BUS STOPS SITED ON THE PERIPHERIES OF VAST PARKING LOTS, FAR FROM DESTINATION STORES, OFFICE BUILDING ENTRANCES, ETC.)
- TOWNSHIP CONTRACTS WITH MULTIPLE SHELTER VENDORS
- THE NEED FOR MULTIPLE PARTY COOPERATION AND AGREEMENTS BEFORE ACTION CAN BE TAKEN: ANY GIVEN BUS STOP MAY INVOLVE—FOR INSTANCE—PRIVATE PROPERTY, LOCAL MUNICIPAL OWNERSHIP, STATE DEPARTMENT OF TRANSPORTATION JURISDICTION, AND TRANSIT COMPANY OVERSIGHT

### WHAT MAKES A BUS STOP SITE SAFE?

- \* Clear, accessible pathways
- \* Protected crossing
- \* Visibility to and from the roadway
- \* Closeness to activity generators (comfortable walking distance to/from destinations)
- \* Level terrain

In some cases, those requirements necessitated adjustments to existing bus stop locations. Proposed new sites are as close as possible to current ones.

BACKGROUND



The existing bus stop sits very close to the side of a heavily-trafficked road. There is no shelter, and there are no contiguous pedestrian walkways, and few crossing protections. The area's commercial destinations are dispersed, so people using the bus often have to walk considerable distances in unguarded conditions.

Initially, it appeared that the 120-foot right-of-way, which provided about 30 feet of clear curbside area outside the travel lanes, would easily accommodate larger shelters set back comfortably from the curb—but siting options were restricted by sloping grades and the need to maintain ADA-compliant paths.

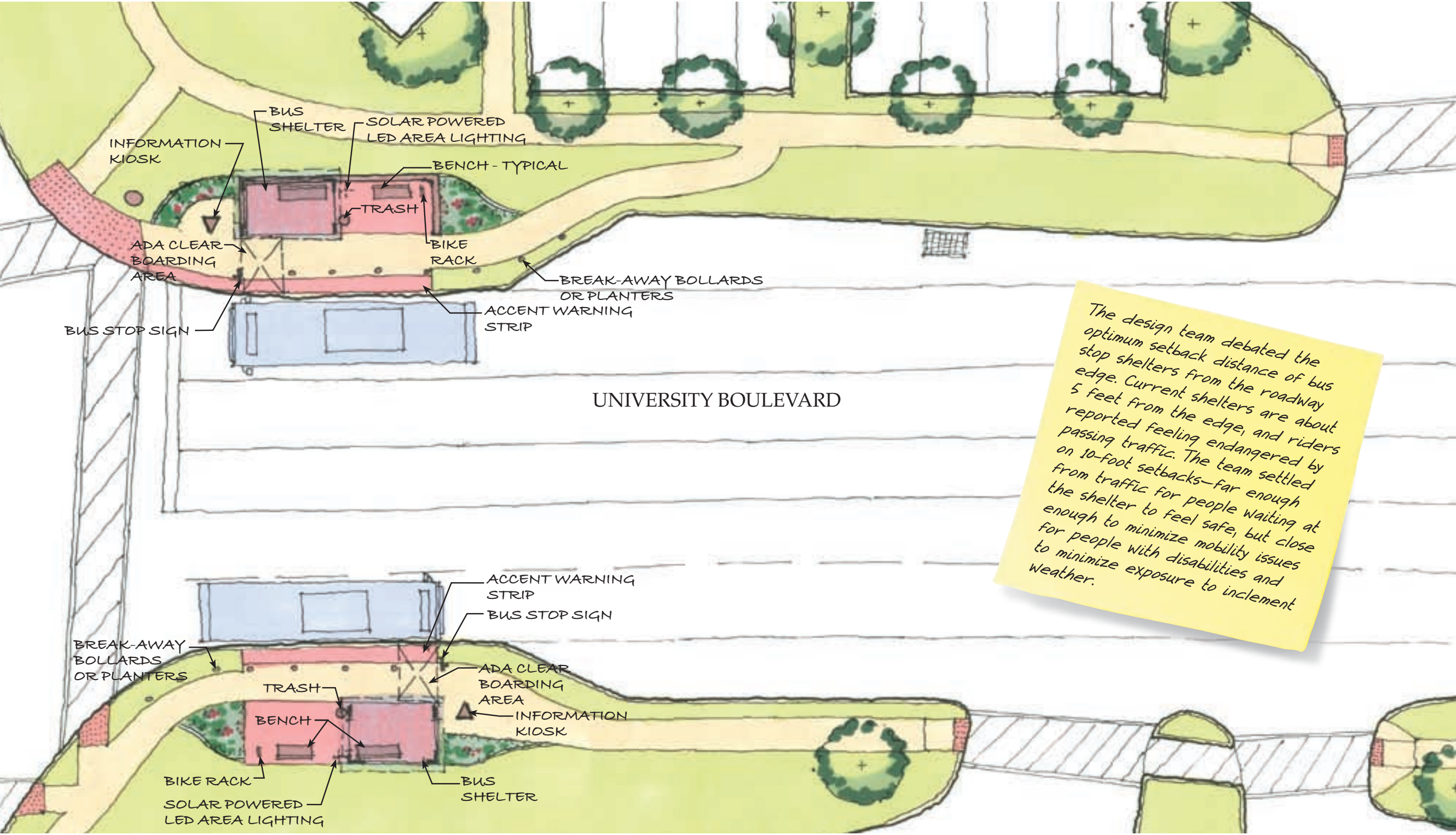
Each of the intersection's four corners was evaluated for bus stop placement. Instead of imposing a near-side or far-side rule of thumb, stops were sited based on accessibility, topography, and available clear area—with the result that this prototype design includes both a near side and a far side bus stop.



*In the study area,  
this stop is in Moon  
Township, at University  
Boulevard and  
Brodhead Road /  
Beaver Grade Road.*

# BUS STOP





The design team debated the optimum setback distance of bus stop shelters from the roadway edge. Current shelters are about 5 feet from the edge, and riders reported feeling endangered by passing traffic. The team settled on 10-foot setbacks—far enough from traffic for people waiting at the shelter to feel safe, but close enough to minimize mobility issues for people with disabilities and to minimize exposure to inclement weather.



# BUS STOP



**THE PROTOTYPE DESIGN INCLUDES THESE PROPOSED IMPROVEMENTS:**

**FEATURES**

(INCLUDING ACCESSIBILITY)

- 3-foot (minimum) benches inside and outside the shelter, with an accessible clear floor area (30" by 48") immediately next to each bench to accommodate people in wheelchairs and their companions (longer benches can be divided with armrests to discourage sleeping)
- A 6-foot by 10-foot shelter with clear wind screening panels to maximize visibility into and from the shelter, and with an opaque roof for sun shading
- An easily reachable trash receptacle adjacent to the shelter but not obstructing accessible paths
- Bicycle racks that don't obstruct accessible paths



**INFORMATION**

- Route maps and timetables at the rear of the shelters or on freestanding information kiosks located beyond the departing side of a shelter to minimize view obstructions
- Accommodations for information technology such as automatic vehicle location (AVL) and announcement systems or "RouteShout" cellular phone service(s)
- Advertising panels on freestanding information kiosks located beyond the shelter's departing side

**SAFETY**

- Location close to the intersection to discourage mid-block crossing by pedestrians and cut-ins by motorists
- Location away from un-signalized driveways
- Shelter location 10 feet from the curb line
- Location on a level site, or with retaining walls provided to create a level site
- Maintenance of clear zones (the Pennsylvania Department of Transportation mandates 10 feet for a 35 mph zone) and view triangles
- Solar-powered light-emitting diode (LED) shelter lighting

- Solar-powered LED general area lighting (where lacking) to eliminate the "fishbowl" effect of strong lighting within the shelter; general area lighting should incorporate appropriate cut-off angles to avoid spillover light pollution
- Identification of the bus-boarding area with a bus stop sign and a 60" by 96" accessible pad
- A 30" warning strip between the curb and the bus pad in a contrasting color and texture (such as decorative brick or rustic terrazzo)
- Decorative breakaway bollards or crushable planters (with 5-foot-minimum spacing) between the accent strip and sidewalk, ensuring that ADA-compliant clearances are maintained, and spacing adjusted so bus doors are not obstructed



- Landscaping with low shrubs that don't provide hiding places; deciduous trees may provide additional shading but shouldn't obstruct views

**ADDITIONAL THOUGHTS...**

- The design team recommends that low-volume bus stops be upgraded in a manner similar to this approach.
- The team also recommends that crosswalks and pedestrian crossing signage be provided at all suburban bus stops. Signalized intersections should provide pedestrian walk signals. At heavily traveled streets, flashing pedestrian protective signage and raised rolled-edge crosswalks would serve as traffic-calming measures at mid-block crossings, enhancing pedestrian safety. Crosswalks, curb cuts, and sidewalks should be consistently provided as components of the suburban landscape.

**Probable construction costs (range) for each stop: \$55,650-\$107,300**



**BUS STOP**



*In the study area, this stop is in North Fayette Township, in front of the Walmart on Summit Park Drive.*

The study area is home to many “big box” stores, each freestanding and at a substantial distance from other buildings. Most stores are surrounded by large parking lots that lack protected walking paths.

The existing bus stop is located on a sidewalk running along the edge of a bus bay near the front of the Walmart. Bus patrons are shielded from traffic by concrete-filled steel tube bollards that line a curb that is flush with the sidewalk and parking lot, allowing easy movement of shopping carts and wheelchairs.

An overhang, approximately 10 feet high and 6 feet deep, provides little protection from wind and wind-driven precipitation. There is no wind screen, and no bus stop lighting. Three metal benches and a cigarette urn are grouped tightly near the bus stop sign.

The existing stop has two significant features the design team believes all suburban retail center bus stops should include: (1) a 10-foot-wide accessible sidewalk/bus stop pad, and (2) a location at a central point near the main store entrance.

THE DESIGN TEAM COMMENDS WALMART FOR PROVIDING AN ACCESSIBLE BUS STOP NEAR THE STORE'S ENTRANCE. TOO OFTEN, SUBURBAN BUS STOPS ARE SITED AT THE PERIPHERIES OF PARKING LOTS, REQUIRING BUS PATRONS TO NAVIGATE A SEA OF PARKING LOT TRAFFIC. MANY RETAILERS SAY THEY PREFER NOT TO HAVE BUS STOPS NEAR STORES BECAUSE BUSES CAN DETERIORATE PAVED SURFACES AND OBSTRUCT BUILDING ENTRANCES. HOWEVER, THOSE ISSUES CAN BE ADDRESSED SUCCESSFULLY BY MODIFYING LAYOUTS AND MATERIALS.

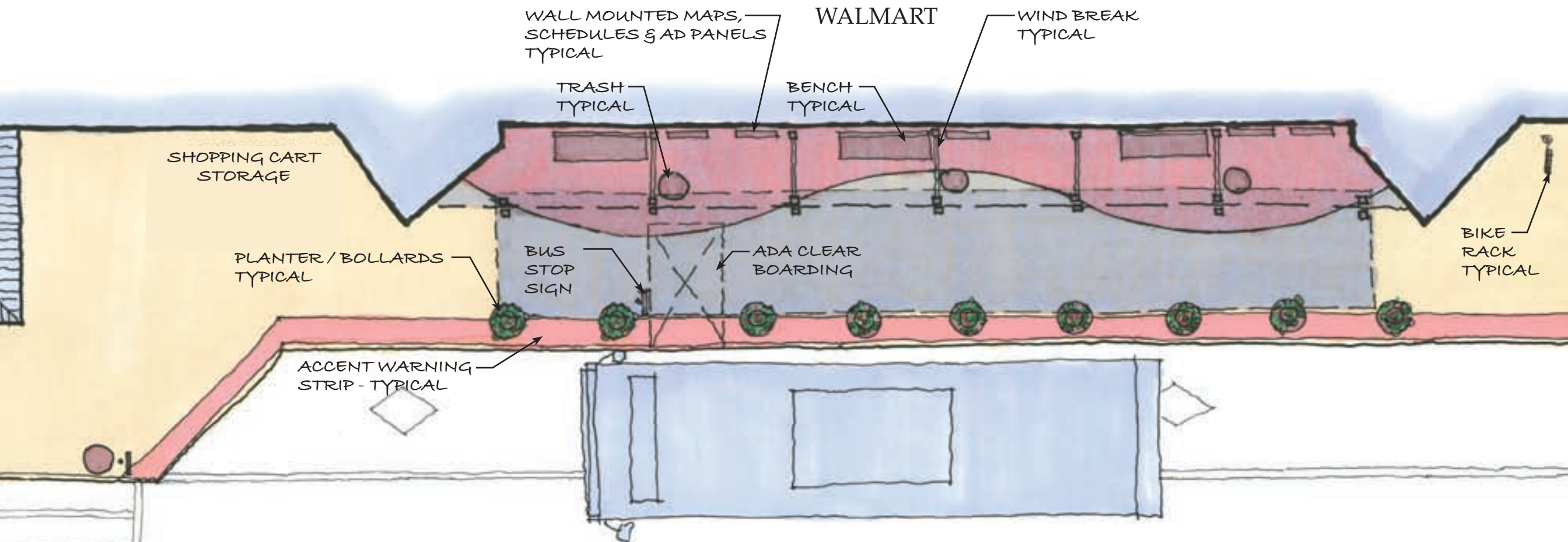


WALMART

Proposed Bus Stop Location

# SUBURBAN RETAIL CENTER BUS STOP





# SUBURBAN RETAIL CENTER BUS STOP



## THE PROTOTYPE DESIGN INCLUDES THESE PROPOSED IMPROVEMENTS:

### FEATURES

(INCLUDING ACCESSIBILITY)

- Identification of the bus-boarding area with a bus stop sign and a 60" x 96" accessible pad (for this specific site, the team recommends relocating the existing sign and ADA pad to a position that allows easier bus maneuvering at the curb)
- Clear windscreen panels perpendicular to the building façade, not obstructing visibility into and from the bus stop area
- Across the center of the store, a continuous, column-supported canopy with an opaque roof to provide sun shading (without imposing new loads on the existing retail structure, and without obstructing views of existing store branding signage)
- Light-color paint on the underside of the existing overhang
- A series of 3-foot (minimum) benches within the bus stop area and between wind screening panels, with an accessible clear floor area (30" by 48")

immediately next to each bench to accommodate people in wheelchairs and their companions (longer benches can be divided with armrests to discourage sleeping)

- Easily reachable trash receptacles within the bus stop area (not obstructing accessible paths)
- Bicycle racks that don't obstruct accessible paths

### INFORMATION

- Route maps and timetables placed on the existing face of the building to minimize view obstructions
- Accommodations for information technology such as automatic vehicle location (AVL) and announcement systems or "RouteShout" cellular phone service(s)
- Store advertising panels on the existing face of the building to minimize view obstructions

### SAFETY

- Solar-powered light-emitting diode (LED) up-lighting at the underside of the existing overhang and the new canopy
- Verification that levels of general area lighting are adequate to eliminate the "fishbowl" effect of strong lighting within the shelter; general area lighting, preferably solar-powered, should incorporate appropriate cut-off angles to avoid spillover light pollution
- A 30" warning strip between the curb and the bus pad/sidewalk in a contrasting color and texture (such as decorative brick or rustic terrazzo)
- Decorative bollards, decorative posts with hanging baskets, or planters (with 5-foot minimum spacing) between the accent strip and sidewalk to shield pedestrians from perpendicular vehicle movements (ADA-compliant height and width clearances should be maintained, and spacing adjusted so bus doors are not obstructed)

Probable construction costs (range) for each stop: \$64,550 - \$123,300



PLANTERS AND HANGING BASKETS ARE ATTRACTIVE TO CUSTOMERS AND BUS PATRONS—BUT THEY ALSO OFFER RETAILERS A MERCHANDISE DISPLAY OPPORTUNITY, PARTICULARLY DURING GARDENING SEASON.



# SUBURBAN RETAIL CENTER BUS STOP



## ROBINSON TOWN CENTRE

Bus stops flanking Park Manor Drive between IKEA and Robinson Town Centre—a major mall—are the area's service hub for Port Authority of Allegheny County buses and ACTA shuttles. Adjacent IKEA parking serves as a park-and-ride facility.

The existing stops are sited on a curve in an area where motorists often accelerate; that poses a safety challenge. The location lacks adequate pedestrian crossings.

Utilization of the two stops is significant, and shelters and amenities at the existing stops are overstressed by current usage; it's not unusual to see as many as 30 or 35 people crowding around a single shelter. There are no bicycle facilities.

Given the high usage of the stops, the design team recommends upgrading them to hub stations, with larger shelters and additional amenities.

Additionally, the team recommends relocating the stops. IKEA plans to relocate its driveway entrance, and the new stops would have convenient near-side and far-side sites near the new driveway/road intersection. The proposed new locations allow significantly more space for shelters, and provide better sight lines for both pedestrians and drivers.

*In the study area, the two existing bus stops flank Park Manor Drive between the IKEA store and Robinson Town Centre.*

EXISTING BUS STOP LOCATIONS

PROPOSED BUS STOP LOCATIONS

BUS STOP CAPACITY IN SUBURBS IS USUALLY NOT PLANNED TO ACCOMMODATE FUTURE LOADS. A SMALL STOP CAN QUICKLY BECOME OVERUTILIZED AS COMMERCIAL DEVELOPMENT BOOMS AROUND IT—AND RIDERS CAN FIND THEMSELVES STANDING IN MUD OR SNOW, IN BUSY PARKING LOTS, OR IN THE PATHS OF MOVING VEHICLES.

# HUB STATION





ALTERNATE PEDESTRIAN PATH

ROBINSON TOWN CENTRE

PARK MANOR BLVD.

IKEA

CHERRY

BIKE RACK  
TYPICAL

SOLAR POWERED  
LED AREA LIGHTING  
TYPICAL

TRASH  
TYPICAL

BENCH  
TYPICAL

BUS SHELTER  
TYPICAL

INFORMATION  
KIOSK - TYPICAL

BUS STOP  
SIGN - TYPICAL

BOLLARDS  
TYPICAL

ACCENT WARNING  
STRIP - TYPICAL

ADA CLEAR  
BOARDING



## THE PROTOTYPE DESIGN INCLUDES THESE PROPOSED IMPROVEMENTS:

### FEATURES

(INCLUDING ACCESSIBILITY)

- 6-foot by 10-foot shelters—two at each stop—with clear wind-screening panels to maximize visibility into and from the shelter
- An opaque roof for sun-shading
- A bus-hailing system such as the “I-Stop,” which includes a side-of-the-road pole with a call button that activates a light atop the pole, alerting bus drivers to stop (bus schedule information can be mounted on the pole)
- 3-foot (minimum) benches inside and outside the shelter, with an accessible clear floor area (30" by 48") immediately next to each bench to accommodate people in wheelchairs and their companions (longer benches can be subdivided with armrests to discourage sleeping)
- A trash receptacle adjacent to the shelter, easily reachable but not obstructing accessible paths
- Bicycle racks that don't obstruct accessible paths
- Small parklets or plazas that include benches or café-style tables/chairs and trash receptacles

### INFORMATION

- Route maps and timetables at the rear of the shelters or on freestanding information kiosks located beyond the departing side of a shelter to minimize view obstructions
- Accommodations for information technology such as automatic vehicle location (AVL) and announcement systems or “RouteShout” cellular phone service(s)
- Advertising panels on freestanding information kiosks located beyond the shelter's departing side

### SAFETY

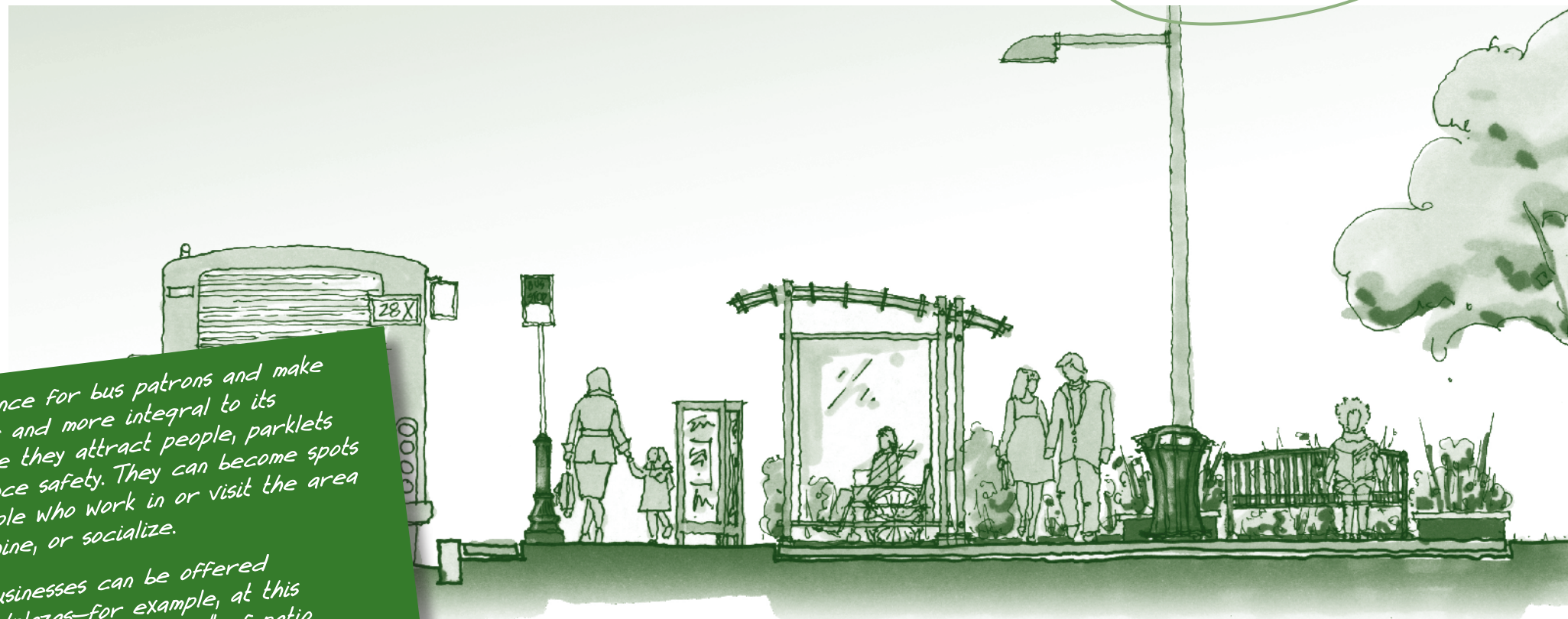
- Contiguous 5-foot sidewalks with curb cuts
- Bus shelters set back 10 feet from the curb
- Maintenance of clear zones and view triangles
- Solar-powered light emitting diode (LED) shelter lighting
- Solar-powered LED general area lighting (where lacking) to eliminate the “fishbowl” effect of strong lighting within the shelter; general area lighting should

incorporate appropriate cut-off angles to avoid spillover light pollution

- Identification of the bus-boarding area with a bus stop sign and a 60" by 96" accessible pad
- A 30" warning strip between the curb and the bus pad in a contrasting color and texture (such as decorative brick or rustic terrazzo)
- Decorative bollards or planters (with 5-foot minimum spacing) between the accent strip and sidewalk, ensuring that ADA-compliant clearances are maintained, and spacing adjusted so bus doors are not obstructed

- Landscaping with low shrubs that don't provide hiding places; deciduous trees may provide additional shading but shouldn't obstruct views.
- A new pedestrian path between the hub stop area and the nearby mall, allowing pedestrians to walk safely through a large parking lot; combined with new and existing crosswalks and sidewalks, the new path forms a complete pedestrian-safe walking system between IKEA and Robinson Town Centre

**Probable construction costs (range) for each stop: \$91,450 - \$154,900**



*Parklets and plazas add convenience for bus patrons and make the bus stop area more appealing and more integral to its surroundings; additionally, because they attract people, parklets can discourage crime and enhance safety. They can become spots for not only bus patrons but people who work in or visit the area to have lunch, read in the sunshine, or socialize.*

*In a commercial area, nearby businesses can be offered incentives to equip the parklets/plazas—for example, at this prototype stop, IKEA could create “working displays” of patio furniture. These kinds of public-private partnerships can produce significant and lasting benefits to all parties involved.*

*Some parklets/plazas have themes (such as the chess/checkers theme pictured); that can be an attractor, but in any case designs should be simple, clear, and easily maneuvered for those with physical or cognitive impairments.*

# ATION



The typical western Pennsylvania suburban transfer center—found in many places throughout the region—is a bus stop with a park-and-ride lot. The centers, although useful for both commuters and transit providers, are often secluded from the kinds of services that many commuters find useful—for example, newsstands, coffee shops, child care facilities, dry cleaners, and more.

The Port Authority of Allegheny County, the study area's largest transit provider, owns a parcel of land it plans to develop into an intermodal transfer center (ITC). The volume of usage of the future ITC will be significant enough to warrant classification as a bus station, with larger shelters and additional patron amenities.

The design team recommends that, for the sake of efficient movement of buses, the bus stop components of the ITC be located along the main access road; as a result, portions of the prototype design may be located in a public right of way.

*In the study area, the proposed site for the new Intermodal Transfer Center is in North Fayette Township near Montour Church Road, north of Route 22/30/Steubenville Pike.*

PROPOSED  
ITC  
LOCATION

# INTERMODAL TRANSFER CENTER



KISS & RIDE

MONTOUR CHURCH ROAD

STREET CROSSING WITH OVERHEAD FLASHING SIGNAL

ACCESS DROP OFF/PICK UP OR KISS & RIDE

ACCENT WARNING STRIP - TYPICAL

CAFE TABLES TYPICAL

TRASH TYPICAL

BUS SHELTER TYPICAL

TRASH TYPICAL

BENCH TYPICAL

BUS STOP SIGN TYPICAL

BIKE RACK TYPICAL

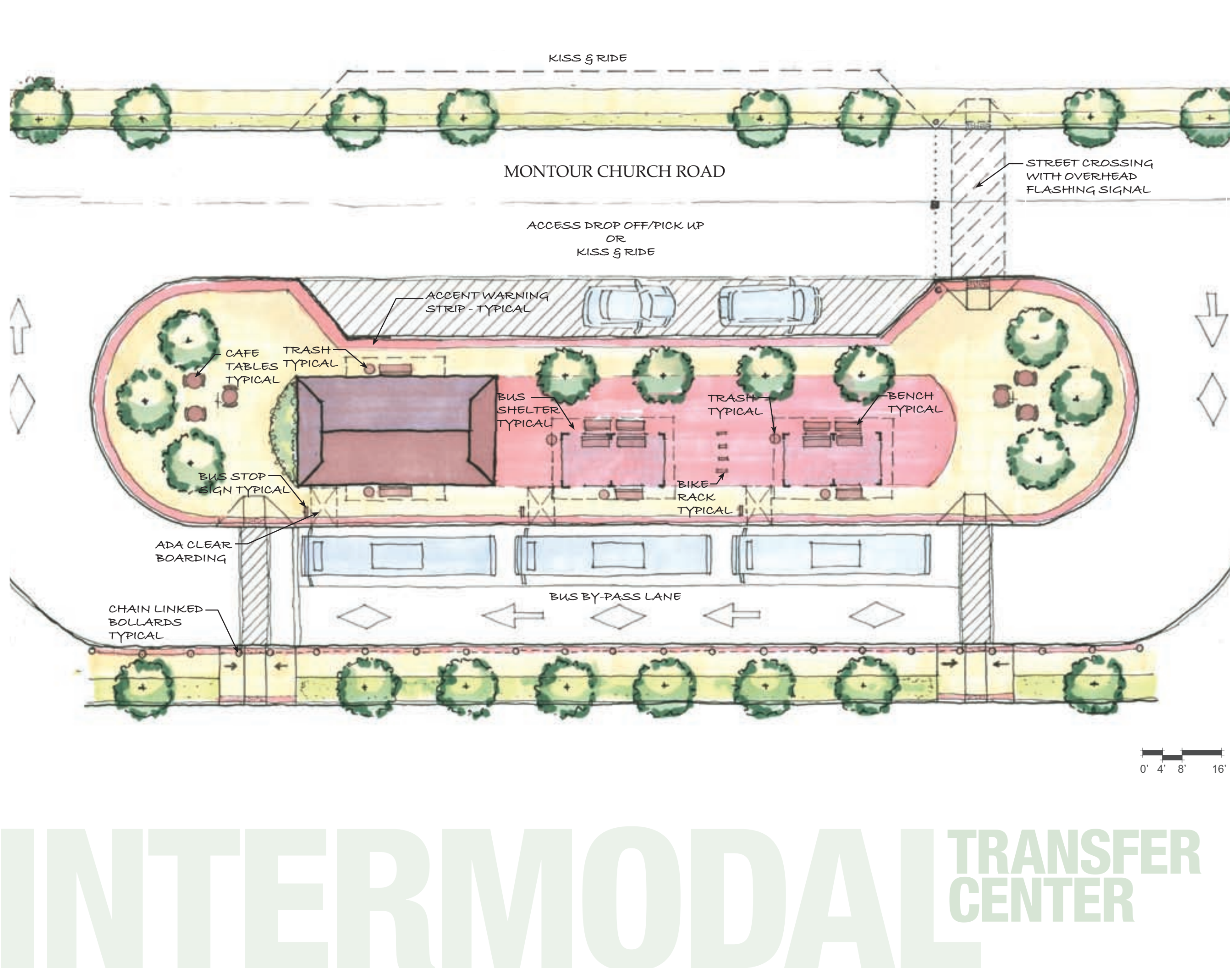
ADA CLEAR BOARDING

BUS BY-PASS LANE

CHAIN LINKED BOLLARDS TYPICAL

0' 4' 8' 16'

# INTERMODAL TRANSFER CENTER





**RECOMMENDED COMPONENTS OF THE INTERMODAL TRANSFER CENTER INCLUDE:**

**FEATURES**

(INCLUDING ACCESSIBILITY)

- Contiguous 5-foot sidewalks with curb cuts along the access road and within the park-and-ride parking lot
- A bus berthing lane and a bus bypass lane
- A pullover lane to serve both Access/on-demand vehicles and “kiss and ride” vehicles, with immediate passenger access to the bus shelter
- A 10-foot by 20-foot shelter at each bus boarding position with clear wind screening panels to maximize visibility into and from the shelter (or, alternatively, continuous canopies with clear wind screening along the length of several bus docking positions)
- On shelters, opaque roofs for sun shading
- Several 3-foot (minimum) benches inside and outside each shelter, with an accessible clear floor area (30" by 48") immediately next to each bench to accommodate people in wheelchairs and their companions (longer benches can be subdivided with armrests to discourage sleeping)

- An easily reachable trash receptacle adjacent to each shelter, without obstructing accessible paths
- Bicycle racks that don't obstruct accessible paths
- Within the bus station area, landscaped plazas that include benches (or café-style tables and chairs) and trash receptacles; designs should be kept simple, clear, and maneuverable for those with physical or cognitive impairments.
- An indoor, heated bus patron waiting area that houses “Transit-Oriented Development” retail

**INFORMATION**

- Route maps and timetables at the rear of the shelters or on freestanding information kiosks located beyond the departing side of a shelter to minimize view obstructions
- Accommodations for information technology such as automatic vehicle location (AVL) and announcement systems or “RouteShout” cellular phone service(s)
- Advertising panels, if required, on freestanding information kiosks located beyond the departing side of a shelter

**SAFETY**

- Maintenance of clear zones and view triangles
- Solar-powered, light-emitting diode (LED) shelter lighting
- Decorative, pedestrian-scaled, solar-powered LED general area lighting (where lacking) to eliminate the “fishbowl” effect of strong lighting within the shelter (general area lighting should incorporate appropriate cut-off angles to avoid spillover light pollution)
- Identification of the bus-boarding area with a bus stop sign and a 60" by 96" accessible pad

- A 30" warning strip between the curb and the bus pad in a contrasting color and texture (such as decorative brick or rustic terrazzo)
- Decorative bollards or planters (with 5-foot minimum spacing) between the accent strip and sidewalk, ensuring that ADA-compliant clearances are maintained, and spacing adjusted so bus doors are not obstructed
- Landscaping with low shrubs that don't provide hiding places (deciduous trees may provide additional shading but shouldn't obstruct views)

**Probable construction costs (range) for the prototype center: \$484,500 - \$802,800**

TRANSIT-ORIENTED DEVELOPMENT (TOD) IS ECONOMIC DEVELOPMENT ATTRACTED AND ENABLED BY PROXIMITY TO TRANSIT. THE DESIGN TEAM RECOMMENDS THAT THE INTERMODAL TRANSFER CENTER BE VIEWED AS AN OPPORTUNITY TO INCORPORATE TOD SUCH AS A COFFEE SHOP, NEWSSTAND, AND OTHER BUS PATRON-FRIENDLY AMENITIES. SIMILARLY, OTHER INTERMODAL TRANSFER CENTER SITES COULD BE DEVELOPED AND SITUATED WITHIN WALKING DISTANCE OF EMPLOYMENT CENTERS AND SERVICES THAT COMPLEMENT TRANSIT FACILITIES—FOR EXAMPLE, BOOKSTORES, CHILD CARE CENTERS, AND CAFES.



**INTERMODAL TRANSFER CENTER**



## NEXT STEPS

- Seek funding to implement the prototypes
- Form working partnerships with retailers, shelter owners, and municipalities
- Work with local governments to modify zoning ordinances, ensuring that they permit bus shelters
- Work with transportation engineers on sharing the travel path and other modal conflicts, with the goal of balancing pedestrian and motorist safety

IMPROVING SAFETY FOR ONE MODE CAN COMPROMISE ANOTHER. FOR EXAMPLE, THE DESIGN TEAM RECOMMENDED THAT BOLLARDS OR PLANTERS BE PLACED ALONG CURBLINES AT BUS STOPS AS PROTECTION FROM CARS VEERING OVER THE CURB—BUT PENNDOT REPRESENTATIVES NOTED THAT STATE REGULATIONS REQUIRE A CLEAR ZONE ALONG ROADWAYS (10 FEET FOR A 35 MPH ZONE) IN CASE MOTORISTS NEED TO MOVE OUT OF THE TRAFFIC LANES. IT'S A THOUGHTFUL PROTECTION FOR MOTORISTS IN DISTRESS—BUT IT CAN ENDANGER PEDESTRIANS WALKING OR WAITING AT THE ROADSIDE. BREAKAWAY BOLLARDS OR CRUSHABLE PLANTERS COULD PROTECT MOTORISTS, BUT THEY OFFER LESS PROTECTION TO PEDESTRIANS. SO TO WHOM DOES THE TRAVEL PATH BELONG? IT CAN BE ARGUED THAT, IN A PUBLIC RIGHT-OF-WAY WHERE MULTIPLE MODES OF MOBILITY OCCUR, THE TRAVEL PATH BELONGS TO ALL—AND, THEREFORE, PROTECTIVE MEASURES BALANCING PEDESTRIAN AND MOTORIST SAFETY SHOULD BE STUDIED, DEFINED, AND IMPLEMENTED.

*The team believes that several related studies are needed: (1) a look at the financial benefits to suburban retail centers, box stores, and malls when nearby bus stops are safer and more convenient; (2) a study of ways to provide shelters with emergency call buttons that tie into local municipalities' existing emergency response systems; and (3) an investigation of ways to heat bus shelters energy-efficiently and cost-effectively.*

- When the prototypes are implemented, test their effectiveness, looking at statistical improvements (via crime reports and accident reports), perceptual changes (are people more willing to use public transportation if bus stops are more geared toward rider safety and convenience?), and actual utilization (does willingness translate into usage?)

## MAJOR LESSONS LEARNED...

In the process of the study, the team learned a great deal. We're sharing some of what we learned here, in the hope that it will be useful to people working to plan, develop, or retrofit suburban areas elsewhere.

- Economically successful suburban development often leads to additional adjacent development—but too often the area's infrastructure is built piecemeal, without an overall plan for land use and road networks. The frequent results: suburban "sprawl," road congestion, and almost immediate overutilization.
- Most suburban commercial areas are "car-centric:" customers and others are expected to trek from site to site in cars, even when their destinations are close together. Sidewalks and safe walking paths are rarely provided across parking lots and between commercial establishments. There's a pervasive lack of recognition on the part of developers, property-owners, tenants, and municipal planning and

zoning enforcement bodies that many of the employees, patrons, and visitors in suburban commercial centers will be traveling via public transit. Further, accommodation of people with disabilities is either lacking or inconsistent.

- It's clearly most effective (and cost-effective) for communities to be proactive in their planning—to work ahead of need to optimize site densities based on pedestrian-scaled development, and to upgrade planning and zoning ordinances to require investment in pedestrian and transit amenities. The marginal increase in initial costs of providing traffic controls, curb cuts and sidewalks, landscaping, lighting, site furnishings, and comfortable bus stops (with room for future expansion) results in a safer, more attractive environment that is more appealing to targeted users. However, in places where planning was not proactive and there is a desire to improve the current situation, retrofits are possible.
- Optimizing bus stops and shelters—siting them conveniently and attractively, and making them a comfortable size—can require cooperation among multiple entities, including municipalities, private property owners, civic

organizations, and others. When that doesn't happen, bus stops are often wedged into narrow public-property sites at the sides of roads.

- Stakeholders—such as the people on our Stakeholder Committee-- should talk with each other more about their needs and concerns. There aren't many natural opportunities for that to happen, so opportunities need to be created. When that happens, the public benefits greatly.
- It is far easier to make physical changes than to overcome socioeconomic biases. Some people value the presence of transit at a retail center; in this study area, that is very much the case. But in many other areas, people believe a commercial center's image is somehow "downscaled" by the presence of transit facilities and users. It is ironic that the people who staff and patronize commercial establishments aren't always welcomed by the landlords and owners who prosper through their presence. Such biases require a larger—and inevitably slower—societal response.

PUBLIC EDUCATION STRESSING THE RIGHTS OF PEDESTRIANS MAY IMPROVE SAFETY. EFFORTS CAN BE AS MAJOR AS ENTIRE CAMPAIGNS—OR AS SIMPLE AS POSTING MORE AND BETTER "YIELD TO PEDESTRIANS" SIGNAGE.

NEXT STEPS





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