

Pedestrian Environmental Quality Index

Data Collection Manual



*The Pedestrian Environmental Quality Index tool used by the City of Austin Planning and Development Review Department is adapted for use from the Pedestrian Environmental Quality Index developed by the San Francisco Department of Public health.

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Introduction

Environments which enable and encourage walkability promote healthier lifestyles, safer streets, environmental quality, and social equality. Unfortunately, policies, development practices and planning for transportation, land use, and design have resulted in significant impediments to pedestrianism as a viable form of transportation.

Efforts to increase walkability are well-served when they incorporate a data collection and analysis component in order to demonstrate geographic areas most in need and specific methods to remedy barriers to walkability. Austin's Planning and Development Review Department has adapted a Pedestrian Environmental Quality Index (PEQI) to provide a tool which assesses pedestrian desires and needs, as well as deficiencies in infrastructure and experience.

The PEQI is a hybrid quantitative and qualitative device to capture information about the street environment which affects a person's travel behaviors and decisions through numerical, textual and

Future Use of Data

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After this data is collected, Planning and Development Review will undertake to assign respective weights to each category for which data was collected.

The survey data collected will be entered into a database and a single "walkability" score will be assigned to each intersection and street segment.

This information will be analyzed utilizing Geographic Information System software to identify the worst areas for walkability. The information will supplement existing City resources, including the Sidewalk Master Plan and Neighborhood Plans.

Future funding priorities may be identified.



photographic means. The PEQI developed by San Francisco's Department of Public Health drew on extensive research, already-developed instruments, and input from experts. Austin's Planning and Development Review staff adapted the tool by eliminating certain street design practices utilized in San Francisco but not Austin. Other refinements were made to the specific elements being assessed. A national expert provided comments to the tool.

Data Collection

Before beginning the data collection process, plan your route ahead of time and verify that segments of your planned route have not been assessed by other members of your team.



It is further recommended to do the assessment in teams of two. Carrying the multiple tools required to do an assessment (clipboard, data collection forms, camera, water bottle, etc.) can be burdensome for one person to carry. Additionally, efficiencies in data collection can be realized with multiple team members working together.

Intersection Data Collection Form

1. 3- or 4-way intersection

An important component of walkability is whether street connections exist in order to travel efficiently between origins and destinations.

For this survey element, please evaluate whether an intersection is a three- or four-way intersection.



3-Way Intersection	4-Way Intersection
	

2. Possible / intended crossings

Barriers to walkability exist in many forms. Streets were – and sometimes still are – designed without any intention of pedestrian presence.

This element is intended to capture physical circumstances more hazardous to pedestrians than the absence of crosswalk painting.

For this survey element, please evaluate for unintended or impossible directions of pedestrian travel at intersections.

Unintended Crossing	Impossible Crossing
	

3. Crosswalks

Crosswalks are a designed, safe crossing place for pedestrians marked with solid white lines connecting corners of the intersection. They signal to automobiles where to watch and slow for pedestrians.

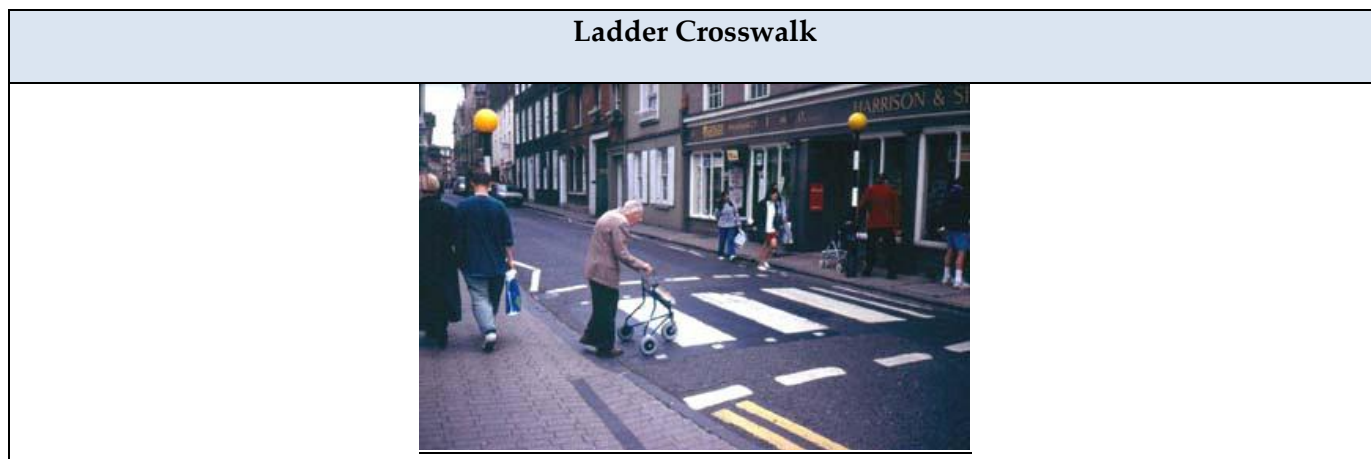
For this survey element, count how many crosswalks are in the intersection.

Crosswalks	
	

4. Ladder Crosswalks

Ladder crosswalks, also known as “zebra crossing”, can provide a safer crossing point than standard crosswalks because the markings provide greater a larger surface area to attract visual attention.

For this survey element, count how many ladder crosswalks are in the intersection.



5. Pedestrian Signals – with or without countdowns

An intersection where both automobiles and pedestrians have signals to follow which are clear is ideal. A pedestrian signal *with* a numeric countdown – as opposed to one with only a flashing hand or “don’t walk” message – provides important information to pedestrians: how much time remains to cross the street.

For this survey element, count the number of crosswalks that have pedestrian signals *with* countdowns and crosswalks that have pedestrian signals *without* numeric countdowns.



6. Signal Lights

Traffic lights at an intersection indicate when it is safe to cross by foot, bike, or automobile.

For this survey element, count the number of directions at the intersection regulated by a traffic light.



7. Stop Signs

Like traffic lights, stop signs indicate when it is safe to cross an intersection.

For this survey element, count the number of directions at the intersection regulated by a traffic light.





8. No Right Turn on Red Light

Permitting automobiles to make right turns at a red light can pose additional safety concerns for pedestrians trying to cross an intersection. When drivers are focused on finding an opening in traffic (looking left) they can fail to note the presence of pedestrians at the corner to their right. The beginning

of a pedestrian crossing signal is especially dangerous as cars attempting right turns with an opportunity to turn might fail to observe the pedestrian crossing light has activated.

For this survey element, count the number of intersection directions where right turning at a red light is restricted. Be sure to check every light for signage. This may require you to cross the intersection.

No Right Turn on Red	No Right Turn on Red
	



9. Curb Ramps at Pedestrian Crossings – corners with one or two ramps

Federal law requires state and local governments to make pedestrian crossings accessible to people with disabilities by providing curb ramps. The absence of a curb cut and ramp can be an insurmountable obstacle to an individual in a wheelchair. It also fails to serve individuals with visual impairments or individuals pushing strollers, etc.

The design and placement – as well as slope and materials – can significantly alter a curb ramp's functionality. Parallel curb ramps best serves pedestrians by steering them directly to the opposite crosswalk. Diagonal curb ramps can direct individuals at least partially into traffic, especially persons with visual impairments, wheelchairs, and strollers. Generally, though, the presence of a curb ramp is better than no curb ramp.

For this survey element, mark the number of ramps present at each corner. For example, if three corners possess two ramps, and one corner possesses one ramp, mark a "2" under *3 Directions* and a "1" under *1 direction*.

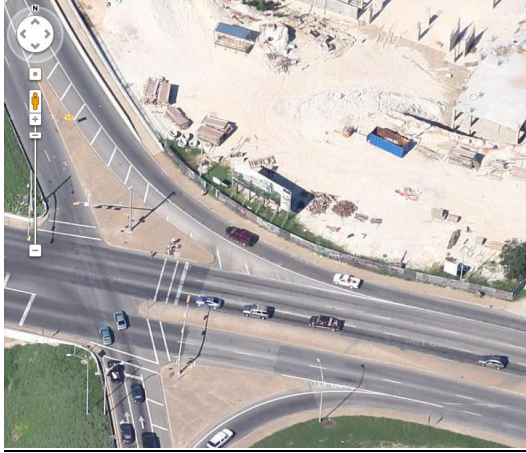


Perpendicular Curb Ramps (Two Ramps)	Diagonal Curb Ramp (One Ramp)
	

10. Presence of Non-Yielding Vehicle Turn Lanes

Technically, automobiles must yield to pedestrians in an intersection. However, a through lane with no signals or markings indicating a driver must yield to pedestrians – especially a shallow-angled turn lane which anticipates an intersection – presents a safety risk to pedestrians.

For this survey element, determine whether there are turn lanes which do not clearly direct vehicles to yield with signage or road markings.

"Non-Yielding" Vehicle Turn Lane


11. Crossing Distance

The crossing distance of an intersection and the speed required to cross as determined by the pedestrian crossing signal can be a major impediment to walkability. The amount of time provided by crossing signals is generally sufficient for healthy adults. However, the elderly, children and



individuals with disabilities might be unable to completely cross the intersection in the allotted period of time.

For this survey element, a series of steps will determine the crossing speed required to cross the intersection. A crossing speed of greater than 3.5 feet per second is undesirable.

Prior to entering the field to collect data, you should predetermine your average step size in order to accurately estimate the length of intersection crossings. **You will have determined this at the training and have recorded this average stride length in Appendix A.**







- A) When evaluating the intersection, determine the larger street by considering the number of lanes. **Count travel lanes, turn lanes and sides of on-street parking as lanes, also.** Record this number.
- B) When crossing the intersection count the number of steps it takes to completely cross the intersection. Multiply your average stride by the number of steps the intersection requires you to take. Record this number.
- C) The permitted crossing time is the amount of time the pedestrian crosswalk signal is active, including the period when the countdown or flashing occurs. Use a timing device to accurately record the permitted crossing time.
- D) Divide the crossing distance by the permitted crossing time to yield the crossing speed. Record this number.


12. Intersection Traffic Calming Features

Increased vehicle speed is associated with greater risk for pedestrian injury or death if struck. Increased vehicle speeds also result in more noise and reduced physical comfort diminishing the pedestrian experience.

Traffic calming features or devices can reduce the speed of automobiles and increase the pedestrian and driver visibility. **See Appendix C for definitions of terms.**

For this survey element, check all traffic calming features present at the intersection.



Partial Closure	Speed Table (Raised Crosswalk)
	
Mini-Circles or Roundabouts	Curb Extensions / Bulbouts
	
Curb Extensions / Bulbouts	Curb Extensions / Bulbouts
	

Pavement Treatments	Mid-Crossing Refuge
	

13. Additional Pedestrian Signs

Additional pedestrian signs are signs that either brings drivers' attention to the presence of pedestrians, thereby acting to improve the pedestrian environment, or that makes clear pedestrians are unwelcome.

For this survey, determine whether pedestrian-specific signage exists. If it does, record the type of signage.

Yield to Pedestrian Sign	Pedestrian Crossing
	

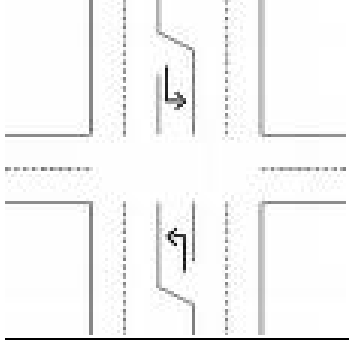

Pedestrians Prohibited	
	

Street Segment Data Collection Form

1. Number of Vehicle Lanes

More vehicle lanes accommodate more automobile traffic, thereby increasing the chance for pedestrian and vehicle conflicts. Further, roadways with increased number of traffic lanes generally allow for greater speeds and they increase pedestrian crossing distance.

For this survey element, count the total number of lanes in the street segment. Do not include short-length turn lanes that are present only at intersections. But, do count turn lanes if they are present for the entirety of the street segment.

Turn Lanes Which Should not be Counted	Turn Lanes Which Should be Counted
	

2. Two-Way Traffic

Two-way traffic is easier and safer for pedestrians to cross. Vehicle traffic is faster on one-way streets and drivers need to make additional turns, increasing the risk of a pedestrian being struck.

For this survey element, note whether the street segment is one-way or two-way.

3. Speed Limit


Vehicle speed increases the likelihood of pedestrian injury or death in an accident. A pedestrian struck by a car traveling at 20 miles per hour has a 95 percent chance of survival. A pedestrian struck by a car traveling 30 miles per hour, however, only has a 50 percent chance of survival. Faster vehicle traffic produces greater noise, diminishing the pedestrian experience.



For this survey element, record the speed limit for each street segment.

4. Street Traffic Calming Features

Similar to traffic calming features at intersections, street traffic calming features exist to reduce vehicle speed. The following features are unique to, or more typically found along, street segments than at intersections.

For this survey element, check all traffic calming features present along each street segment.

Street Medians	Chicanes
	

Speed Bumps	Rumble Strips
	

5. Does This Street Segment Have a Transit Stop?



Streets designed to accommodate all modes of transportation, including mass transit and bicycling, are more likely to be walkable. Mass transit riders and bicyclists travel at least a part of their trip by foot. Their presence on the street network increases the safety of the street. Street segments with more pedestrians are more likely to receive attention and prioritization as a pedestrian route and be granted street improvements which enhance walkability.

Areas served by transit are also likely to be more “destination-rich” places. These places will likely have more shops, more pedestrians, and greater attention paid to the safety and experience of the street.



The quality of transit stops can encourage ridership and, thereby, pedestrianism. Transit stops with seating and shelters provides a place for people to sit and wait and/or shelter from the elements.

For this survey element, record whether a transit stop exists along each street element on either side of the street. If it does, note the quality of the transit stop. **Note: A street may be known to be served by transit, but only mark Yes if a stop exists along the specific street segment being evaluated. A more complete picture of the quality of transit service will emerge when the street is evaluated as a whole.**

Bus Stop with Seating and Shelter	Bus Stop with Seating
	

Bus Stop Only


6. Presence of Bike Lanes or Sharrows

Similar to transit service, a street which supports bicycling is more likely to be a walkable street.

A bike lane is a separate, dedicated lane for bicyclists designated by striping, pavement markings and signage. A sharrow is a device placed in what is traditionally viewed as an automobile travel lane and signals to drivers that bicyclists have a right to be in the road and to take the entire lane. In other words, a sharrow reminds drivers to share the road.

For this survey element, record whether bicycle lanes or sharrows are present on each street segment.


Note: Only record Yes if the bike lanes or sharrows exist on this street segment.

Bike Lanes	Sharrow
	



7. Width of Sidewalk

The width of a sidewalk must be wide enough to support the number of pedestrians trying to use it. Insufficient sidewalk width is more likely to possess barriers and to require pedestrians to step off the sidewalk (sometimes into the street) when passing other pedestrians.

For this survey element, note the width of the sidewalk along the street segment. **Note: The width should be measured at mid-block, not at the intersection. Sidewalks at intersections are sometimes wider.**

No Sidewalk	Less Than 4.5 Feet
	







4.5 Feet – 8 Feet	Great Than 8 Feet
	

8. Sidewalk Surface Condition

The quality of a sidewalk impacts walkability. Significant cracking, buckling, holes, vegetative encroachment, slopes, and uneven surfaces can discourage pedestrianism and be a detriment to safety. **A wheelchair or baby stroller should be able to be used on sidewalks.**

For this survey element, check for flaws in the sidewalk condition. A sidewalk segment possessing a few or minor flaws, mark *few impediments*. If there are many minor flaws or a few major flaws in the sidewalk condition, mark *significant impediments*.



Few Impediments	Few Impediments
	

Significant Impediments	Significant Impediments
	

9. Large Sidewalk Obstructions

Similar to the sidewalk's surface condition, the presence of large sidewalk obstructions can reduce the walkability of a street.

For this survey element, note large obstructions which reduce the width of a sidewalk or which overhang the sidewalk and reduce its usability.



Temporary Obstruction	Permanent Obstruction
	

Temporary Obstruction	
	

10. Trees

Trees serve walkability in several respects. They are aesthetically pleasing, they act as a buffer between automobile traffic and pedestrians, and they provide necessary shade in hot weather.



For this survey element, mark whether the street is continuously or sporadically lined, or whether there are no trees on each street segment. Do not count trees planted in medians – only the sidewalk.

Continuously Lined	Sporadically Lined
	

11. Presence of Buffer

Buffers are design features which protect pedestrians from automobile traffic. On-street parking can be a buffer, as well as curbs because they prevent cars from mounting the sidewalk. A sidewalk set away from the street can also be a spatial buffer, providing room between pedestrians and fast moving traffic.

For this survey element, mark all buffers which exist on each street segment.

Parallel Parking	Curb, But no Other Buffer
	

Wide Right of Way



12. Land Uses Present

Diversity of land uses encourages a street active with pedestrians. More than the mere presence of a sidewalk, people must have a reason to walk. The ability to satisfy work, social, and recreational needs within walking distance greatly encourages pedestrianism.

For this survey element, mark all land uses which exist on the street segment.

Land Uses Present



13. Street Activity



An active street, one with many things to do and many people present, provides a sense of security and attracts people to a place. Many great streets succeed in being active throughout the day and evening.

For this survey element, record the number of businesses along the street segment that remain open beyond 7pm and whether other people (people not in cars) are present.

14. Public Seating

Public seating is seating which does not require an individual to participate in a financial transaction. Public seating invites leisure strolls and prolonged stays on public streets and provides a necessary resting place for those unable to stand or walk for prolonged periods.


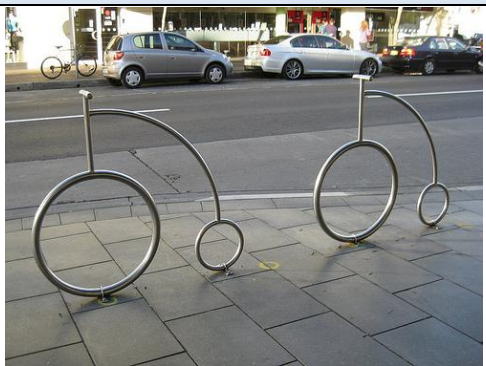
For this survey element, please mark whether public seating exists along the street segment. Be aware of informal seating areas, such as planters that may serve as seating.

Public Seating	Other Seating Opportunities
	

15. Presence of Bike Racks

Similar to the presence of transit stops and bike lanes, the presence of bike racks supports non-automotive transportation that ultimately supports pedestrianism.

For this survey element, check whether bike racks exist along the street segment.

Bike Rack	Bike Rack
	



16. Location of Parking

The placement and amount of parking indicates the prioritized mode of transportation. Because walking is inherently a more time-intensive transportation choice, the requirement to travel extra distance discourages pedestrianism. Additionally, walking alongside vast empty spaces absent street activity and storefronts contributes to a feeling of the environment being unsafe. These environments are often loud, and walking through a large parking lot, usually without pedestrian paths or connections to the sidewalk, can be dangerous.

For this survey element, evaluate the location of business and residential parking. Because businesses along a particular street segment may be set back different distances from the street, mark all that apply.



On-Street Parking	Side of Building Parking
	

Between Sidewalk and Buildings	
	

17. Proximity of Businesses to Sidewalk

The corollary to the location of parking is the location of a business. The location of a business can encourage walkability by shortening travel distances and ensuring easy access.

For this survey element, evaluate for proximity of the business to the sidewalk.

Right Next to Sidewalk	Fairly Close to Sidewalk
	

Far Away from Sidewalk	
	

18. Construction Sites

Construction sites are unattractive, loud, and pose safety concerns to pedestrians. Construction sites can prevent use of a sidewalk and cause an obstacle to reaching a particular destination.

For this survey element, note whether construction sites are present along the street segment.

19. Abandoned Buildings / Empty Parcels

Abandoned buildings and empty parcels increase the necessary distance pedestrians must travel, as well as degrade the street activity. These sites can also contribute to pedestrian unease and to feelings of being unsafe.

For this survey element, mark whether there are abandoned buildings or empty parcels along the street segment.





20. Driveway Cuts

Driveway cuts are driveways or entry and exit points where automobiles intersect the sidewalk. The number and size of driveway cuts increases the chances of a pedestrian being struck by a vehicle entering or exiting a residence or business.

The number of vehicles entering or exiting also increases the likelihood of vehicles blocking the sidewalk. Pedestrians moving off the sidewalk to bypass a vehicle are placed in unsafe conditions as vehicles entering or exiting will not be anticipating their presence.

For this survey element, count the number of driveway cuts along each side of the street segment. **A driveway cut into a commercial, apartment building, and a parking garage should be counted as two.**

Many (and large) Driveway Cuts	Vehicle Blocking Sidewalk
	

Commercial, Apartment Building, and Parking Garage Entrances	
	

21. Scary Animals

Fear of animals can prevent people from using the sidewalk. Even a chained domesticated animal can scare people.

For this survey element, record the presence of any scary animals along the street segment.

22. Graffiti

Graffiti can suggest an area which is unsafe and lacking adequate law-enforcement presence. Fear can discourage pedestrianism.


For this survey element, look for the presence of graffiti in the form of paint, pens, or scratches on public or private surfaces. If it is hardly noticeable, mark *Little to None*. If there is a significant amount, mark *Yes*.



23. Litter

Similar to Graffiti, litter can indicate a lack of concern for community space. Litter can detract from the aesthetics of an area and contribute to the presence of scavengers and produce foul odors.



For this survey element, check for litter along the street segment. Litter is a common element in cities, so a few pieces of litter would warrant a response of *Little to None*. For instance, an overflowing trash can. However, litter strewn about the street should be rated *Yes*.

Little to No Litter	Litter
	

24. Pedestrian-Scale Lights

A safe and enjoyable pedestrian experience should include appropriate lighting, especially at night. Street lamps overhanging the street which illuminates the path for automobiles does not provide lighting for pedestrians to feel safe. Pedestrian-scaled street lamps are shorter than automobile-scaled street lamps and direct light to the sidewalk.

For this survey element, note the presence of pedestrian-scale public and private lighting along the street segment.

Pedestrian-Scale Lighting, Public	Auto-Oriented Street Lamps
	



Pedestrian-Scale Lighting, Private





Appendix A

Measuring Your Stride Length: Step-by-Step Instructions

1. Mark a line and place heels of your feet at this line.
2. Take ten steps in a straight line.
3. Mark where the heel of your tenth step lands.
4. Measure the distance you have walked. Convert this distance into inches.
5. Divide this distance by ten (the number of steps taken).
6. Convert this number from inches to feet by dividing by twelve.
7. This is your stride length.

Record your stride length for future reference: _____ feet

Appendix B

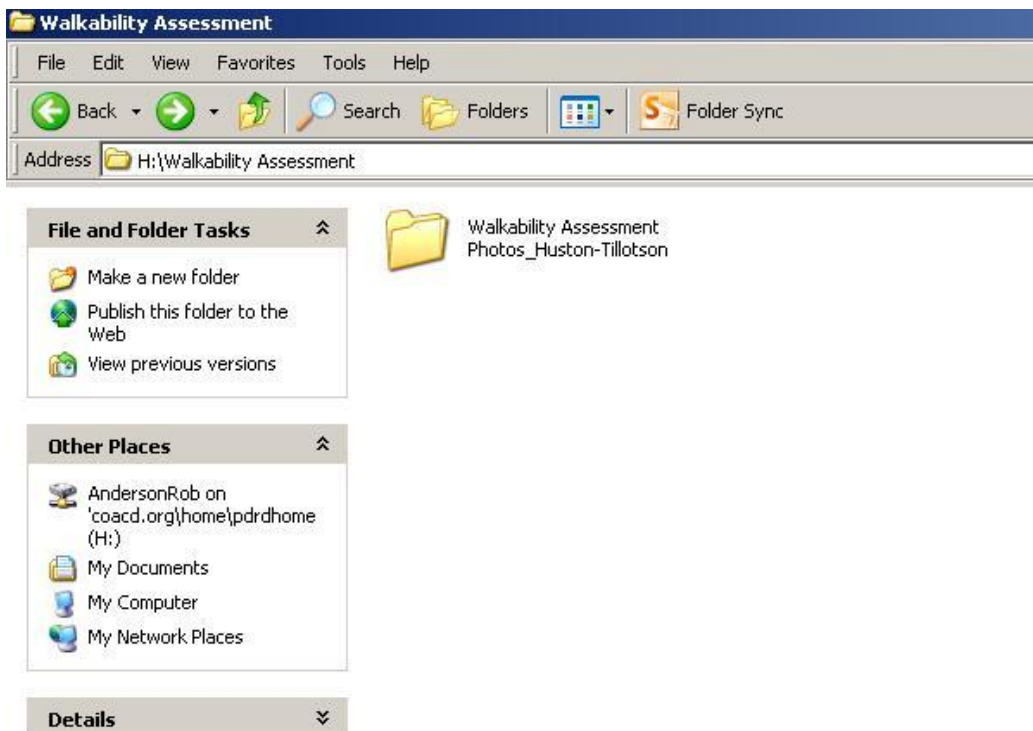
Photo Database:

How to Save and Name Your Photographs

Photographs are great supporting evidence when collecting your data and filling in the Intersection and Street Segment Data Collection Forms. We encourage your teams to take photographs and conditions which reduce or increase walkability. Additionally, if you are unsure how to complete an element of the data collection forms, photographs will aid Planning and Development Review staff as we work to assist you in recording data for specific, unique circumstances encountered in the field.

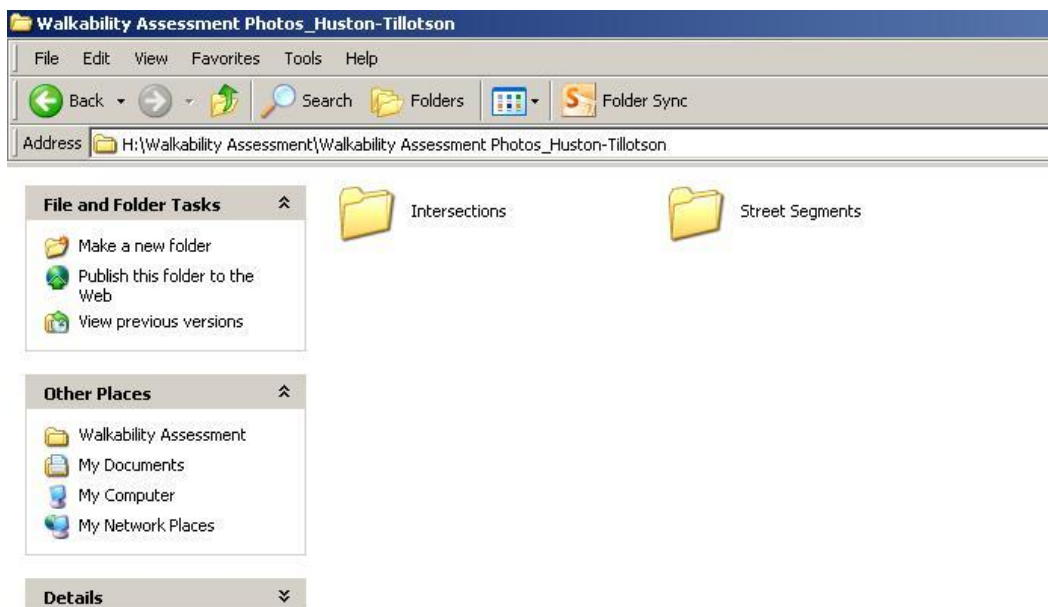
Due to the number of project sites and the potential for many photographs – especially if there are to be future data collection efforts to expand on the data collected – it is important that photographic evidence be collected and recorded in a manner that allows tracking and easy access to the digital records.

1. First, create a folder on your computer for Walkability Assessment Photos. (If it is possible do to this on a shared computer, it will enable all data collectors to upload images. Otherwise, after all data collection is complete, photos will need to be combined. Duplicate names of photos assigned by data collectors could complicate this process).





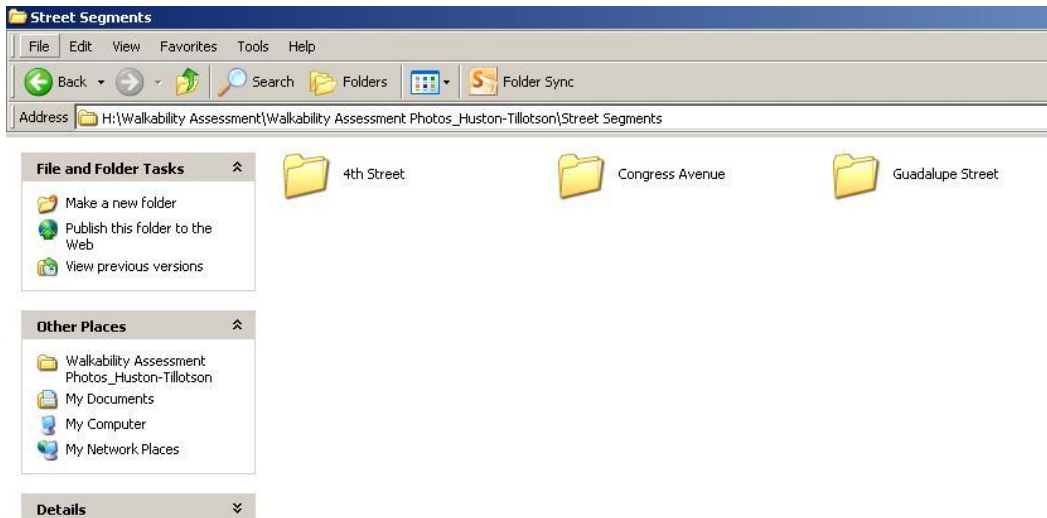
2. Then, as a subset of the Walkability Assessment folder, create Intersections and Street Segments sub-folders. Photos taken while completing the Intersection Data Collection Form will be stored within the Intersections folder. Photos taken while completing the Streets Segment Data Collection Form will be stored within the Streets Segments folder.



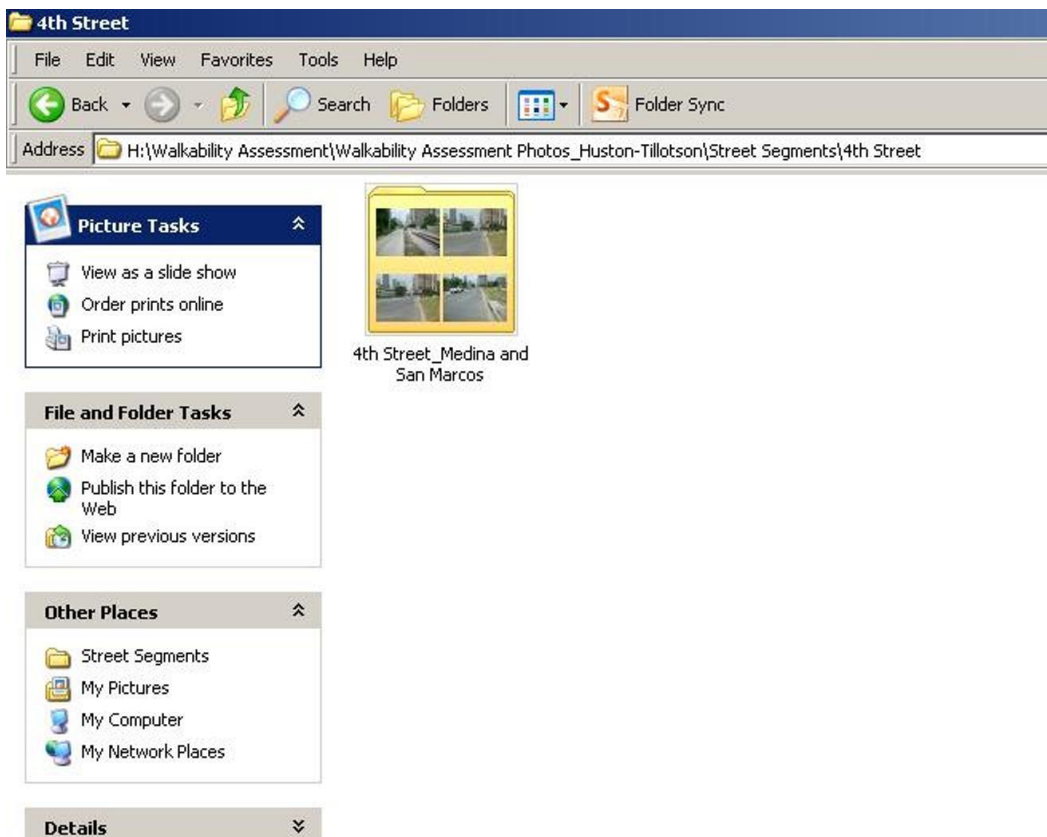
3. Additional sub-folders will be created within the Intersections and Street Segments folders, as needed. This will be determined by how large the assessment area is and how many photographs are taken.

Within the Intersections folder, photos may be placed directly into this folder and labeled accordingly. Or, if many photos are taken of a specific intersection, create a unique folder using the two cross streets for the name of the folder. (See Step 5 for how to label individual photographs).

Within the Streets Segments folder, create sub-folders for each street being assessed and store photos accordingly. Depending on how long the street is and how many photos are taken, additional sub-folders can be added. See below:



4. If additional sub-folders are required within the Street Segments folder, please place photographs within folders that are specific to street segment, named according to street and cross streets as shown below.





5. It is important that every photograph be labeled to ensure accuracy while reviewing data collection sheets and analyzing results.

If the photograph is an Intersection photo, label the photo with the name of the two streets intersecting which form the intersection. For example, a photo at the corner of Congress Avenue and Second Street might be labeled ***Congress and Second Street***.

If the photograph is a Street Segment photo, label with the ***name of the street_direction facing_two cross streets***. In the example below, assume the data collector has placed a check mark on the Street Segment Data Collection Form, number 7: No Sidewalk. The photo illustrates that there is no sidewalk between Medina and San Marcos Streets on 4th Street. The photo is taken facing west, toward the IH-35 bridge and downtown.

If multiple photos are taken to illustrate the same feature checked on the data collection form, highlight all of the photos (depress the control button and left-click all associated photos), and right-click to rename. The computer will automatically generate numbers after the name of the photo label.

If you wish to label photos with the key idea of the photo, you may do this. In the example below, to indicate no sidewalk, you could label the photograph as ***4th Street_W_Medina and San Marcos_No Sidewalk***. You could also copy and rename the photograph to demonstrate no trees present.



4th Street_W_Medina
and San Marcos

6. Lastly, the entire photo set for each neighborhood should be burned onto a compact disc and submitted with the Data Collection sheets to Planning staff.

Appendix C

Traffic Calming Features: Definitions

Intersection Traffic Calming Features (PEQI pages 9 – 10)

Curb extensions or bulbouts: an extension of the sidewalk, often at intersections, that also narrows the street, making it easier and safer for pedestrians to cross.

Mid-crossing refuge: A pedestrian refuge island or median are physical spaces within an intersection that separate lanes of traffic creating a space for a pedestrian to stand while waiting for traffic to clear before crossing safely.

Mini-circles: small raised circular located in the center of intersections which force cars to slow down because they are diverted from a straight path.

Partial closures: blockage of one direction of traffic on a two-way street. The open lane of traffic is signed one-way, and traffic from the blocked lane is not allowed to drive through

Pavement treatments: special pavement textures (e.g. bricks) and markings to designate areas for pedestrians and for slower speeds.

Roundabouts: medium to large raised circular areas placed at the center of intersections and which replace stop signs or traffic lights. Roundabouts are larger than min-circles and feature special signage and entryways divided by medians to facilitate proper usage. Pedestrian crosswalks through these entry points are common.

Speed humps: a rounded, raised mound of pavement placed across a roadway.

Speed tables: a raised pedestrian crossing with pavement treatments which serves to heighten pedestrian visibility while reducing vehicular speeds.

Street Segment Traffic Calming Features (PEQI page 12)

Bicycle lane: A bicycle lane is a section of the road designated by striping, signing, and pavement markings for the preferential and exclusive and exclusive use of bicyclists

Buffer: A buffer is a physical separation, either through physical distance or physical barrier which exists between vehicle traffic and pedestrians walking along a sidewalk.



Chicanes: a series of narrowings or curb extensions that alternate from one side of the street to the other forming S-shaped curves forcing motorists to slow down.

Pavement treatments: *see above.*

Rumble strips: Ridged sections of pavement running along the boundary of a roadway which will cause vibration and audible noise to alert the driver of failure to stay within the road lanes.

Sharrows: A sharrow is a painted symbol placed on roadways within a travel lane indicating to automobile drivers and bicyclists that bicycles are allowed on the road and permitted the full use of the lane.

Speed humps and tables: *see above.*

Street medians: a strip of land or concrete separating opposing lanes of traffic.