

**IRVINE MINNESOTA INVENTORY
FOR OBSERVATION OF PHYSICAL ENVIRONMENT FEATURES
LINKED TO PHYSICAL ACTIVITY**

CODE BOOK¹

I. INTRODUCTION

This Irvine Minnesota Inventory is designed for collecting data on physical environment features that are potentially linked to physical activity, for use in research on the relationship between the physical environment and physical activity. The instrument was developed by a team of researchers at the University of California, Irvine, and tested and refined by researchers at the University of Minnesota. This section answers questions about whether this instrument is appropriate for use in your study.

What forms of physical activity are emphasized?

The instrument focuses on physical environment features that may be linked to walking and bicycling—both forms of physical activity that are part of daily life and that may be undertaken for travel and/or recreation.

What kinds of places may be observed with this instrument?

The instrument is designed to be used for observing settings that are roughly the equivalent of neighborhoods in size. Possible settings to observe include a wide range of land uses, not only residential areas. The instrument is appropriate for settings that contain primarily residential, commercial, or other land uses, and those that contain a mix of land uses. Settings may be rural, suburban, urban, or somewhere in between. Studies can compare two or more settings, or may focus on one setting only.

The instrument was developed based on observations of US settings. It can be easily adopted for use in settings in other contexts, especially in industrialized countries. A limited number of questions includes measurements in English measurements (e.g., miles per hour.) These questions can be changed to use metric equivalents.

What aspects of the physical environment may be observed?

The instrument allows for observation of macro- and micro-scale features of the physical environment. Macro-scale features pertain to the entire setting (e.g., overall street pattern—grid versus curvilinear). These are called *setting-level observations* in the instrument. Micro-scale features pertain to one particular block (what the instrument calls a segment) or section of the setting (e.g., number of street trees on a segment.) Micro-scale features are called *segment-level observations* in the instrument. Micro-scale features can vary for different places in the setting.

The instrument is organized into four scales, for observation of physical environment features that are potentially related to (1) accessibility, (2) pleasurable, (3) human needs and comfort, and (4) safety.

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The instrument is designed for use of all four scales; however, one or more scales may also be used independently.

What kind of background is needed to use this instrument?

This data collection instrument is designed to be used by trained observers. Training takes approximately 8 hours. Observers can be college students or others (e.g., community members). Observers do not need previous expertise in design or in physical activity to use the instrument. A team leader, preferably an individual with advanced research training (a Ph.D. or advanced graduate training), is needed to prepare for data collection, train the research team, test for reliability in observations, and oversee data collection and data analysis.

How is data actually collected?

Data is collected through in-person observation, conducted by walking through the setting and coding observations directly into a Tablet PC. The instrument can also be used in a paper version and entered separately into a computer for data analysis. A supplement to the instrument (**Appendix A**) identifies several questions for which information can be collected using Geographic Information Systems (GIS). The instrument can be used without GIS by simply skipping those questions.

How long does it take to observe one setting?

Settings are defined by researchers. Settings can vary dramatically in size. A sampling scheme (described later) is used within a setting to determine which segments to observe. Within an average size setting, say, a neighborhood with 60–80 blocks, the sampling scheme would result in a sample of approximately 15–20 segments to observe. Observations of 15–20 segments would take about 3–4 hours, using a team of two observers.

What is needed to use this instrument?

Two observers are needed to observe each setting, so that the reliability of observations can be calculated. In addition, observers should each have a Tablet PC with a copy of Microsoft Access software and the file for this instrument. Also needed is a detailed map of each setting (one map per setting), which has marked all streets (or their equivalents, e.g., alleys, footpaths, etc.) To use the GIS question supplement, the researcher will also need a GIS program, such as ARC-GIS, with street map and census geography layers (See **Appendix B**) For analyzing data from this instrument, researchers will need Stat Transfer and SPSS software or its equivalent.

II. GETTING STARTED

This section provides information to get you started in using this instrument for your study.

Identifying settings for observation

Your study may focus on one or more settings for observation. Conceptually, settings are the equivalent of neighborhoods, but settings are not only residential in terms of their land uses. Settings can be defined in various ways: as census block groups, as politically defined districts, as districts that display a coherent physical appearance (such as a neighborhood of historic homes), as places defined by dominant geographic borders or borders (such as districts that are bounded by major streets or by physical edges like rivers or large open spaces), or as places with homogeneous populations (such as a senior community).

Researchers should identify the settings they will observe, and mark the boundaries of the setting on a map that also shows all streets for that setting.

Defining settings as linear or non-linear

Researchers must first determine whether each setting to be observed is linear or non-linear in its organization. Linear settings are organized by a network of streets or the equivalent of streets (e.g., pedestrian streets). Linear settings are made up of segments. Segments refer to both faces of a street block, or its equivalent (e.g., facing sides of a pedestrian pathway.) *Most settings are linear.*

Settings that are non-linear are those that cannot be readily organized or understood in terms of streets or their equivalents. Examples of non-linear settings could include outdoor shopping malls or campus settings (college, office, etc.) that face inwards and that are not regularly intersected by street networks.

- *Each setting should be defined as linear or non-linear in its organization.* If the sample includes both linear and non-linear settings, researchers may elect to use the instrument and instructions for non-linear settings. See **Appendix B** for this short version of the instrument, which is available in paper form only.

The remaining instructions focus only on settings that are linear in their composition.

Identifying segments within settings

The unit of analysis for this instrument is the segment. Each setting must be subdivided into segments for observation. A segment is typically defined as a block face, including *both* facing sides of the street, which are coded by observers as one unit. Each setting will have a different total number of segments. Typically, segments range from as few as 40 to as many as 80 per setting.

- *The team leader should systematically drive or travel through the entire setting, numbering each individual segment in the setting on the detailed map and clearly marking the boundaries of each segment where these boundaries are not evident.* Any missing segments (such as alleys, etc.) should be added to the map. When possible, segment boundaries should be defined by intersections; blocks should not be divided into multiple segments in most cases. It is essential that segment boundaries be determined when actually observing the segment itself. Segment boundaries are not always obvious simply by looking at the map (though boundaries may appear clear on the map, in actuality, judgment is often required to determine where each segment begins and ends). The team leader should make any necessary determinations about the boundaries of a segment, where this is not evident. A consistent rule of thumb should apply

(e.g., when segment boundaries are not clear, the segment will always extend to the near edge of the next building after the open space).

The team leader should also confirm which segments should be included in the setting. If a segment is located at least partially within the setting, that segment should be included in the setting.

Sampling segments for observation

Only a sample of the segments in each setting will be observed. The sampling procedure is intended to ensure that a sufficient number of segments are observed to characterize the overall physical features of the setting. Also, the sampling procedure is intended to ensure that any unique or distinctive segments in the setting are included in the sample of segments that are observed. The presence of even one such segment in a setting can dramatically shape the potential of that setting to support physical activity (e.g., the presence of one segment with retail uses, in a setting where all other segments have only residential uses).

- After numbering all of the segments within the setting, the team leader should choose a segment on which to begin to implement the sampling scheme. The first segment chosen (you do not necessarily have to begin with the first numbered segment) will be included in the sample. The team leader should then move on to the next adjacent segment. The next adjacent segment should be included in the sample if any one of the following four characteristics differ from the preceding segment: 1) Land uses; 2) Sidewalk network; 3) Barriers; 4) If it is a nice place to walk. (This last criterion is intentionally meant to be subjective. It is meant to allow the researcher to include a segment that he or she knows is different from the preceding segments in a way that is important to his or her hypotheses, but the reason as to why it is different does not fall into any of the three objective criteria.) The team leader may only skip up to three adjacent segments in identifying segments to be sampled; the next segment must then be included in the sample, even if its characteristics appear to be similar to the segment just sampled. This process is repeated until all segments have been observed.

Tablet PC

A Tablet PC is recommended for data collection. A Microsoft Access file has been designed to allow users to simultaneously collect and enter data on-site. The Microsoft Access file is best used on a Tablet PC as the Tablet PC is relatively small and allows users to choose responses with a stylus-type apparatus as opposed to utilizing a keyboard. The Tablet PC utilized in this project was a Toshiba Protégé M200.

III. CONDUCTING OBSERVATIONS

At the start of each observation session, the observer should note the date of the observations. Observers should each be assigned an individual observer number, and that number should also be noted.

Only one response may be marked for each question, unless noted otherwise. All questions must receive a response. Where more than one response could fit, observers should select the response that best characterizes the segment or setting. Two observers should conduct observations separately.

Segment-level observations

Observers should select one segment to begin observations. Observers may choose to observe segments separately, to ensure that their observations are independent. Segments need not be observed according to their numerical order on the map. *Except where otherwise noted, observations pertain to features present or absent on this segment only.*

- *While standing at one end of the segment, observers should type the intersection names where indicated, beginning with numbered streets first in ascending order and followed by named streets in alphabetical order.*
For example:
Observer is standing at the corner of Walnut and 1st street; type “1st and Walnut”
Observer is standing at the corner of Walnut and Main; type “Main and Walnut”
Observer is standing at the corner of 5th avenue and 3rd street; type “3rd and 5th”
Observers should answer questions 1-6 again as they pertain to that end of the segment.
Observers should then answer questions 7–11 as they stand at that end of the segment.
- *After answering questions 1–11, observers should walk to the other end of the segment. As they walk, observers should answer questions 12–56.*
- *At the end of the segment, observers should type the intersection names where indicated, beginning with numbered streets first in ascending order and followed by named streets in alphabetical order. Observers should then answer questions 1–6 as they pertain to that end of the segment. All questions pertaining to a segment should be answered before leaving that segment.*

Data to be observed are organized in terms of four scales or factors that are hypothesized to link to physical activity, including (1) accessibility, (2) pleurability, (3) human needs and comfort, and (4) safety. In the observation instrument itself, for ease, data are collected in an order that mixes these four scales together. Researchers may like to refer to these separate scales for analysis purposes, however. The scales (and the questions associated with each) are included as **Appendix C**.

Setting-level observations

Data collection ends with observations of characteristics of the entire setting. Before responding to the setting level questions, observers should drive/walk through the entire setting. Observers should base responses to questions on the characteristics of the entire setting.

The following sections of the codebook provide specific instructions for responding to each question.

IV. SEGMENT LEVEL QUESTIONS

The following questions measure features of a single segment.

1. Monuments or Markers

For each segment, determine if there are monuments, markers, or neighborhood entry signs that tell individuals that one is entering a certain neighborhood or district. These might include neighborhood entrance signs or posts or walls or other features at the entrance that indicate a particular or a special area. Entry markers do not have to have a name on them, they can simply signal that this is a particular place with its own identity and boundaries. Also include city signs that indicate a special district or neighborhood.

2a. Crosswalks

Consider the places on this end of the segment that are intended for pedestrians to cross the street. Are these places marked for pedestrian crossing (for example, painted lines, traffic signal, etc.)? Do not consider places where pedestrians are not allowed to cross when determining how many of the intended crossings are marked. Mark:

All: In all the places where pedestrians are intended to cross the street, there is some marking to show that pedestrian crossing is permitted there.

Some: In some (but not all) of the places where pedestrians are intended to cross the street, there is some marking to show that pedestrian crossing is permitted there.

None: None of the places where pedestrians are intended to cross the street have any markings to show that pedestrian crossing is permitted there.

N/A: There is no street, or there are no places where pedestrian crossing is intended.

2b. Crosswalk Markings

Determine whether the following crosswalk markings are present:

White painted lines: The crosswalk is designated by two parallel lines that are painted white.

Colored painted lines: The crosswalk is designated by two parallel lines that are painted in a color other than white.

Zebra striping: The crosswalk is designated by close diagonal lines that are painted white or another color.

Different road surface or paving: The crosswalk is designated by a special paving treatment, such as brick, tile, or colored concrete.

Other: The crosswalk is designated by some other markings on the pavement that are not listed above. Do not include traffic signals or stop signs.

If there is no crosswalk, mark No.

3. **Curbs Cuts**

Determine if there are curb cuts at all places where pedestrian or bicycle street crossing is expected. Curb cuts involve making a gentle slope (like a ramp) at the corner to make it easier for people and some vehicles to go down the curb (for example, wheelchair users, baby strollers, etc.) Expected crossing places are typically at the end(s) of the segment, but could sometimes also be in the middle of the segment. Mark:

All: Curb cuts are present at **all** places where pedestrians or others are expected to cross the street.

Some: Curb cuts are present at **some** of the places where pedestrians or others are expected to cross the street, but not at all of these places

None: There are **no** curb cuts at places where pedestrians or others are expected to cross the street.

N/A: If neither side of the street has a sidewalk with a curb

4. **Pedestrian Crossing Signs or Signals (answer for the entire segment)**

For the entire segment, determine whether the following types of pedestrian crossing system(s) are present.

Traffic signal: The segment has a pedestrian crossing that is controlled by a traffic signal (stop light).

Stop sign: Traditional red sign or other sign telling car traffic to stop.

Yield sign: Sign telling car traffic to yield or give way to on-coming traffic.

Pedestrian activated signal: A signal intended to indicate to pedestrians when it is safe for them to walk. Usually, a red hand indicates to the pedestrian to stop, while a white human figure indicates that it is safe for the pedestrian to cross. The pedestrian signal may be automatic or have a mechanism (such as a button) by which the pedestrian can activate the crossing signal.

Pedestrian crossing sign: Sign warning motorists of the presence of pedestrians. May not be only at intersection.

Pedestrian overpass/underpass/bridge: A structure built either over the existing street or below street level to allow pedestrians and/or bicyclists to cross the street without encountering vehicle traffic.

5. **Sufficient Safe Crossing Opportunities**

Determine whether there are sufficient opportunities for the average individual to cross the street safely at this location. Answer yes if a typical person would not have to cross unsafely from this segment and if safe crossing is possible on this segment or nearby (within a short distance, say a block or so). Consider also the possible responses of children or teens who might be crossing independently. If the intersection is a cul de sac, mark N/A.

6. **Sufficient Convenient Crossing Opportunities**

Determine whether there are sufficient opportunities for the average individual to cross the street conveniently at this location. Answer yes if a typical person would not feel that he or she had to go noticeably out of his or her way to cross the street at a designated location. Also answer yes if the typical person would not be discouraged from crossing the street because designated places for crossing are too far away. If the intersection is a cul de sac, mark N/A.

7. **Banners**

For each segment, determine how many banners and relate signs are present. Usually, banners are fabric or vinyl, and are intended to mark special places or events. Include holiday or special events banners. Does not include standard city signage or other monuments or markers.

8a. **Pedestrianized Street**

Pedestrianized streets are blocked off to vehicular traffic. These streets are intended for use by pedestrians only. A pedestrianized street does not necessarily have to have pedestrians present while you are observing the segment to be marked as a pedestrianized street; rather it must be clear that motorized traffic is prohibited or permitted.

8b. **One-way versus Two-way Street**

One-way: Mark if the allowed direction of vehicle traffic travels only one-way.

Two-way: Mark if the vehicle traffic travels in both directions.

9. **Alleys**

Determine whether this segment is an alley. Alleys are typically pathways that are located behind buildings and do not have street names.

10. **Lanes for Cars**

For each segment, determine the number of designated lanes for cars on the street. Include turning lanes. Do NOT include parking lanes. Wide lanes that could reasonably fit more than one car across but that are designated for one car only should be counted as one lane. If there are no lanes designated for car travel (for example, on pedestrianized streets), mark N/A.

11a. **Open Views**

For each segment, assess whether it has a significant open views. Most segments have some view to somewhere, at least to other segments. This question asks specifically whether this view is somewhat more distinctive, in that its allows views to other places are notable and clear.

11b. **Attractiveness of View**

For each segment in which there is an open view, assess the attractiveness of that view.

Answer:

Attractive: The open view is pleasant or inviting (e.g., pleasant views of mountains, ocean, etc.)

Neutral: The open view is neither attractive nor unattractive

Unattractive: The open view is unpleasant or distasteful (e.g., unpleasant views of industrial properties, waste sites, etc.)

N/A (no views): If you marked that there was not an open view in question 11a.

12a. **Types of Land Uses**

For each segment, mark every type of land use that is present.

- Residential:** Focus here on the form of the buildings, not the population (e.g., seniors, families, etc.)
Single family home – detached: Houses for one household only, house stands alone. May be rental or owned.
Single family home/duplex – attached: Houses for two households, houses share at least one wall. May be rental or owned.
Town home/condo/apartment housing (3 units or more): Housing for three or more households, houses share at least one wall or floor/ceiling. May be rental and/or owned.
Mobile homes (including manufactured homes): Freestanding units, temporary or permanent structures, that are constructed elsewhere and driven to site.
Residential, other: Housing types not described above .
- School:** Includes public and private schools
Elementary , middle, or junior high school: Serves children in grades K–8 (may include higher and/or lower grades as well.)
High school: Serves children in grades 9–12.
University or college (includes all types of building forms): Includes colleges and universities, including community colleges and trade and technical schools.
School, other: Educational types not described above. Do not include child care here.
- Public space:** *Plaza, square, park, playground, landscaped open space, playing fields, garden:* Includes outdoor-oriented, generally accessible spaces that were developed or clearly intended for use by the public.
Public space, other: Public space type not described above. Do not include vacant or undeveloped land or recreational/sports/leisure facility.
- Recreational/leisure/fitness:** *Gym/fitness center:* Includes public or private gymnasiums or fitness facilities.
Movie theater: A building where films are shown to an audience.
Recreational, other: Recreational use not described above (e.g., pool). Does not include public spaces, above.
- Public/civic building:** *Community center or library:* Public building that houses activities for community residents, including a public building that allows residents to borrow books and offers other community services.
Museum, auditorium, concert hall, theater: Includes public buildings for exhibits and performances
Post office, police station, courthouse, Department of Motor Vehicles
Public building, other: Public building not described above. Does not include recreational/leisure/fitness uses or public outdoor spaces.

- Institutional: *Religious institution (church, temple, mosque, etc.):* Any structure intended to hold religious/spiritual events.
Hospital, medical facility, health clinic: Includes hospitals, urgent care facilities, and medical centers that serve large numbers of people, and that resemble facilities more than offices. Does not include private doctors' offices.
Institutional, other: Institutional uses not described above. Does not include office (below).
- Commercial: *Retail stores/restaurant:* Includes uses that sell food or other goods or (non-financial) services to the public (e.g., delis, restaurants, fast food, coffee shops, clothing stores, etc.)
Bank/financial service: Includes financial institutions and those that provide financial services to the public
Hotel/hospitality: Includes hotels, motels, bed and breakfasts, etc.
Car dealership: Includes places that sell new or used automobiles.
Gas/service station: Includes places that sell gas and that repair motor vehicles. Includes oil change, brakes, etc.
Commercial, other: Commercial uses not described above. Does not include offices.
- Office/service: *Offices:* Includes work spaces that are not primarily oriented to the public, such as administrative facilities. Does not include industrial/manufacturing.
Service facilities (including insurance offices, funeral homes, dry cleaning, Laundromats, etc.): Includes non-retail, non-financial facilities that may have customers, such as insurance offices, funeral homes, dry cleaning, Laundromats, etc.
Office/service, other: Includes offices not described above.
- Industrial/manufacturing: *Light industrial:* Includes uses involved in production of light manufacturing and industry. Typically "clean" industries. Includes auto paint and auto body repair shops.
Medium or heavy industrial: Includes uses involved in production of heavy manufacturing and industry. Typically less clean industries. Includes chemical plants, oil wells, etc.
Industrial, other: Industrial uses not described above. Does not include gas or service stations.

- Other: *Harbor /marina:* Includes places with boats dock, marinas, and related facilities.
- Undeveloped land:* Includes spaces that are left undeveloped or open, such as vacant lots or other spaces in which landscaping or other intentional indicators that space is intended for public are not evident. Less “nature-oriented” than what would count as natural area.
- Agricultural land, ranch, farming:* land that is utilized for farming, herding, ranching, etc.
- Nature feature:* Area that is highly natural in character. May be a dedicated or “unofficial” natural area. Usually includes features like trees, grasses, hills, rocks, and/or water, etc. Do not include public spaces, above.
- Other:* Other land use that is not indicated above.

12b. **Vertical Mixed Use**

Determine whether there are buildings on the segment that contain vertical mixed use. Vertical mixed use refers to the presence of more than one type of use on different floors in the same building or structure. Usually, residential or office/service is located on an upper story, with commercial/retail or office/service below. If there are no buildings on this segment or if buildings are all one story, mark N/A.

12c. **Distinctive Retail Types**

Determine whether any of the retail uses on this segment can be categorized as any of the following:

Big Box shops: A large retail facility, typically with only one entrance and blank walls, often (but not always) surrounded by a large parking lot. There is only one tenant per building (e.g., Target, Walmart, Toys-R-Us, etc.)

Shopping mall: Clusters of stores and related uses, including some public spaces for customers. May be enclosed or open, usually surrounded by extensive parking lots. Most stores are typically entered from interior courts or spaces, rather than directly from the street.

Strip mall/row of shops: Typically retail stores organized along a “strip” or row, usually with parking lots between the buildings and the street. Strip malls typically are composed of one structure, with one roof and with interior walls separating individual stores. Stores are typically entered directly from the outdoors, and not from some designated interior space (enclosed or open).

Drive-thru: Accommodates automobiles to drive directly up to a window and obtain service/products. Most common for fast food, may also be banks or other facilities.

13a. **Public Space**

For each segment, rate the attractiveness of each of the following types of public spaces. Mark “no space” if the space is not present.

Park/playground: Area designed for active and/or passive uses (for example, playing, sitting, picnics.) May include features for playing. May be only dedicated, landscaped open space intended for public use or for public viewing.

Playing or sport field: Area intended for games or sports (for example, soccer field, basketball court, etc.)

Plaza/square/courtyard: Area that typically includes some “hard surfaces” on the ground (pavement, stone, etc.) and is usually adjacent to one or more buildings. Typically not designed for active play.

Public garden: Landscaped area typically designed for viewing and appreciation of landscaping, plants. Includes community gardens, which allow residents themselves to participate in gardening.

Beach: Area adjacent to ocean, lake or similar water body. May be sandy. Often used for active and passive recreation.

Other: Other outdoor space that seems to be intended for public use and that is accessible to the public. Does not include streets, sidewalks, or above elements. Often publicly owned, but not necessarily so.

13b. **Use the Public Space?**

For segments with public space, determine whether it is possible for most people to get into or otherwise use the public space. Mark Unclear if not evident whether most people can use the public space. It is still accessible even if users have to pay a fee to enter. Mark N/A if there are no public spaces.

14. **Other Types of Land Uses**

For each segment, determine how many of the following land uses are present on the segment.

Bars/night clubs: Establishments that are intended primarily for serving and drinking alcohol and/or dancing. Does not include restaurants that also serve alcohol

Adult uses: Establishments of an explicitly sexual nature (for example, adult book stores, adult video parlors, etc.)

Check cashing/pawn shop/bail bond stores: Establishments that are primarily intended as places to cash checks on the spot for customers. Also includes places that provide cash for individuals in exchange for household and other goods. Also includes places that provide cash for bail bonds. Primary purposes of these places is to provide ready cash to individuals. Do not consider automatic teller machines (ATM’s), banks, savings and loans, or other more traditional lending establishments.

Liquor stores: Establishments that sell liquor (including beer, wine, etc.) for customers to take away. Consider also stores that sell limited other goods (e.g., snacks, cigarettes, etc.) if it appears that liquor is the primary item sold at the store. Include if the store name or a store sign indicates prominently that they sell liquor.

15. **Gathering Places**

For each segment, indicate how many of the listed gathering places are present. These are places that encourage people to linger and to socialize with friends and/or strangers. Mark:

Restaurants: Sells food to eat there or take away

Coffee shops: Sells coffee to drink there or take away. May also sell food.

Libraries/bookstores: Can read and/or purchase books and related material.

“Corner” store: Sells convenience items, especially for local residents (e.g., snacks, newspapers, some groceries, etc.)

Art or craft galleries: Displays and sells arts, crafts, or related items.

Farmer’ market: Sells fresh produce and related items, typically grown locally. May be temporary or permanent.

16. **Nature Features**

For each segment, determine whether any of the listed nature features is present on the segment.

17. **Existence of Barriers/Overcoming Barriers**

For each segment, first determine if each of the potential barriers listed are present on this segment.

A barrier must prevent a person from walking or bicycling to a destination on the other side of the object. For an object to serve as a barrier, there must be a possible destination an individual might choose to walk or bicycle to on the other side of the object. For example, if a river runs parallel to the segment and no possible destination exists on the other side of the river, the river would not prevent that person from walking to that designation, so the river should not be marked as a barrier.

For an object to function as a barrier, it is not enough for the object (highway, river, etc.) to be present. The object must prevent walking or bicycling to a destination on the other side of the object. For example, a segment may contain a railroad track, but if that railroad track does not present a physical barrier to a possible destination that one might choose to walk or bicycle to, the fence would not be marked as a barrier. Possible destinations must be generally accessible to the public.

Barriers may be tangible physical barriers or perceived psychological barriers. A psychological barrier discourages people from walking in that direction (such as a major 8 lane road), even if walking is physically possible. Only obvious psychological barriers should be marked.

Mark:

No barrier: if the barrier is not present on this segment

If a barrier is present, you must then determine whether or not the barrier can be overcome. A reasonable means of getting around a barrier is one such that walking and bicycling travel is not significantly impeded. An example of a reasonable means of overcoming a barrier includes the presence of a pedestrian overpass/underpass to overcome the barrier of a street with more than six lanes of traffic.

Can be overcome: If the barrier is present on the segment but the barrier can be reasonably overcome. A reasonable means of overcoming the barrier is present.

Can be somewhat overcome: If the barrier is present on the segment but the barrier can be somewhat reasonably overcome. A somewhat reasonable means of overcoming the barrier is present. The barrier can be overcome but not without some effort.

Cannot be overcome: If the barrier is present on the segment but the barrier cannot be overcome. A reasonable means of overcoming the barrier is not present.

18a. **Presence of Sidewalks**

Determine on how many sides of the segment there is a sidewalk present. Mark:

0: if no sidewalk is present on either side of the segment.

1: if a sidewalk is present on one side of the segment.

2: if a sidewalk is present on both sides of the segment.

**Note that the sidewalk does not have to be complete.

18b. **Completeness of Sidewalks**

Determine whether the sidewalk is complete or incomplete on one or both sides of the segment.

Mark:

Yes: At least one side of the segment has a complete sidewalk.

No: There is not at least one side of the segment with a complete sidewalk.

N/A: There are no sidewalks.

18c. **Sidewalk Maintenance**

For segments with sidewalks, assess the maintenance or physical condition of the sidewalk.

Answer:

Moderate or good: The sidewalk has few or no bumps, cracks, holes and weeds.

Poor: The sidewalk has many bumps, cracks, holes and weeds.

Under repair: The sidewalk is undergoing repairs.

N/A (no sidewalk): If there are no sidewalks on the segment.

18d. **Special Paving**

For each segment, determine whether there is a special paving on the street or sidewalk that makes the sidewalk look distinctive. Paving treatments include distinctive materials such as brick, tile, marble, colored concrete, wood, etc. Mark No if the special paving is in the crosswalk only. Mark N/A if there are no sidewalks present on the segment.

18e. **Protection from Weather**

For each segment, determine how much of the sidewalk is covered by the following architectural elements that help provide protection from sun, rain, or snow. Mark all that apply:

Arcades: A roof over the sidewalk or outdoor area. Arcades are made up of a series of arches covered by a roof and supported by columns. They are typically connected to the building.

Awnings: A roof-like cover or canopy that is fixed or collapsible, that comes out from the building over the sidewalk or outdoor area. Awnings are meant to provide protection from sun, rain or snow. They can be made of canvas, aluminum or other material.

Other: Sidewalks or outdoor areas are protected from the sun, rain, or snow by some other feature not listed above.

N/A: There are no sidewalks present on this segment.

18f. **Sidewalk Buffer**

For segments with sidewalks, determine whether there is a buffer that provides some space and or some “psychological distance” between individuals on the sidewalk and the street. Buffer can include features like parked cars, landscaped strip, row of street trees, etc. Mark N/A if there is no sidewalk present on this segment.

19. **Sidewalks/Greenbelts/Trails/Paths**

Do not include sidewalks that follow the street (questions 18a and 18b) in this answer. Mark:

Yes: There are other designated paths other than sidewalks to accommodate pedestrians (e.g., footpaths, greenbelts, trails.) Do not include paths that are not designated (for example, informal path worn into grass that does not appear to an “official” trail.)

No: There is no other pathway for pedestrians.

20a. **Presence of Bicycle Lanes**

Determine whether designated bicycle lanes are present. Bike lanes should be physically marked by painted lines and/or signage. Do not count regular sidewalks or wide lanes for cars as bike lanes.

20b. **Demarcation of Bicycle Lane**

Determine how the bicycle lanes are marked on the segment. Mark:

On road, painted lines/reflectors: The bicycle lane is marked only by a painted line or by reflectors on the pavement. Demarcation could be easily traversed by car.

On road, physical separation: The bicycle lane is on the street, but is physically separated from the motorized traffic on the segment by a more significant barrier, such as a curb. The bicycle lane continues to be part of the road network/street.

Off road: Bicycle path is not located on the street (e.g., bike trail). May be the same as other path for pedestrians (question 19).

N/A (no bicycle lane): If there is no bicycle lane present on this segment.

21a. **Mid-Block Crosswalk**

For each segment, determine whether there is a marked *mid-block* crosswalk for pedestrians (i.e. not at the corner). Do not count if this mid-block cross is at a “T” intersection with another lane for car travel.

21b. **Mid-Block Crosswalk Markings**

For each segment in which there is a marked mid-block crosswalk, determine whether the following types of marking are present.

White painted lines: The crosswalk is designated by two parallel lines that are painted white.

Colored painted lines: The crosswalk is designated by two parallel lines that are painted in a color other than white.

Zebra striping: The crosswalk is designated by close diagonal lines that are painted white or another color.

Different road surface or paving: The crosswalk is designated by a special paving treatment, such as brick, tile, or colored concrete.

Other: The crosswalk is designated by some other marking on the pavement that are not listed above. Do not include traffic signals or stop signs here.

22. **Steepness**

For each segment, determine how steep or hilly that segment is, or what its grade or slope is.

23. **Outdoor Dining**

Indicate how many outdoor dining areas are provided. Outdoor dining areas are typically adjacent to restaurants, delis, coffee shops, etc. Includes outdoor furniture that provides seating intended to be used for primarily for eating or drinking. Do not include seating intended primarily for sitting and not dining (e.g., bus stop). Seating areas can be located on the sidewalk or on any other public area, such as a plaza.

24. **Street Furniture**

For each segment, determine how much of each of the types of street furniture are present.

Mark:

Benches (not a bus stop), chairs and/or ledges for sitting: Places intended for individuals to sit in public areas.

Bus stops with seating: Seating areas associated with bus stops. May or may not be covered.

Do not include if only bus stop sign with no designated seating.

Heat lamps: Overhead lamps or lamps on posts that provide heat in outdoor areas.

Bike racks: Fixtures intended for individuals to use to lock bikes.

25. **Public Restrooms**

For each segment, determine if there are public restrooms that are accessible. Do not include restrooms in private or commercial establishments that do not appear to be generally open to the public (for example, restrooms in restaurants that are intended only for restaurant patrons.)

26a. **Street Trees**

For each segment, determine how many street trees there are (relative to the size of the segment). Street trees are located along the public right of way. They are typically between the sidewalk and the street or, if there is no sidewalk, trees usually line the street. Consider both sides of the segment in marking your answer.

26b. **Sidewalk Shade**

For each segment with sidewalks, determine to what extent the sidewalk is shaded when the sun is up (e.g., by trees, awnings, buildings, etc.). Consider conditions that are usually present for most of the day.

27. **Building Height**

For each segment, determine the number of stories of most of the buildings on the segment. If there are buildings of different heights without one height prevailing, mark No predominant height. If there are no buildings, mark N/A.

28. **Abandoned Buildings**

For each segment, determine whether there are buildings that appear to be abandoned. A building would likely be abandoned if the windows are boarded up or broken or if there are other visible signs that no one is inhabiting/or planning to inhabit the building. Mark:

Some/a lot: There are several or many buildings on the segment that appear to be abandoned.

Few: There are only one or a small number of buildings that appear to be abandoned.

None: There are no abandoned buildings.

N/A: No buildings.

29. **Building Coverage**

For each segment, determine whether at least 50% of the segment contains buildings.

30. **Bars on Windows**

For each segment, determine how many of the buildings have windows with bars. Consider bars that are attached to windows that appear to be permanent, and that appear to be intended to prevent entering through the window from the outdoors.

31. **Front Porches**

For each segment, determine how many buildings have front porches. Front porches are designated spaces on the front of the building that are large enough to accommodate two or more chairs for sitting. Chairs need not be present to count as a front porch. Porches can vary in size and type. Porches typically function as an “outdoor room.”

32. **Blank Street Walls**

For each segment, determine how much of the segment is lined with buildings with blank walls. Blank walls refer to sides of buildings that do not have windows. Also consider how much of the segment is lined with other kinds of blank walls, such as walls for sound barriers from heavy traffic.

33a. **Garage Doors**

For each segment, determine how many buildings have garage doors that face the street. Do not consider public parking lots (covered or uncovered) as garages. If there are no buildings or no garages on the segment, mark N/A.

33b. **Prominent Garage Doors**

For each segment with garages, determine the prominence of most garage doors from the front of the buildings (i.e., from the street, in most cases.) How “dominant” are the garage doors in the appearance of the building? Mark N/A if no garage doors face the street on the segment.

34a. **Parking Structure**

For each segment, determine whether there is a parking structure visible. Do not consider parking structures that may be present that are not visible (e.g., completely underground and not detectable from the segment.)

34b. **Predominant Ground Floor Use**

For each segment with parking structures, determine if the ground floor contains a non-parking use (for example, retail, offices, bank). Mark N/A if no parking structure is present.

35. **Driveways**

For each segment, determine how many driveways there are that can be seen from the street. Driveways are typically part of private property and do not have street names.

36. **Maintenance of Buildings**

For each segment, assess the quality of the maintenance of the buildings. Do not consider litter in this response. Mark N/A if there are no buildings.

37. **Graffiti**

For each segment, determine whether there is any visible graffiti, or “unapproved” writing, signs, or symbols on buildings, streets, or other objects.

38. **Litter**

For each segment, determine whether there is any visible litter.

39. **Dumpsters**

For each segment, determine how many dumpsters are visible from the street. Consider only large trash receptacles for businesses, residential complexes, etc. Do not include smaller trashcans that could be emptied by an individual without a machine.

40. **Overhead Wiring**

For each segment, determine whether there is electrical wiring that is visible. Typically, overhead wiring is more common in older communities. Newer communities often locate electrical wiring underground.

41. **Presence of Outdoor Lighting**

For each segment, determine whether there is outdoor lighting present. Primarily consider lighting that is intended to light public paths and public spaces, such as sidewalks, streets, and walkways, where the public might travel. Lighting may be on public or private property. Do not consider lighting that is only intended to light small, mostly private areas (such as front doors of homes).

42. **Freeways**

For each segment, determine how or if a freeway overpass connects to the segment.

Under a freeway overpass: The segment (part or entire) is located beneath a freeway overpass.

Next to a freeway: The segment (part or entire) abuts a freeway.

IS a freeway overpass: The segment itself (part or entire) is actually a freeway overpass, on which pedestrians or bicyclists are permitted.

None of the above: This segment does not have any of these relationships with a freeway

43. **Speed Limit**

For each segment, determine the posted speed limit in miles per hour (mph) (for paper version of the inventory; use categories for Microsoft Access version of the inventory) Only note the speed limit if it is actually posted on that segment; do not generalize from other nearby segments. Often, the speed limit will not be posted. If the speed limit is not posted *on that segment*, mark “Not posted.” Note that this question varies for Access and paper version of the instrument.

44. **Traffic Slowing (or Traffic Calming)**

For each segment, determine if features are present that could slow down traffic. Mark Yes or No for each.

Speed bump/speed hump/raised crosswalk or dips: These devices are intended to make cars slow down so that they don't hit this bump in the road. Included are speed bumps and larger speed humps. Also included are speed tables, which have a flattened rather than a rounded top, and are more like flattened “table tops” in the road. Also included are raised crosswalks, which are designated lanes for pedestrian crossing that are raised higher than the adjacent road.

Rumble strips or bumps: These are small markers (or “dots”) or strips of markers on the road that are slightly raised, to warn drivers when the bumps or strips are driven over. Sometimes these bumps are also reflective to show lane boundaries. Also includes grates or cobblestones that are intended to serve this function.

Curb bulb out/curb extension: These are extensions from the sidewalk out into the street, which make the street somewhat narrower at the place where pedestrians cross.

Traffic circles/roundabout: These are circular medians in an intersection that take the place of traffic signals in most instances.

Median: These are permanent “islands” in the center of the road that reduce the size of the road, creating fewer or more narrow lanes for traffic. Medians may or may not have landscaping, and may or may not include a place for pedestrians to stop or wait.

Angled/ On-street parking: Parallel or angled parking that is located between the street and the sidewalk. Cars need not be present while conducting observations.

45a. **Cul-de-sacs/Street Closings**

For each segment, determine if there is a cul-de-sac or street closing. Mark:

Yes: At least one end of street is closed to car traffic by a cul-de-sac or permanent street closing. A cul-de-sac is a street that does not go all the way through; it is a dead-end. Typically, the “closed” end has buildings or houses around an open space that sometimes includes an island at the end of the street on the “closed” end. A street closing is a street that is not open to cars for through travel. The closed end may include a chain or fence, landscaping, or other physical barrier to show that car traffic cannot pass through.

No: No part of the segment is closed to through travel by cars.

45b. **Pedestrian Access Point**

For each segment with a cul-de-sac or permanent street closing, indicate whether there is a pedestrian access point, or a pass through where pedestrians are allowed to cross through the closed street end to adjacent streets/segments. Do not include pass throughs that do not appear to be intended (for example, a hole cut in a chain link fence to allow people to sneak through.) Mark N/A if the segment is not a cul de sac or if there is not a permanent street closing.

46. **Attractiveness of the Segment**

Rate the attractiveness of the segment. Attractiveness refers to the overall pleasantness of the appearance of the buildings, landscaping, and street. Attractive is not the same as interesting. A segment could be attractive or pleasant without necessarily being distinctive, interesting, or unique.

47. **Historic Appearance**

Determine whether the buildings appear to be historic. There are no fixed criteria for historic appearance, but generally, historic buildings would be those that appear to be noticeably older and have some positive quality (not just old). If there are no buildings on the segment, mark NA.

48. **Interesting Architecture**

Rate the interestingness of the architecture or general design of the segment. Interesting refers to how remarkable, fascinating or attention-grabbing the segment is (in color, architectural style, etc.). Interesting is not the same as attractive; architecture could be interesting without necessarily being pleasant or attractive. You don't have to like it for it to be interesting.

49. **Street Vendors/Stalls**

For each segment, determine how many street vendors or stalls are present (e.g., selling food, newspapers and magazines, jewelry, shoe shines.) Vendors may sell from carts, semi-permanent or permanent stalls, or directly on the sidewalk.

50. **Public Art**

For each segment, determine whether public art is visible. This includes artwork that is oriented towards and visible to the public. Most often, public art is located outdoors. It can be a public sculpture, statue, a mural, etc. Do not include fountains or public places themselves (plazas, etc.) as public art.

51. **Billboards**

For each segment, determine how many billboards are present. Billboards refer to large, fixed signs used for advertising. Billboards may be freestanding or mounted on the sides of buildings. Do not include banners that are being used to identify a neighborhood/district or banners used to promote a city event/holiday.

52. **Safety**

For each segment, determine how safe you feel. Do not consider traffic safety here.

53. **Loose/Barking/Unsupervised Dogs**

For each segment, determine if there are any loose/barking/unsupervised dogs that seem menacing (not in yards or on chains or directly supervised by an individual.)

54. **Olfactory Character**

For each segment, determine whether the smell/odor that dominates the segment unpleasant.

V. SETTING LEVEL QUESTIONS

The following questions measure aspects of the entire setting, not only a single segment.

1b. Dominant Land Use

Determine whether settings has a *predominant* residential land use. Mark:

Residential: The setting is mostly comprised of homes. Can be any type (e.g., single family homes, condos, apartments.).

Mixed-use: The setting is comprised of a balance of residential and non-residential uses (e.g., housing and commercial or office.)

Other: The setting is mostly comprised of a use that is not residential (e.g., commercial, office, industrial.)

2a. Existence of Barriers/Overcoming barriers

First, determine if each of the potential barriers listed are present in this setting.

A barrier must prevent a person from walking or bicycling to a destination on the other side of the object. For an object to serve as a barrier, there must be a possible destination an individual might choose to walk or bicycle to on the other side of the object. For example, if a river runs parallel to the segment and no possible destination exists on the other side of the river, the river would not prevent that person from walking to that designation, so the river should not be marked as a barrier.

For an object to function as a barrier, it is not enough for the object (highway, river, etc.) to be present. The object must prevent walking or bicycling to a destination on the other side of the object. For example, a setting may contain a railroad track, but if that railroad track does not present a physical barrier to a possible destination that one might choose to walk or bicycle to, the railroad track would not be marked as a barrier. Possible destinations must be generally accessible to the public.

Barriers may be tangible physical barriers or perceived psychological barriers. A psychological barrier discourages people from walking in that direction (such as a major 8 lane road), even if walking is physically possible. Only obvious psychological barriers should be marked. Mark:

No barrier: if the barrier is not present in this setting

If a barrier is present, you must then determine whether or not the barrier can be overcome. A reasonable means of getting around a barrier is one such that walking and bicycling travel is not significantly impeded. An example of a reasonable means of overcoming a barrier includes the presence of a pedestrian overpass/underpass to overcome the barrier of a street with more than six lanes of traffic.

Mark:

Can be overcome: If the barrier is present in the setting but the barrier can be reasonably overcome. A reasonable means of overcoming the barrier is present.

Can be somewhat overcome: If the barrier is present in the setting but the barrier can be somewhat reasonably overcome. A somewhat reasonable means of overcoming the barrier is present. The barrier can be overcome but not without some effort.

Cannot be overcome: If the barrier is present in this setting but the barrier cannot be overcome. A reasonable means of overcoming the barrier is not present.

3. **Public Space**

Throughout the setting, rate the attractiveness of each of the following types of public spaces. Mark “no space” if the space is not present.

Park/playground: Area designed for active and/or passive uses (for example, playing, sitting, picnics.) May include features for playing. May be only dedicated, landscaped open space intended for public use or for public viewing.

Playing or sport field: Area intended for games or sports (for example, soccer field, basketball court, etc.)

Plaza/square/courtyard: Area that typically includes some “hard surfaces” on the ground (pavement, stone, etc.) and is usually adjacent to one or more buildings. Typically not designed for active play.

Public garden: Landscaped area typically designed for viewing and appreciation of landscaping, plants. Includes community gardens, which allow residents themselves to participate in gardening.

Beach: Area adjacent to ocean, lake or similar water body. May be sandy. Often used for active and passive recreation.

4. **Presence of railroad**

Throughout the setting, determine whether a railroad track is present.

Appendix A: GIS Measures

As noted in **I. Introduction**, a limited number of variables can be measured using Geographic Information System (GIS) rather than through in-person observations. For researchers who do not have access to GIS systems, these items can be skipped.

1. Density of Origins

Population density can be used to measure the density of origins. For each setting, GIS programs can be used to identify the census block(s), block group(s), or tract(s) that comprise the setting. Data on population and land area in the census blocks can then be obtained from census data. As an example, the U.S. Census Bureau web site has population density data for census tracts, which can be obtained through the following steps:

Go to the Census Bureau web site: <http://www.census.gov>

Choose “American FactFinder” from left side menu bar

Under “Getting Detailed Data,” go directly to “data sets”

Choose “Geographic Comparison Tables” from right side menu bar

In the drop-down menu for “Select a geographic type,” choose “county”

In the drop-down menu for “Select a state,” choose the state that contains your setting

In the drop-down menu for “Select a geographic area,” choose the county that contains your setting

In the drop-down menu for “Select a table format,” choose “county – census tract”

Click “Next”

In the menu for “Select a table and click,” choose “GCT-PH1. Population, Housing Units, Area, and Density: 2000”

Click “Show Result”

Table lists census tracts in the county you selected, land area (in square miles), and population density (in persons per square mile).

Note that census tracts will be too large for most settings. Users should obtain population density for smaller census block groups or blocks. Also, for most settings, census geography will not be contiguous with setting definitions. Users will have to either choose the census geographic units that best correspond to the setting or define settings based on census geography, e.g. by defining settings based on block or block group boundaries.

2. Density of Destinations

Researchers can measure this either by the density of jobs per land area or by the density of land uses (e.g., shopping, office, employment) by land area. Neither job data nor land use data are available from the census.

Many metropolitan planning organizations have data on jobs for census geographies – census blocks, block groups, or tracts. Researchers should take care to obtain employment-at-place data, which are data on the number of jobs in a geographic area, as opposed to data on the number of employed residents in a geographic area. Due to commuting, the number of jobs in small geographic areas can be very different from the number of employed residents in the same area. To proxy for the end of commute trips, researchers could gather data on the number of jobs. In some metropolitan areas, employment data will be available for unique geographies,

often organized into transportation analysis zones, as opposed to census geographies. Large planning departments (counties, cities) may also have these data. Land area data can typically be obtained from the same agency that compiles the employment data, or from the census if census geography is used.

In many studies of active transportation (walking, bicycling), destinations to shopping, education, and entertainment are of particular interest. In some cases land use data for parcels will be available. City governments are typically the best source for these data. Such data could be used to obtain counts of the number of land uses by type (commercial, entertainment, education, or other types) with the setting area.

3. **Intersection Pattern**

Intersection pattern can be measured by two variables: the percentage of street intersections within the setting that are four-way, and the number of intersections per square mile within the setting area. Most GIS programs can provide information for both variables. The percentage of street intersections that are four-way gives a measure of the extent to which the street network in the setting follows a grid pattern. The density of street intersections per square mile can proxy for average street block size.

4. **Street Width**

When GIS data are available, researchers can use GIS maps to calculate street widths for segments in the setting. If street width varies along the segment, the width at mid-block should be used. When GIS data are not available, street width can be measured in person with rolo-tape measuring devices.

5. **Street Length**

GIS data, when available, can also be used for this, measuring the distance between the two intersections that define the segment. Average street length for the setting can be effectively proxied by either the number of intersections per land area in the setting or the average census block size in the size. Street length can also be measured in person, measuring the length of the segment in feet, rounding to the nearest foot, from intersection to intersection.

Appendix B Inventory for Observation of Non-Linear Settings

The following, shortened version of the instrument can be used to observe settings that are not linear in their organization (see **II. Getting Started.**) This version of the instrument was not tested for reliability in non-linear settings.