UNIVERSAL DESIGN - UNIVERSAL DELIGHT:

INCLUSIVENESS

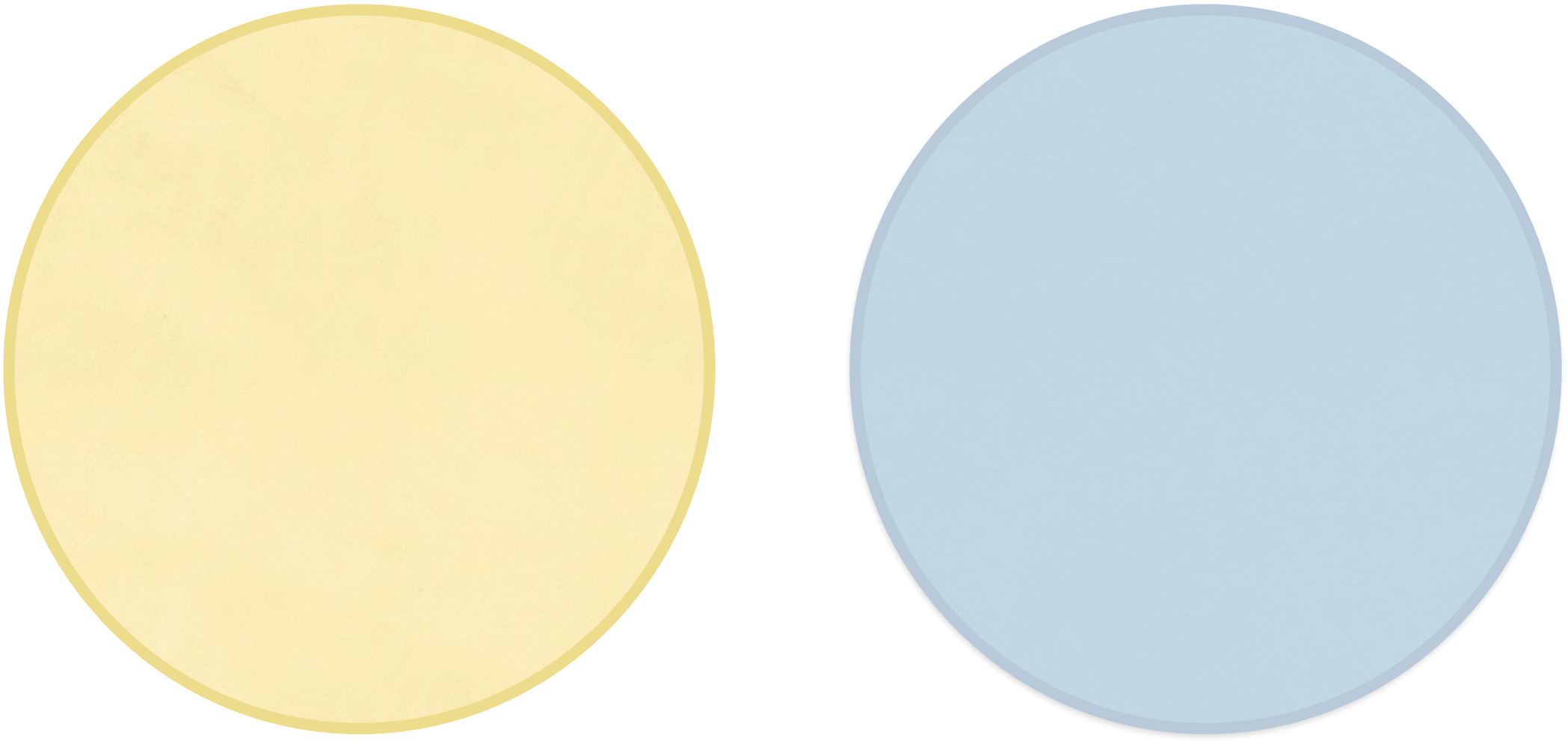
AND THE

AMERICANS WITH DISABILITIES ACT

Product Design 340
8 May 2017

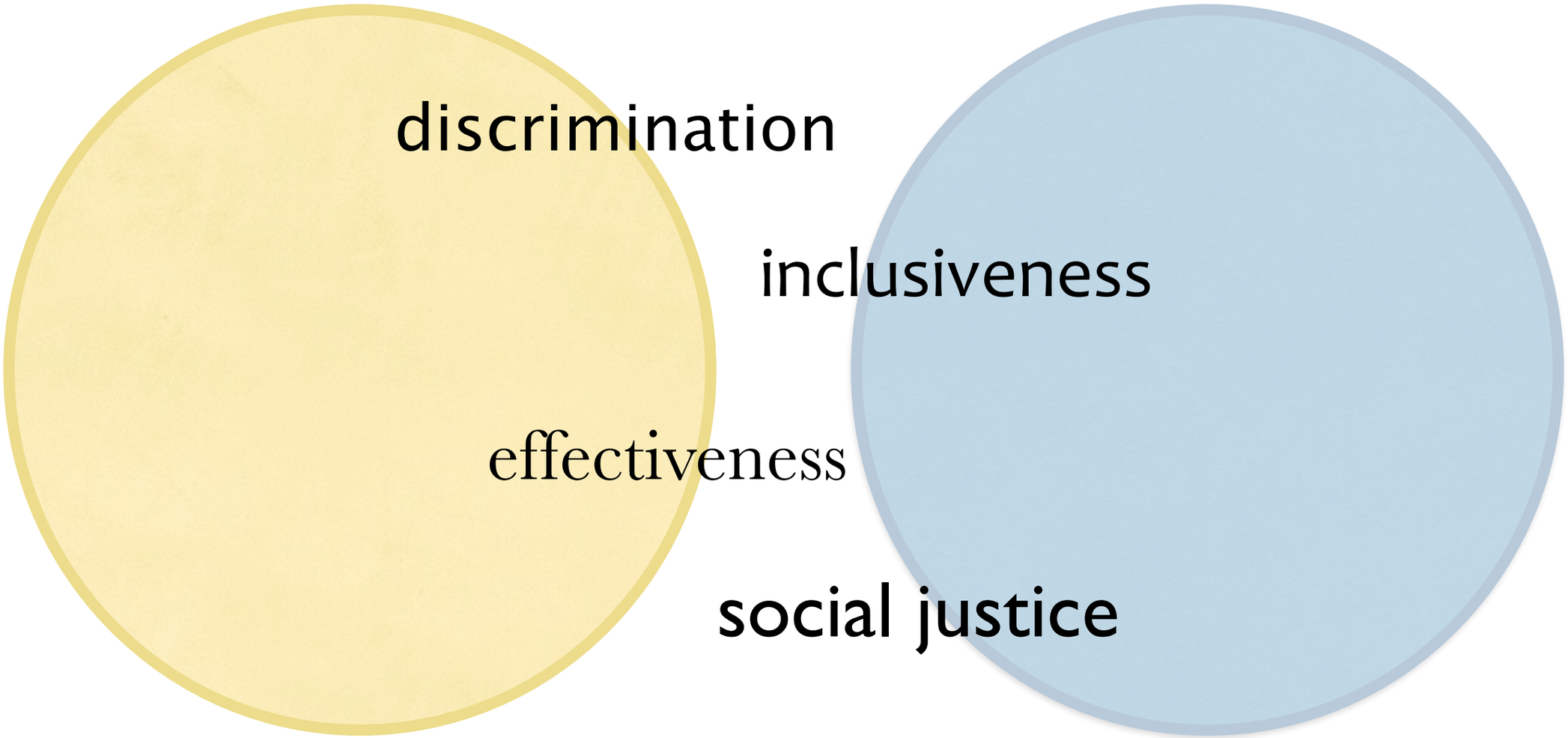
design

accessibility



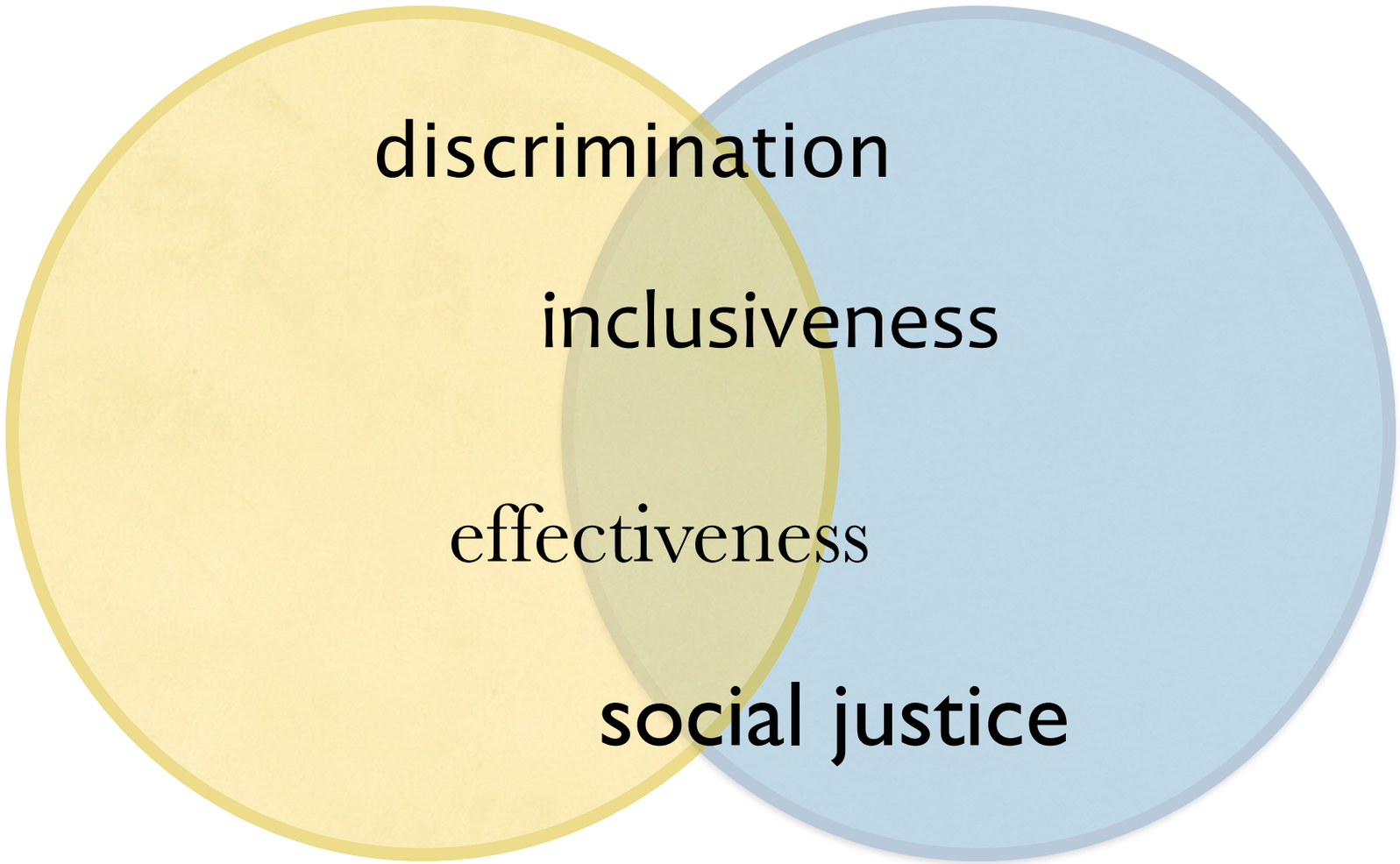
design

accessibility



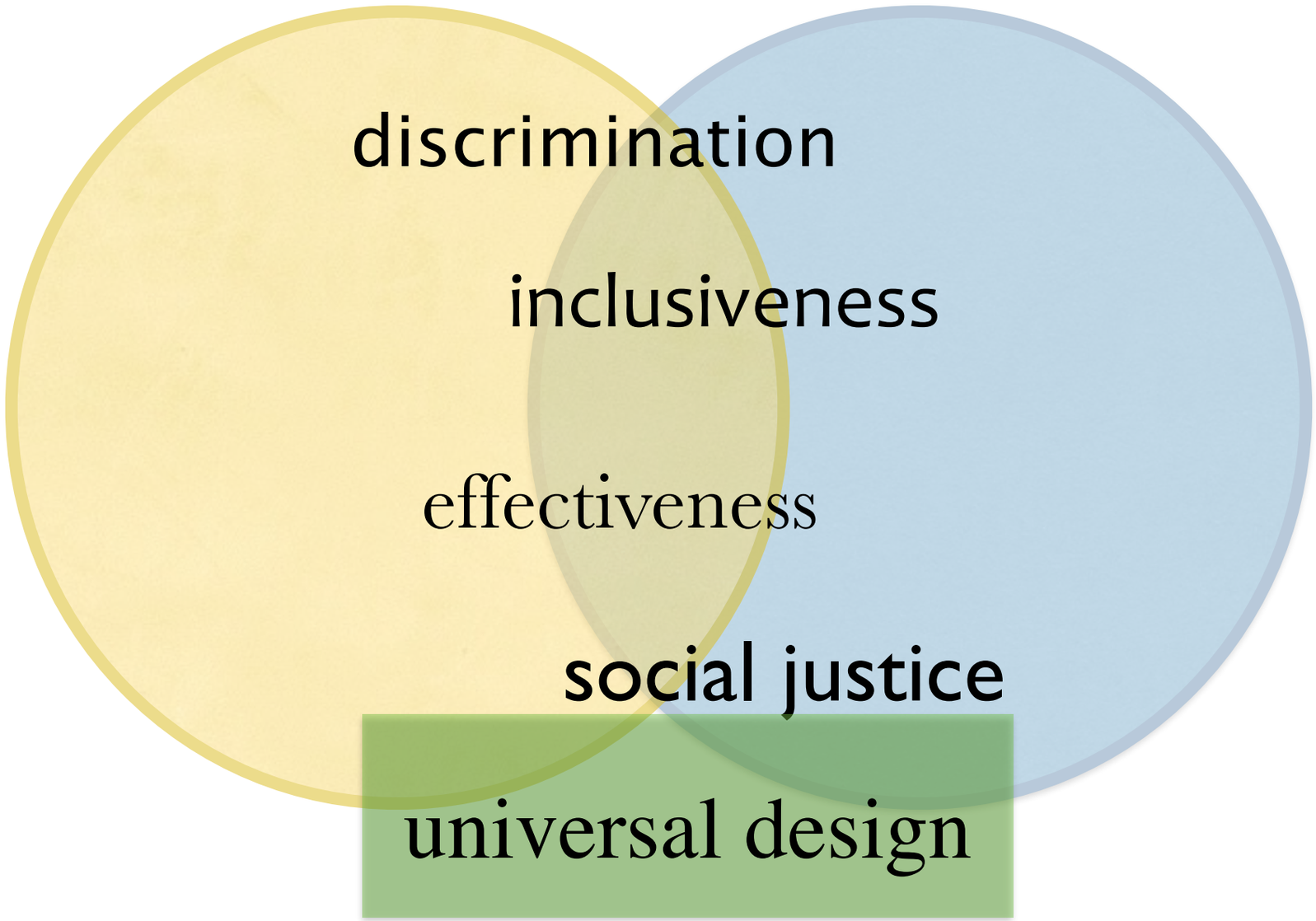
design

accessibility



design

accessibility




RND
FM
AM
CD
AUTO
KLCC89.7
89.7
SCAN
EXIT
VOLUME
PUSH POWER
BASS
TREBLE
BALANCE
FADER
SOURCE
ON AC OFF
1
2
3
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6
R


89.7 KLCC89.7
LO
LO
RADIO
MEDIA
TEL
MY CAR
NAV
SOUND
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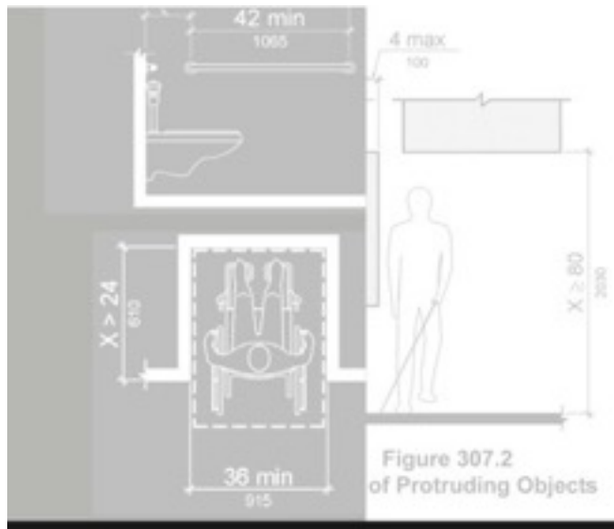
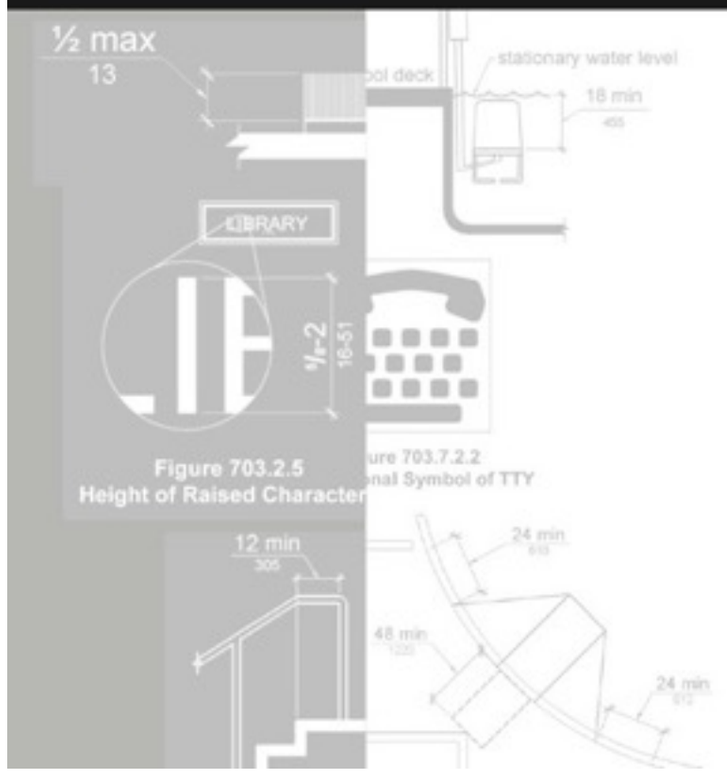
Owners: ADA standards & mobility

PERCEPTION
is the core problem



2010 ADA Standards for Accessible Design



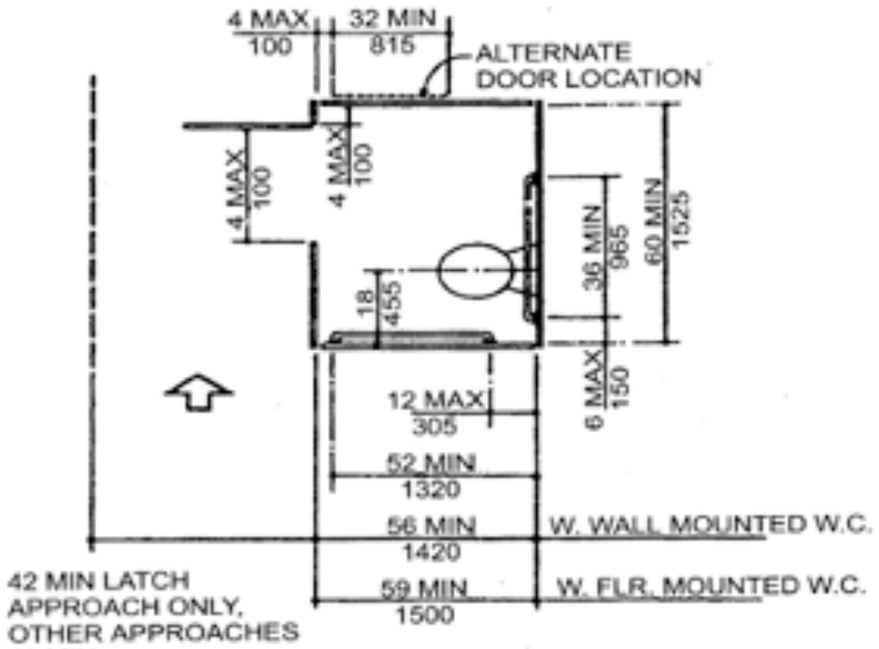
Department of Justice
September 15, 2010

Community view of accessibility

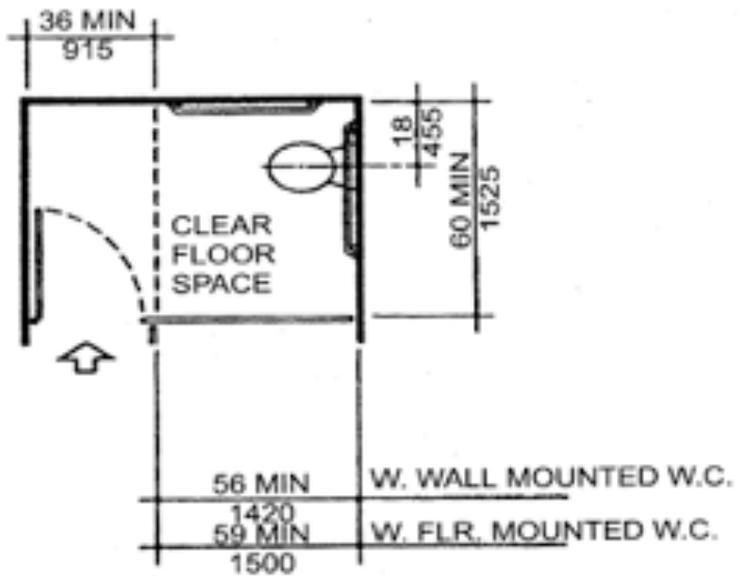
Community view of accessibility

Architects' view of accessibility

- code compliance



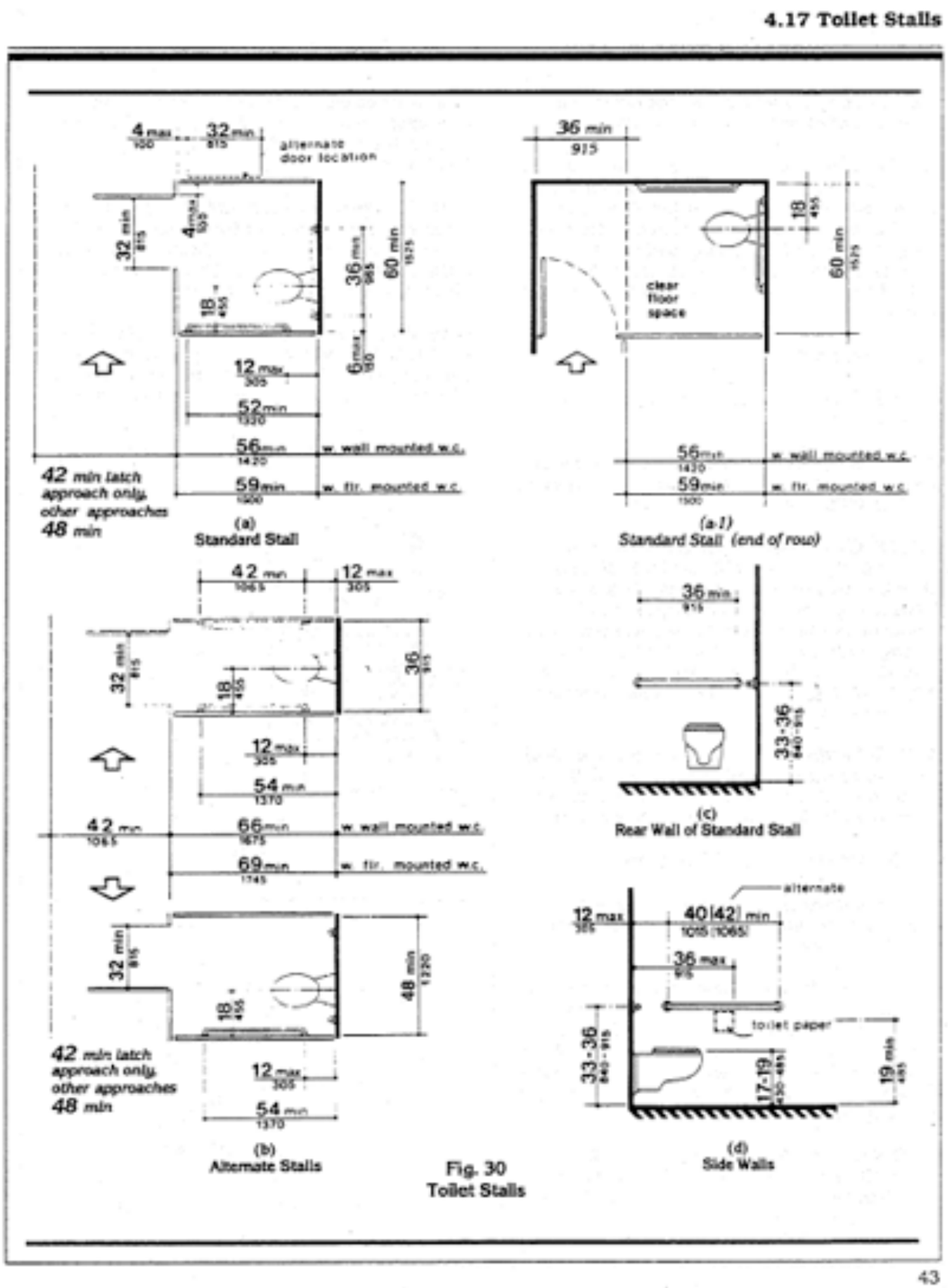
(a)
STANDARD WALL



(a-1)
STANDARD STALL (END OF ROW)

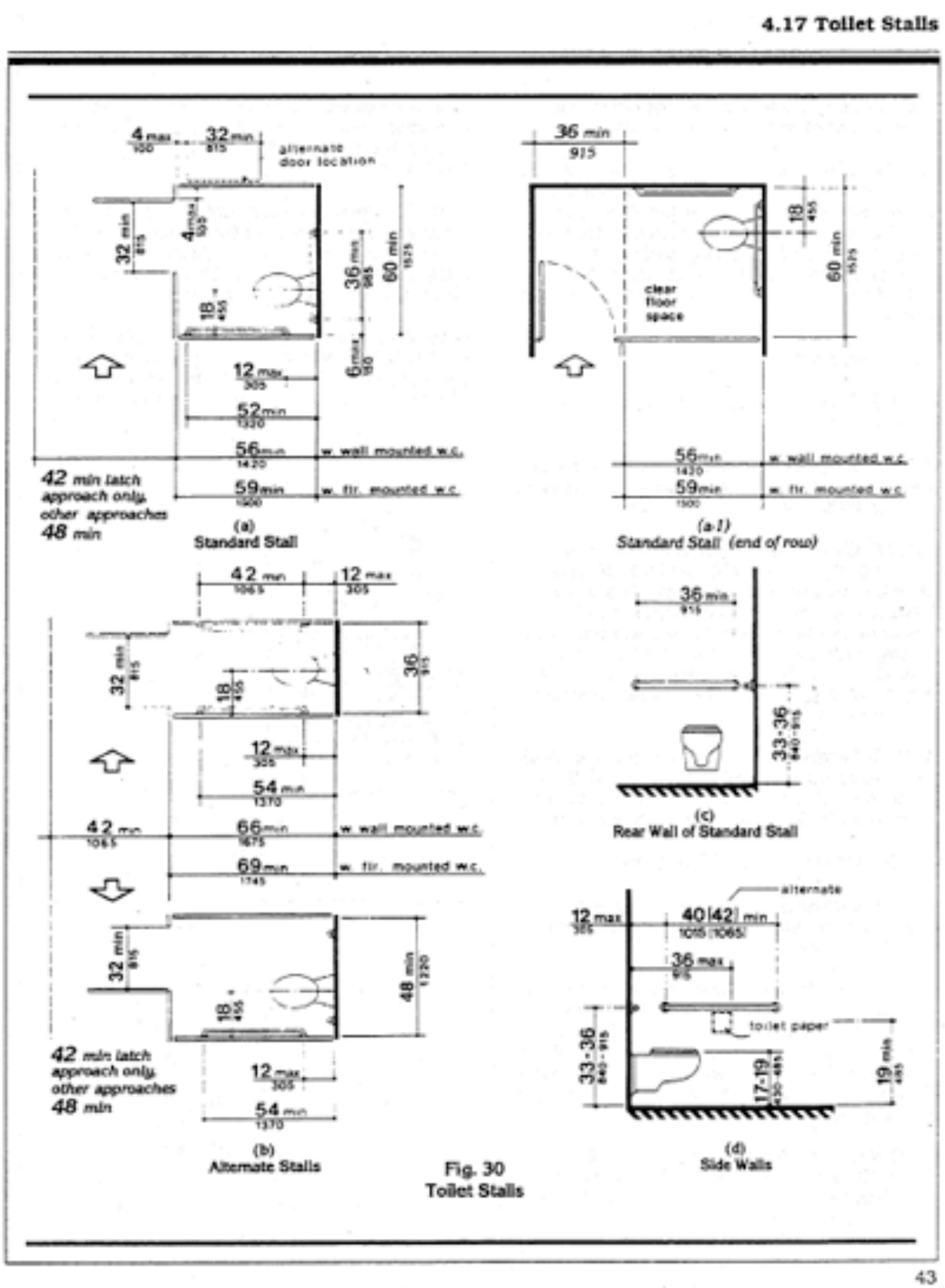
ADAAG FIGURE 30
TOILET STALLS

Architects' view of accessibility



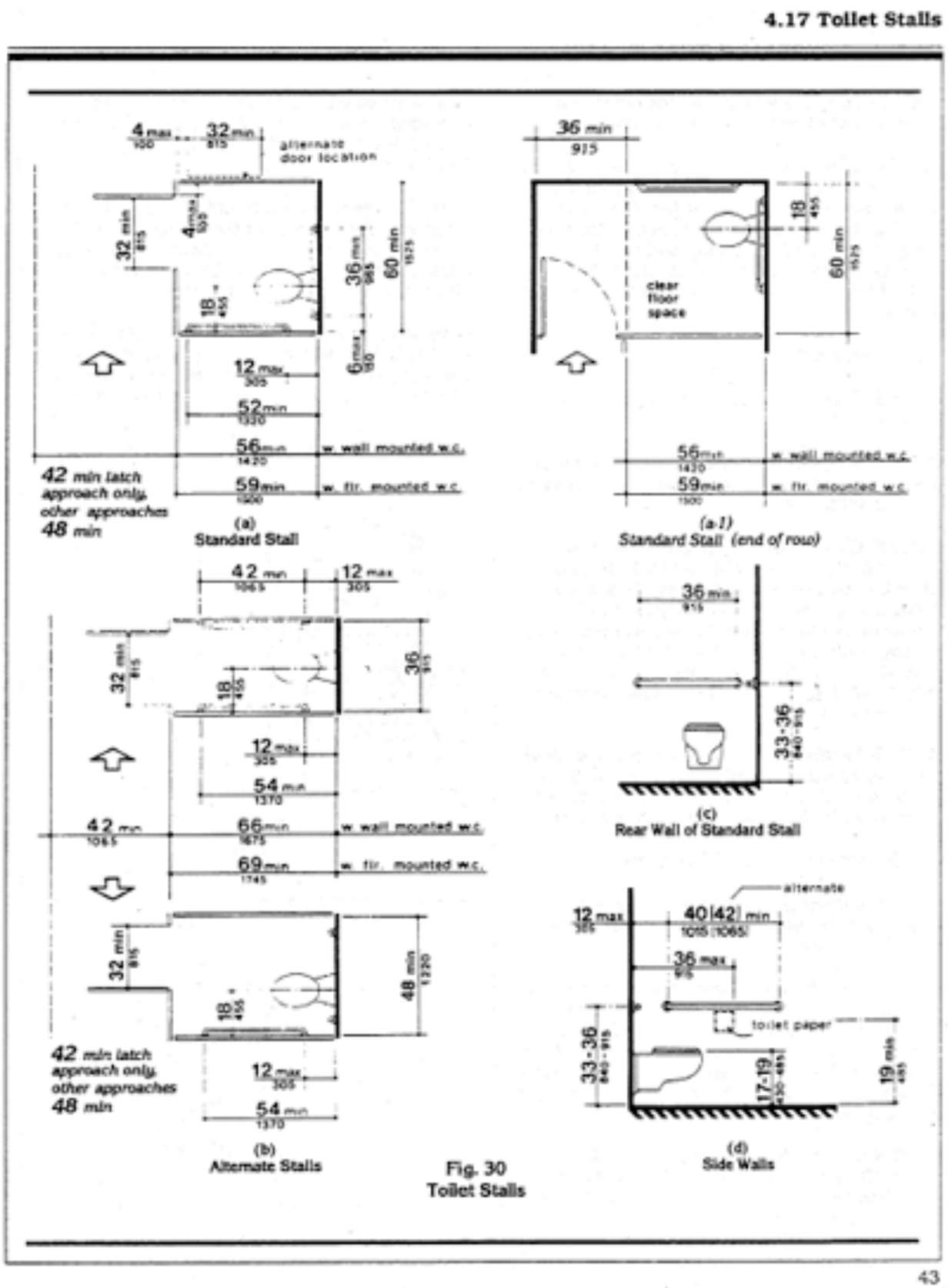
- code compliance
- focussed on wheelchairs

Architects' view of accessibility



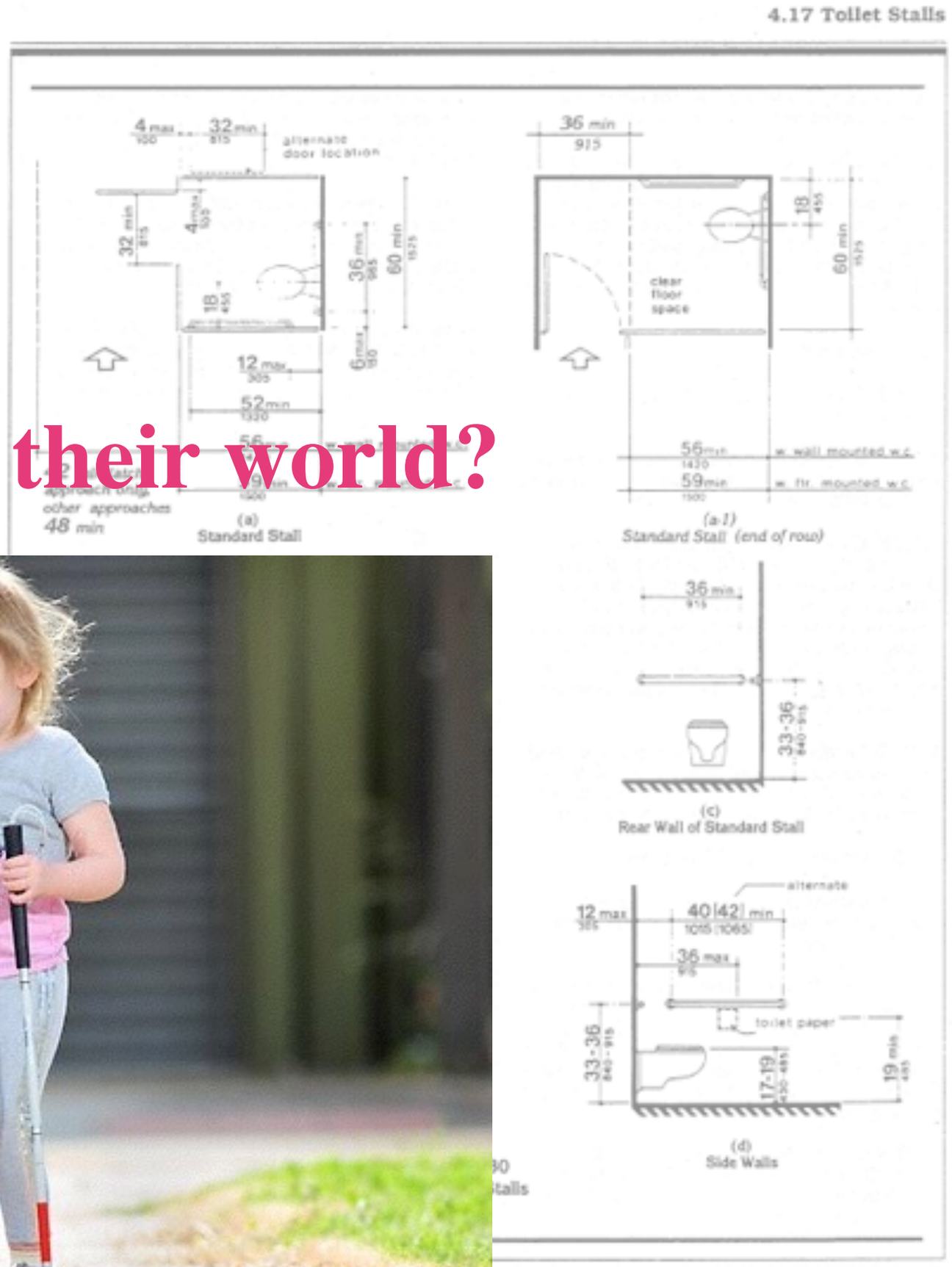
- code compliance
- focussed on wheelchairs
- emphasis on toilet rooms

Architects' view of accessibility



- code compliance
- focussed on wheelchairs
- emphasis on toilet rooms
- minimum = maximum

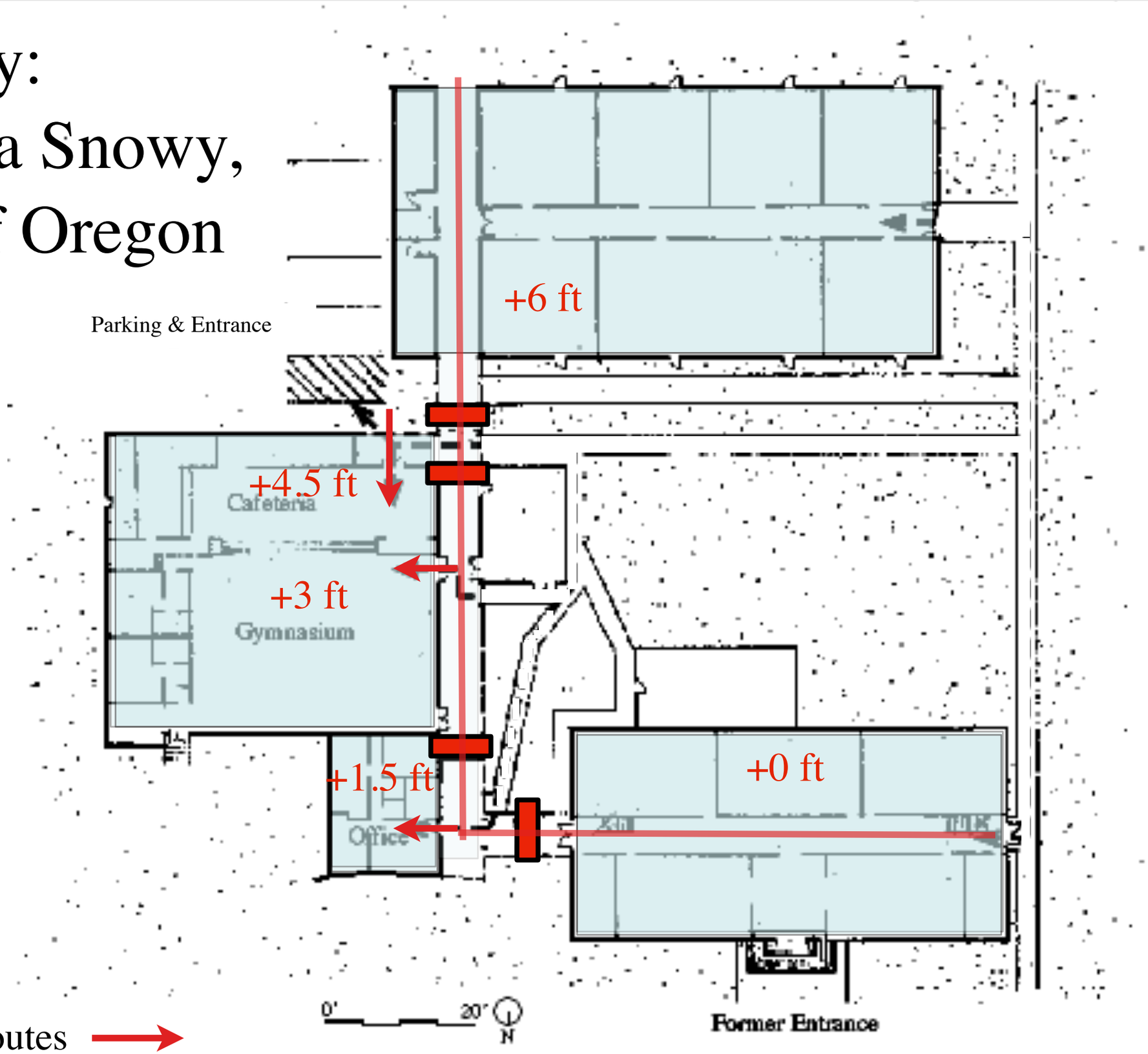
Architects' view of accessibility



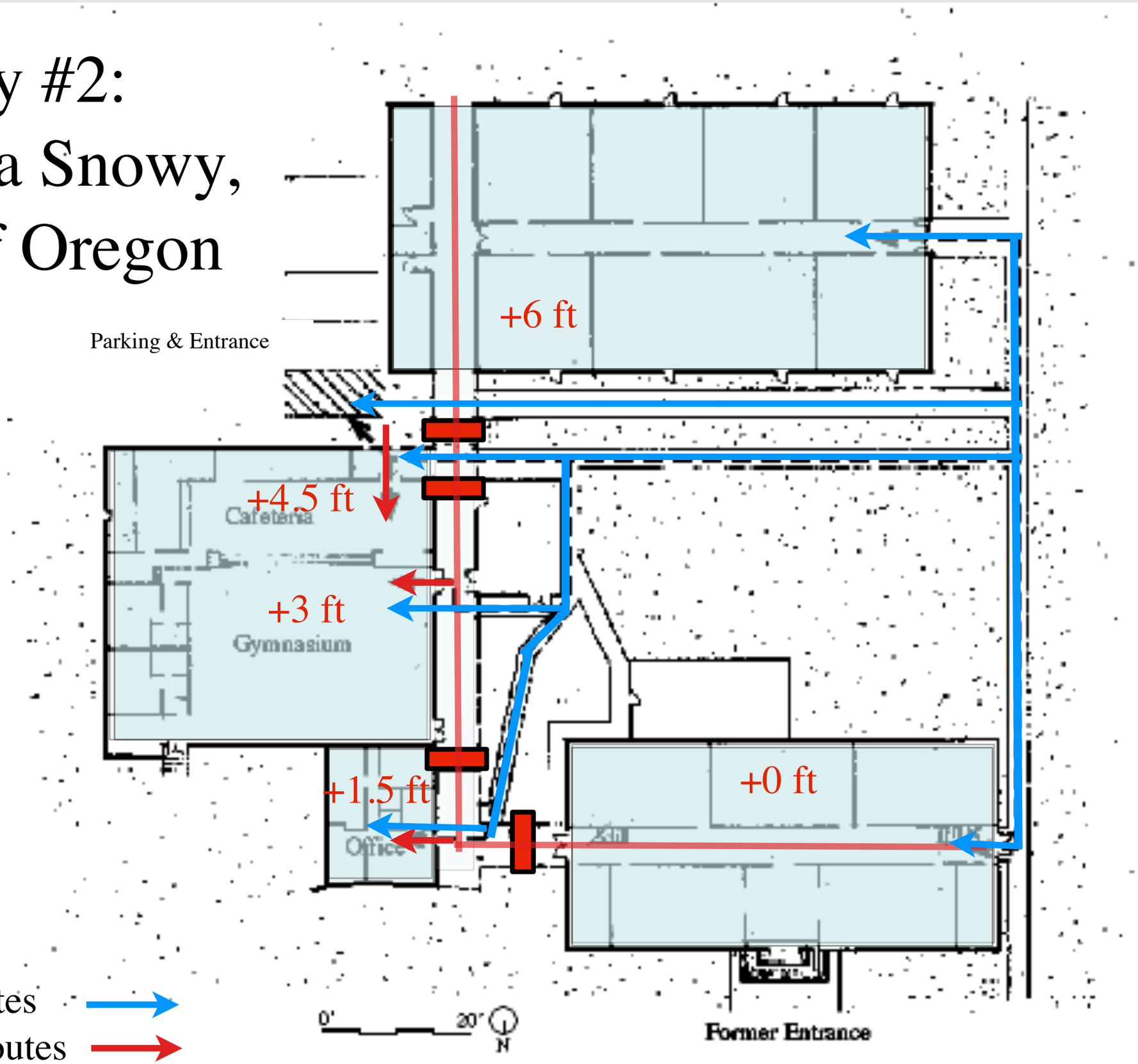
How does that fit into their world?

Architects' view of accessibility: minimum = maximum

Case Study: School in a Snowy, Icy Part of Oregon

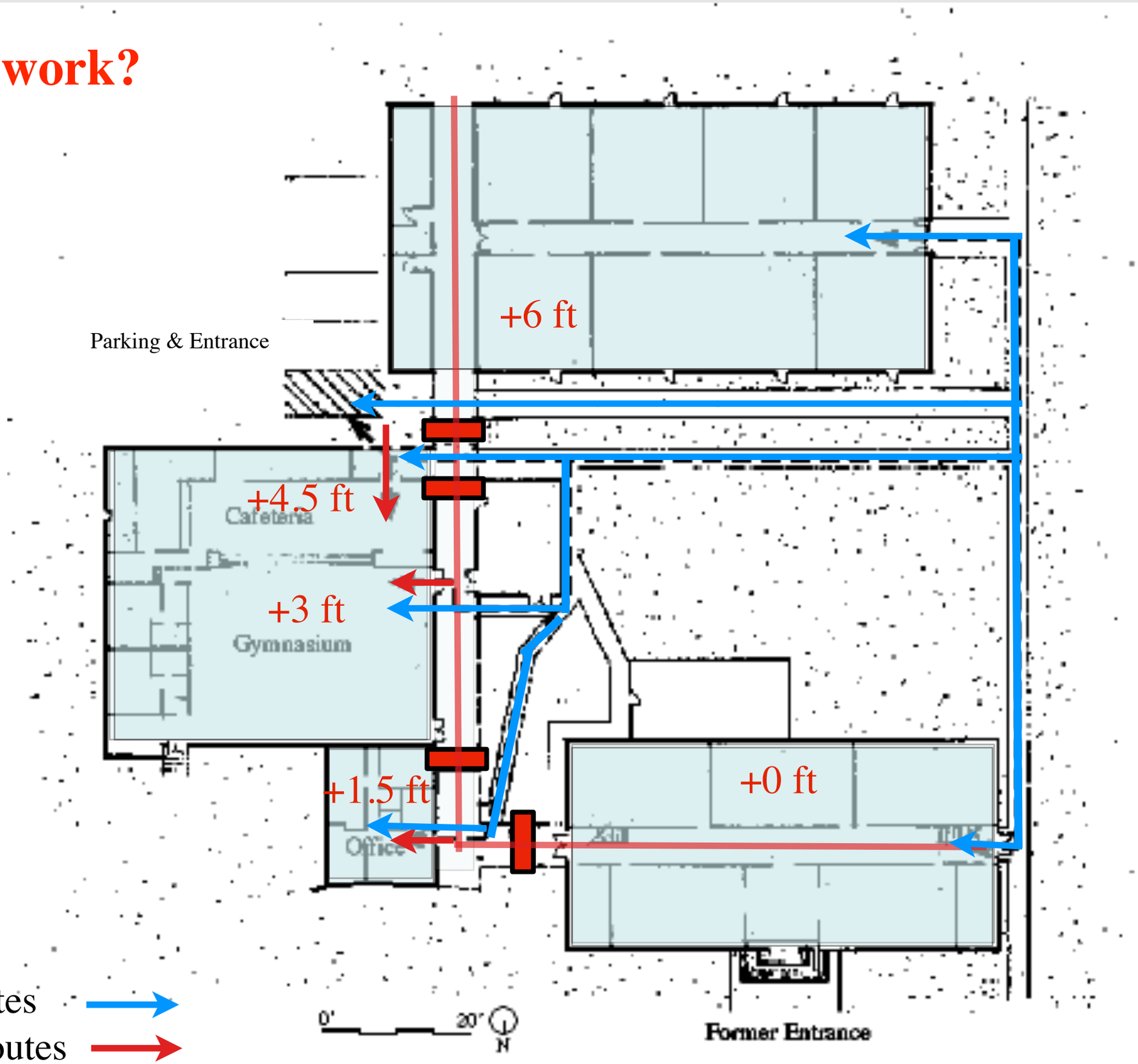


Case Study #2: School in a Snowy, Icy Part of Oregon



Architects' view of accessibility: minimum = maximum

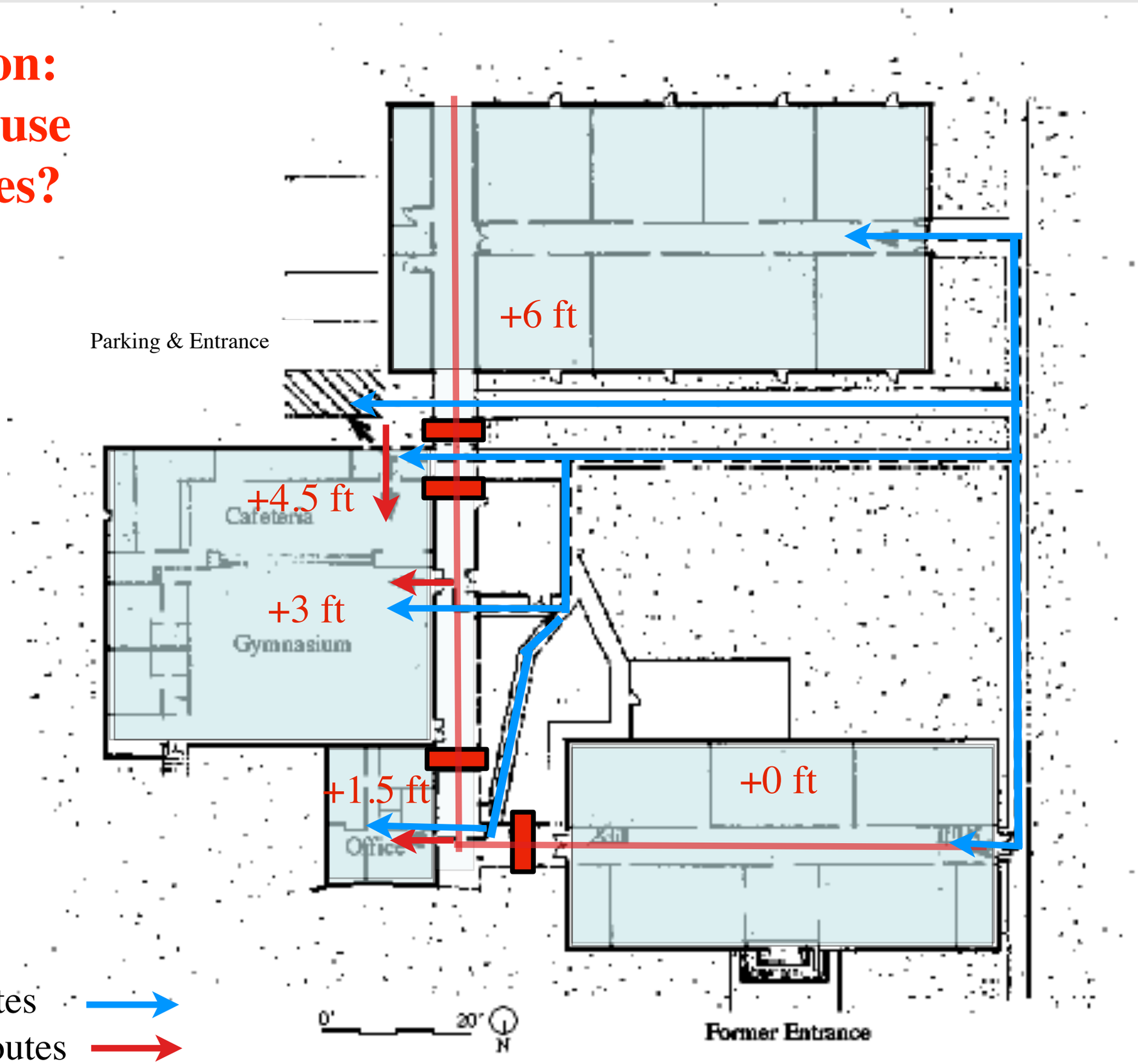
but does this work?



Architects' view of accessibility: legal yet not effective

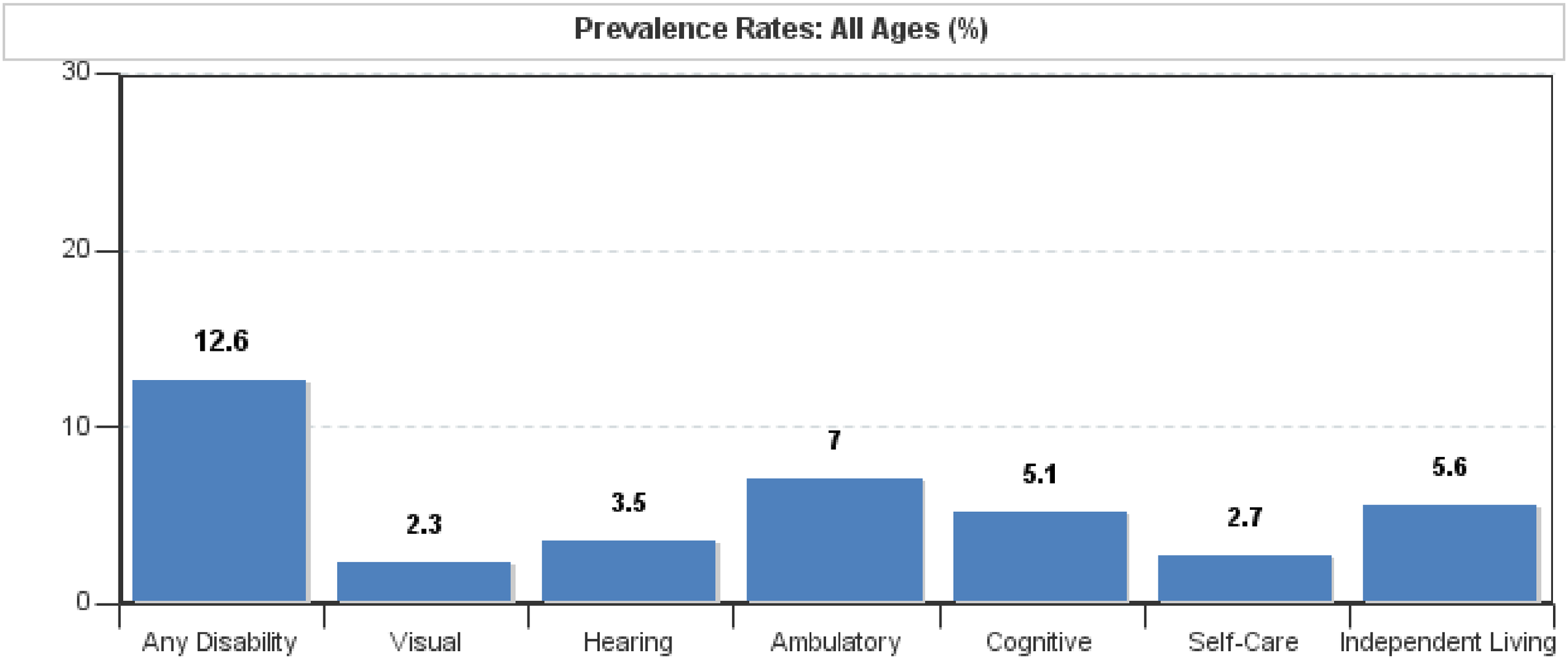
Social isolation: if you had to use the blue routes?

Practicality?



Statistics: percentage of US population with disabilities

Prevalence of disability among non-institutionalized people of all ages in the United States in 2015*



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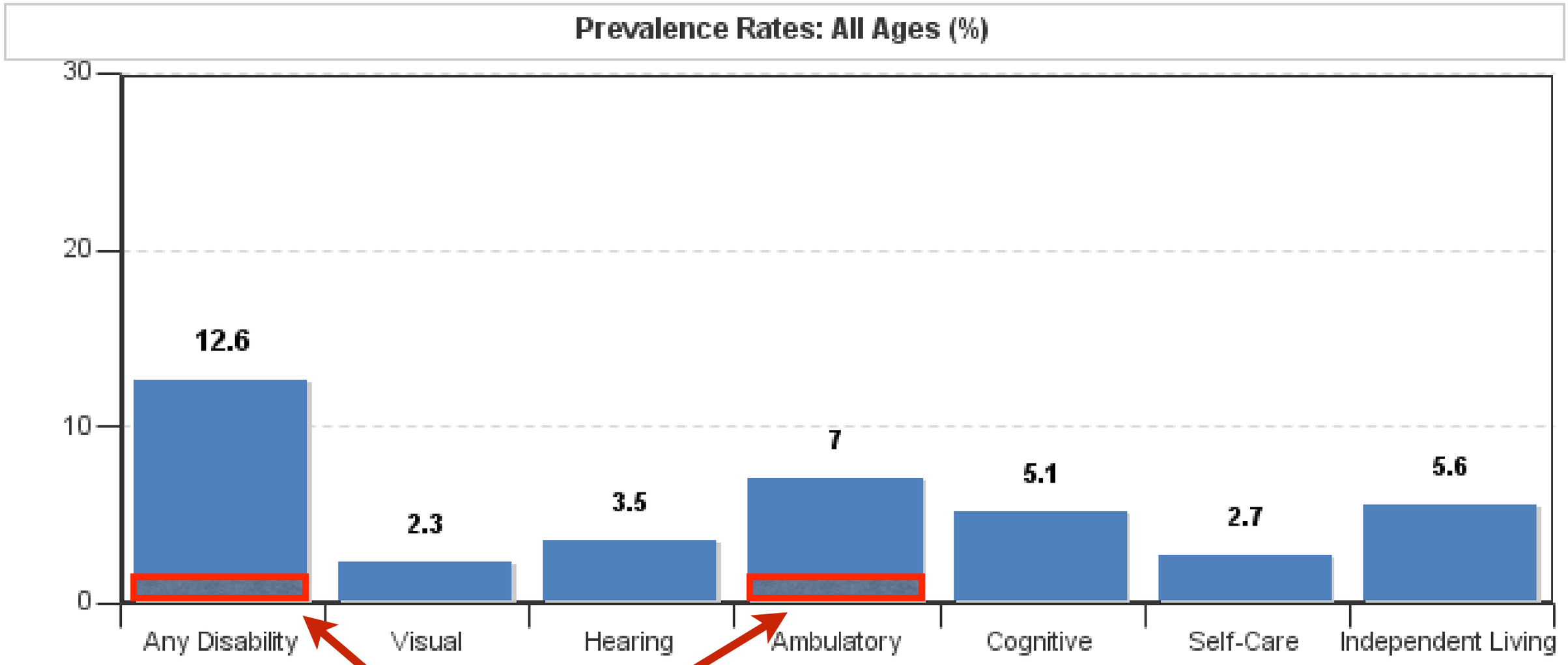
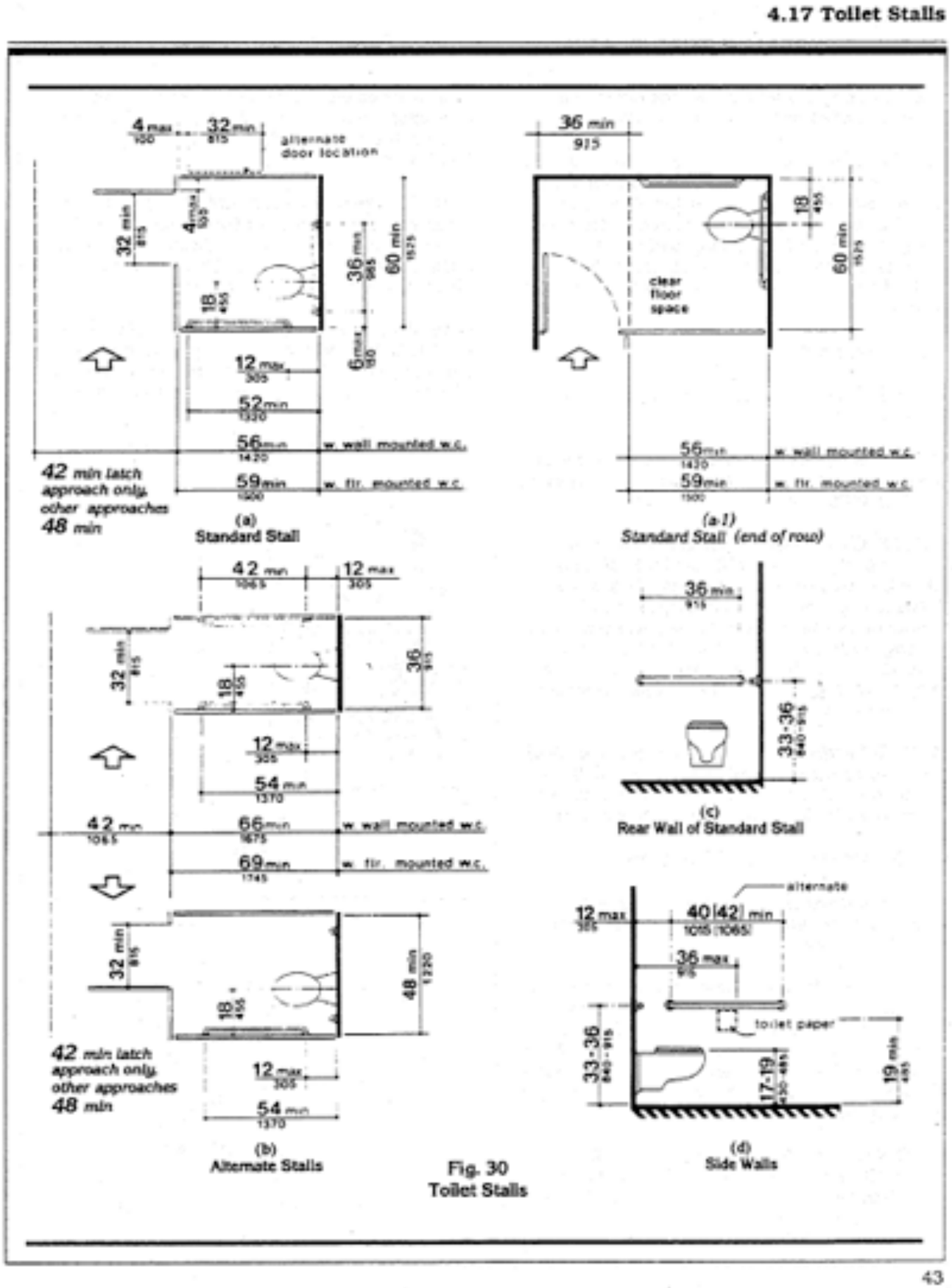


~1.5% of population uses a wheelchair (2005)

(www.census.gov/prod/2008pubs/p70-117.pdf)

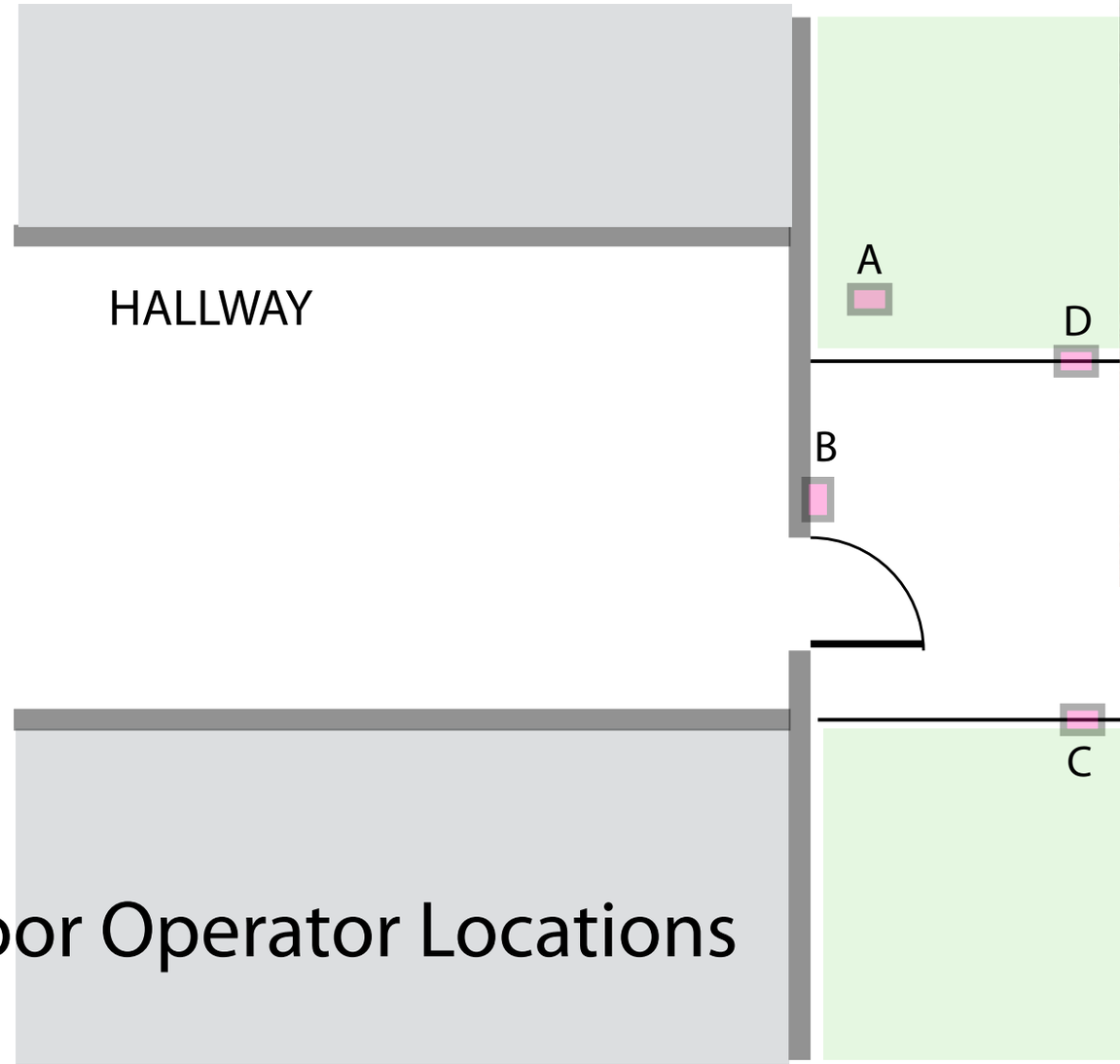
Architects view of accessibility vs. disability statistics

- code compliance
- largely about mobility
- focussed on wheelchairs
- emphasis on toilet rooms
- minimum = maximum



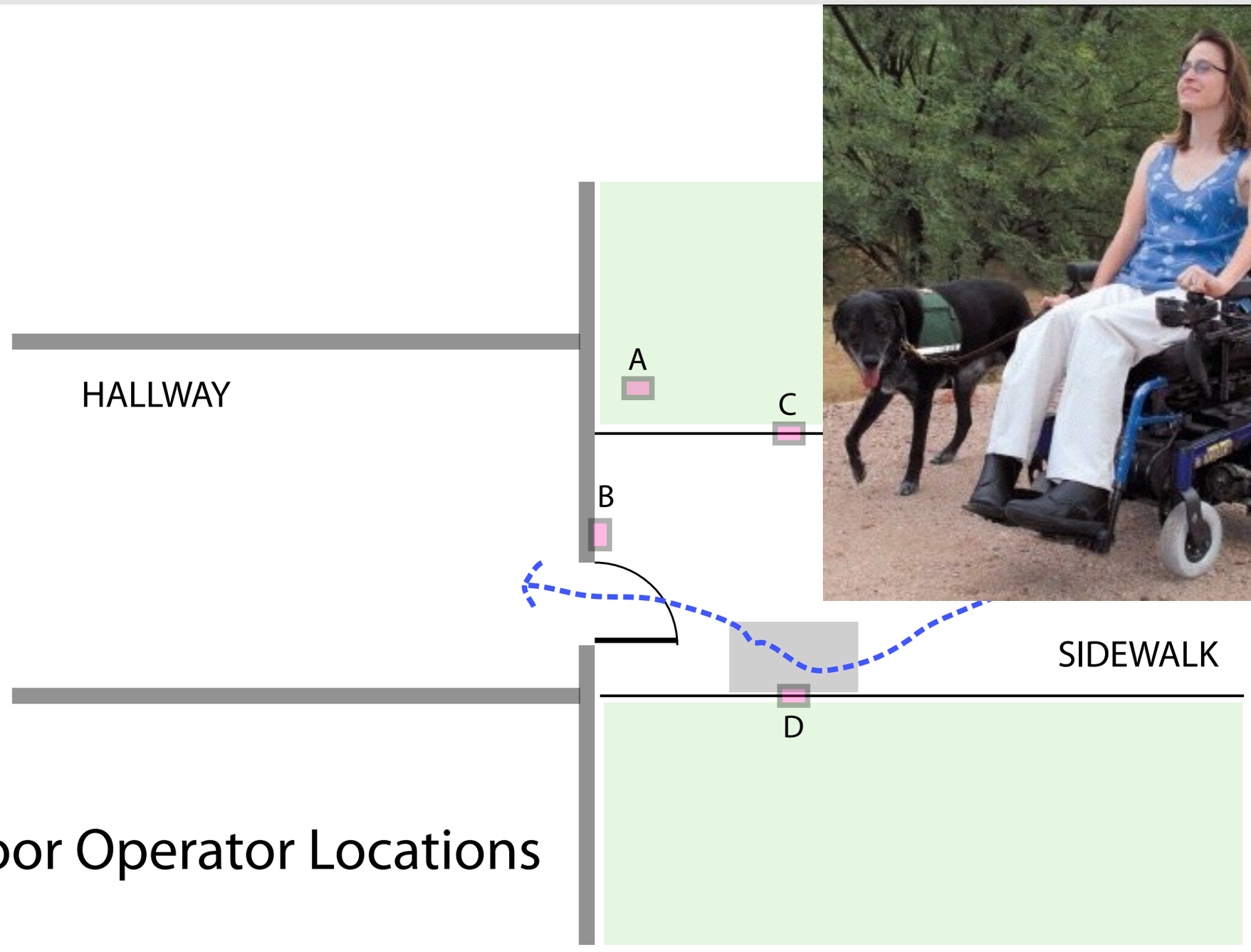
Universal Design: door operator example

Universal Design: door operator example



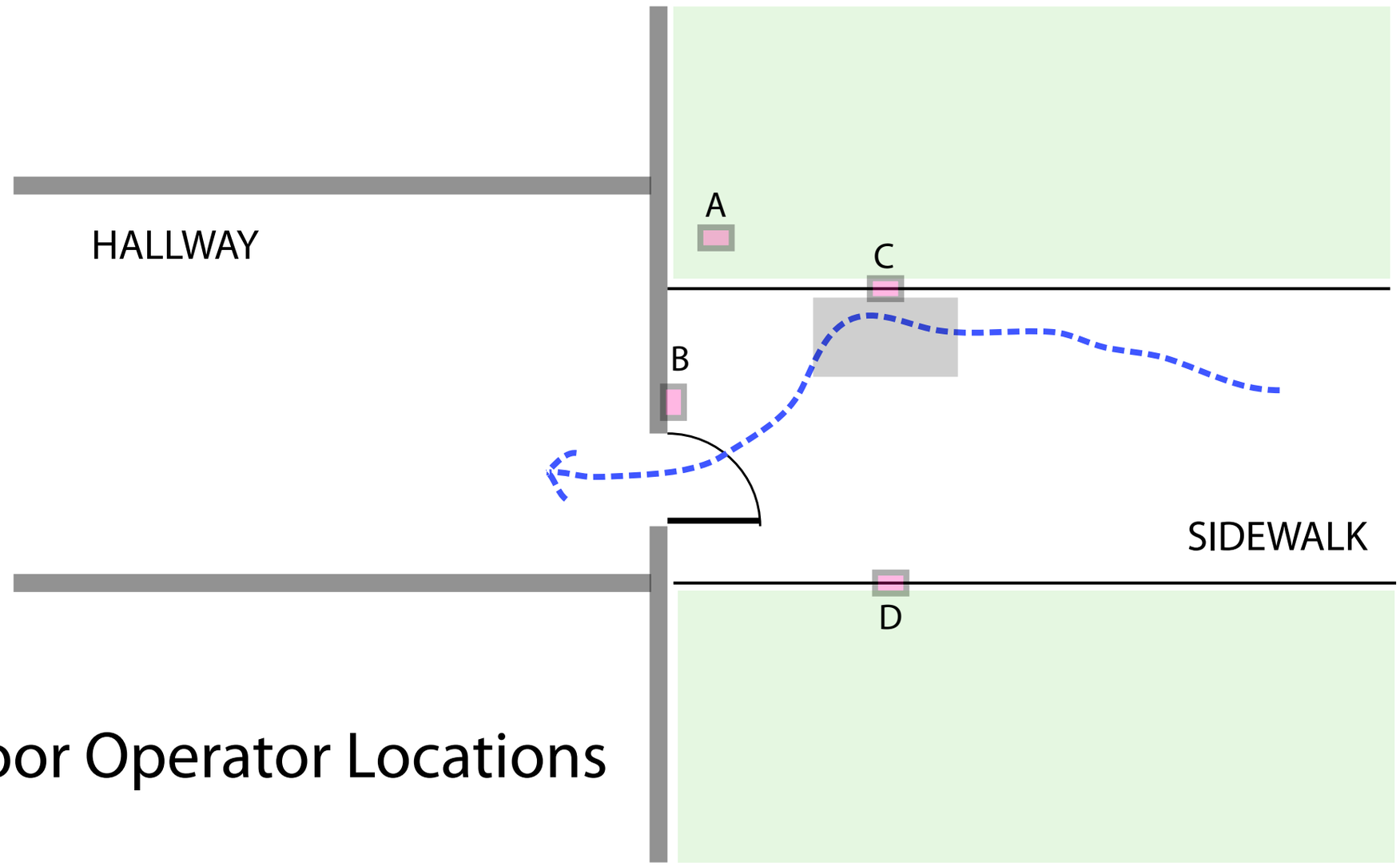
Power Door Operator Locations

Universal Design: door operator example



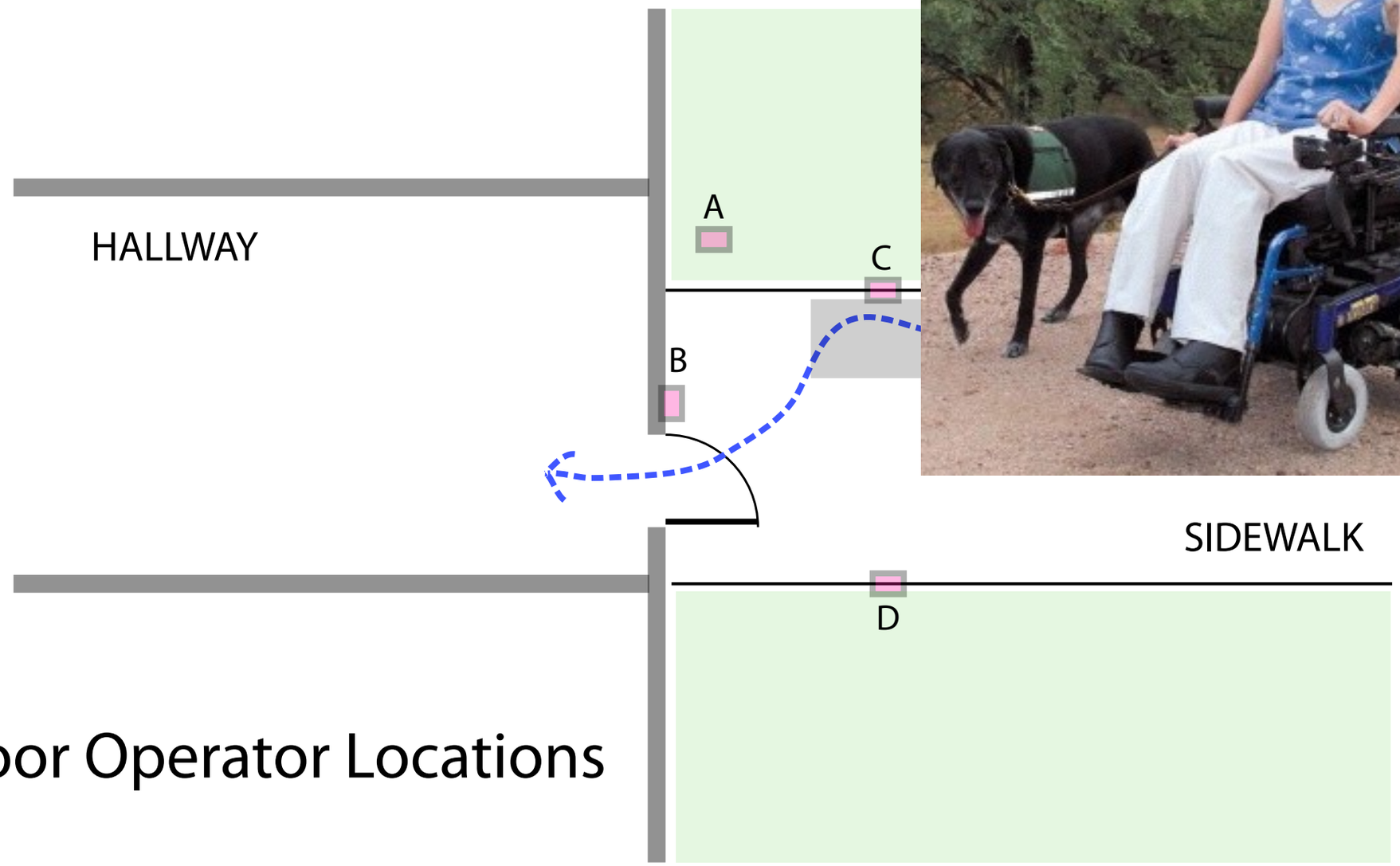
Power Door Operator Locations

Universal Design: door operator example



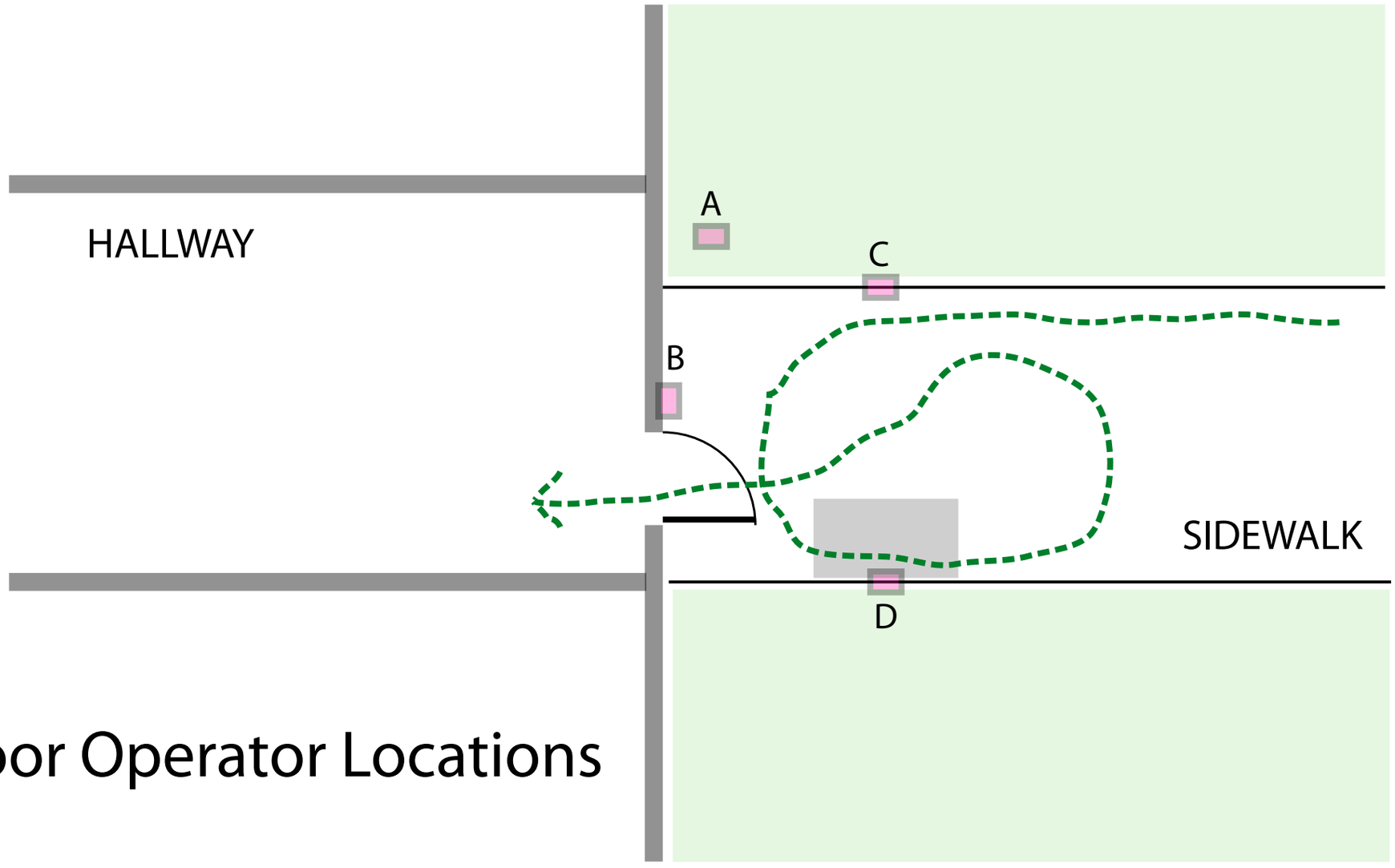
Power Door Operator Locations

Universal Design: door operator example



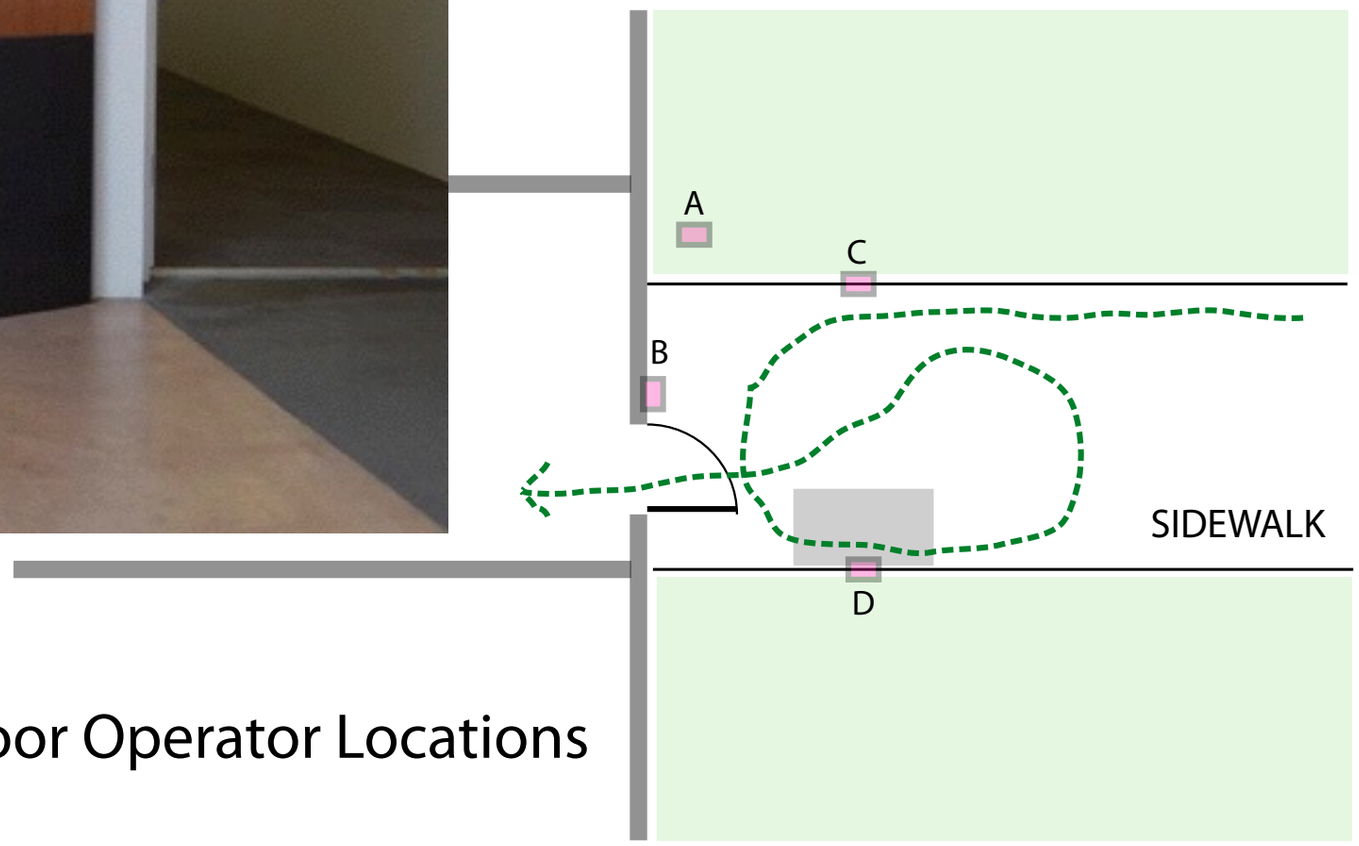
Power Door Operator Locations

Universal Design: door operator example



Power Door Operator Locations

Universal Design: meeting broader challenges - door operator case study



Power Door Operator Locations

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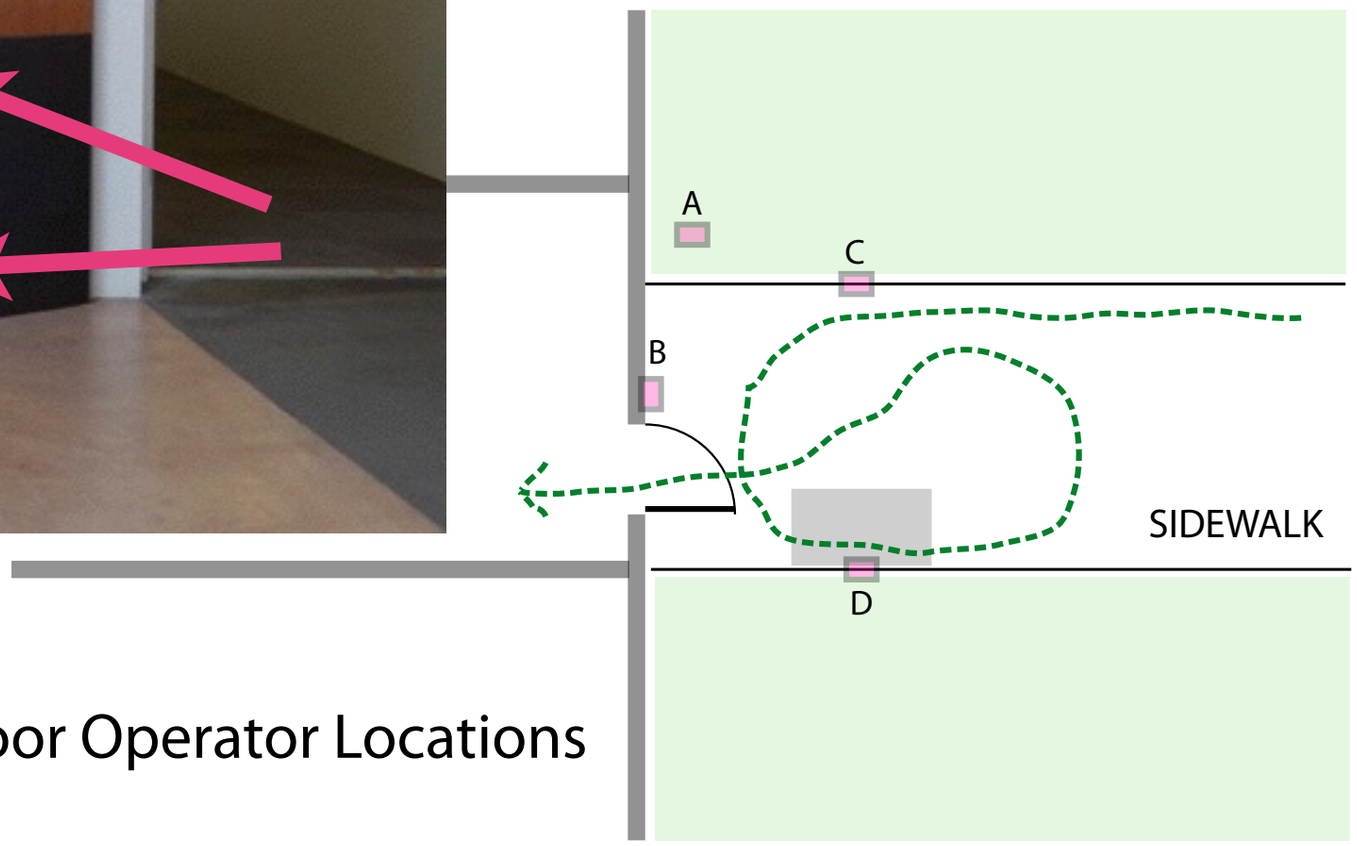

Power Door Operator Locations

Where now? Going beyond the standards...

Seven Principles of Universal Design

[Ronald Mace, et al., Center for Universal Design, NCSU]

1. Equitable Use:

The design is useful and marketable to people with diverse abilities.

2. Flexibility in Use:

The design accommodates a wide range of individual preferences and abilities.

3. Simple and Intuitive:

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

4. Perceptible Information:

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

5. Tolerance for Error:

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

6. Low Physical Effort:

The design can be used efficiently and comfortably and with a minimum of fatigue.

7. Size and Space for Approach and Use:

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

(from http://www.design.ncsu.edu/cud/univ_design/princ_overview.htm and other sources)

1. Equitable Use:

The design is useful and marketable to people with diverse abilities.

Guidelines:

1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.

1b. Avoid segregating or stigmatizing any users.

1c. Provisions for privacy, security, and safety should be equally available to all users.

1d. Make the design appealing to all users.

UNIVERSAL DESIGN = UNIVERSAL BEAUTY

1. Equitable Use:

The design is useful and marketable to people with diverse abilities.

2. Flexibility in Use:

The design accommodates a wide range of individual preferences and abilities.

Guidelines:

2a. Provide choice in methods of use.
2b. Accommodate right- or left-handed access and use.
2c. Facilitate the user's accuracy and precision.
2d. Provide adaptability to the user's pace.

Seven Principles of Universal Design

[Ronald Mace, et al., Center for Universal Design, NCSU]

1. Equitable Use:

2. Flexibility in Use:

The design accommodates a wide range of individual preferences and abilities.

3. Simple and Intuitive:

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

Guidelines:

3a. Eliminate unnecessary complexity.
3b. Be consistent with user expectations and intuition.
3c. Accommodate a wide range of literacy and language skills.
3d. Arrange information consistent with its importance.
3e. Provide effective prompting and feedback during and after task completion.

1. Equitable Use:

2. Flexibility in Use:

3. Simple and Intuitive:

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

4. Perceptible Information:

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Guidelines:

4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
4b. Provide adequate contrast between essential information and its surroundings.
4c. Maximize "legibility" of essential information.
4d. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
4e. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

Seven Principles of Universal Design

[Ronald Mace, et al., Center for Universal Design, NCSU]

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2. Flexibility in Use:

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4. Perceptible Information:

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

5. Tolerance for Error:

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

Guidelines:

5a. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
5b. Provide warnings of hazards and errors.
5c. Provide fail safe features.
5d. Discourage unconscious action in tasks that require vigilance.

Seven Principles of Universal Design

[Ronald Mace, et al., Center for Universal Design, NCSU]

1. **Equitable Use:**
2. **Flexibility in Use:**
3. **Simple and Intuitive**:
4. **Perceptible Information:**
5. **Tolerance for Error:**

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

6. **Low Physical Effort:**

The design can be used efficiently and comfortably and with a minimum of fatigue.

Guidelines:

6a. Allow user to maintain a neutral body position.
6b. Use reasonable operating forces.
6c. Minimize repetitive actions.
6d. Minimize sustained physical effort.

Seven Principles of Universal Design

[Ronald Mace, et al., Center for Universal Design, NCSU]

1. **Equitable Use:**
2. **Flexibility in Use:**
3. **Simple and Intuitive**:
4. **Perceptible Information:**
5. **Tolerance for Error:**
6. **Low Physical Effort:**

The design can be used efficiently and comfortably and with a minimum of fatigue.

7. **Size and Space for Approach and Use:**

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Guidelines:

7a. Provide a clear line of sight to important elements for any seated or standing user.
7b. Make reach to all components comfortable for any seated or standing user.
7c. Accommodate variations in hand and grip size.
7d. Provide adequate space for the use of assistive devices or personal assistance.

Universal Design is the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people regardless of their age, size, ability or disability. An environment (or any building, product, or service in that environment) should be designed to meet the needs of all people who wish to use it. This is not a special requirement, for the benefit of only a minority of the population. It is a fundamental condition of good design. If an environment is accessible, usable, convenient and a pleasure to use, everyone benefits. By considering the diverse needs and abilities of all throughout the design process, universal design creates products, services and environments that meet peoples' needs.

Simply put, universal design is good design.

[National Disability Authority (Ireland) http://universaldesign.ie/What-is-Universal-Design/]

Bear in mind the range of expression of each disability:

full hearing — hard of hearing — deafness

Bear in mind the range of expression of each disability:

full hearing — hard of hearing — deafness

full vision — limited vision — blindness

Bear in mind the range of expression of each disability:

full hearing — hard of hearing — deafness

full vision — limited vision — blindness

mobility aids:

none — handrails — canes — crutches — walkers — wheelchairs

Seven Principles of Universal Design

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The design is useful and marketable to people with diverse abilities.

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These can be hard to apply across all design fields.
Perhaps follow them up...

Universal Design: Four Questions

- **Is it universal?**
  - Is it designed for a wide range of abilities and needs?

- **Is it effective?**
  - Does it actually work for the specific needs?
  - Has it been tested or at least reviewed by representatives of a wide range of users?
  - Is it supported by research, design standards, or other sources?

- **Is it welcoming and inclusive?**
  - Does it feel natural and comfortable for all users?
  - Does it discriminate unnecessarily on the basis of ability?
  - Does it give the impression of disability-based discrimination?

- **Will the design solution be appreciated over time?**
  - Is it “loveable”? Is it delightful for all users?
  - Can it accommodate change through flexibility, adaptability, or adjustability?

Universal Design: Inclusiveness

- Welcoming?

Universal Design: Inclusiveness

- Welcoming?
- Is it too “special”?

Universal Design: Inclusiveness

- Welcoming?
- Is it too “special”?
- **Does it make a spectacle of those who use it?**
- **Is it socially isolating?**

Universal Design: Inclusiveness

- Welcoming?
- Is it too “special”?
- Does it make a spectacle of those who use it?
- Is it socially isolating?
- Is it **delightful**? Beauty for all as a characteristic of Universal Design

Universal Design Case: Mobility and way finding

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Universal Design Case: Mobility and way finding

Social Isolation:

If this is your only route to studio, how would you feel?

MOBILITY PATTERNS

Integrated Path

Low Slope/Short Ramps

Shortest Path

Easy Climbs

Universal?	**Welcoming?**	**Effective**?	**Durable**?
Is it universal? Is it designed for a wide range of abilities and needs?	Is it welcoming? Does it feel natural and comfortable for all users? Does it discriminate unnecessarily on the basis of ability? Does it give the impression of disability-based discrimination?	Is it effective? Does it actually work for the specific needs? Has it been tested or reviewed by representatives of a wide range of users? Is it supported by research, design standards, or other sources?	Will the design solution be durable over time? Can it accommodate change through flexibility, adaptability, or adjustability?

Universal Design Case: Mobility and way finding

Universal Design Case: Mobility

- Universal?
-Welcoming?
- Effective?
- Durable?

MOBILITY PATTERNS

Integrated Path

Low Slope/Short Ramps

Shortest Path

Easy Climbs

Universal Design: Vision

PATTERNS:

No Protrusion Hazards

Avoid items that protrude more than 4" above 24" (ADA Standards = 27”) so that blind and low vision users are safe

Safe Crossings

Design vehicular areas with clear separation from pedestrian areas, either

- curbs at 1:12 slope, or
- 3' band of tactile pavement, or
- bollards with 3' maximum gaps

Effective Shorelines

Provide consistent edges to guide cane users and others

- vertical edges such as walls and curbs, or
- textural contrasts such as pavement to planting, or concrete to gravel, or paving type, and
- provide visual contrast along shorelines as appropriate

90 Degree Corners, No Curves

Provide clear circulation to enhance imageability

Avoid curves and angles, use a rectilinear organization for circulation

Visual Contrast

Use light/dark contrast to emphasize stair hazards, shorelines, etc.

VISION PATTERNS

No Protrusion Hazards

Safe Crossings

Effective Shorelines

90 Degree Corners

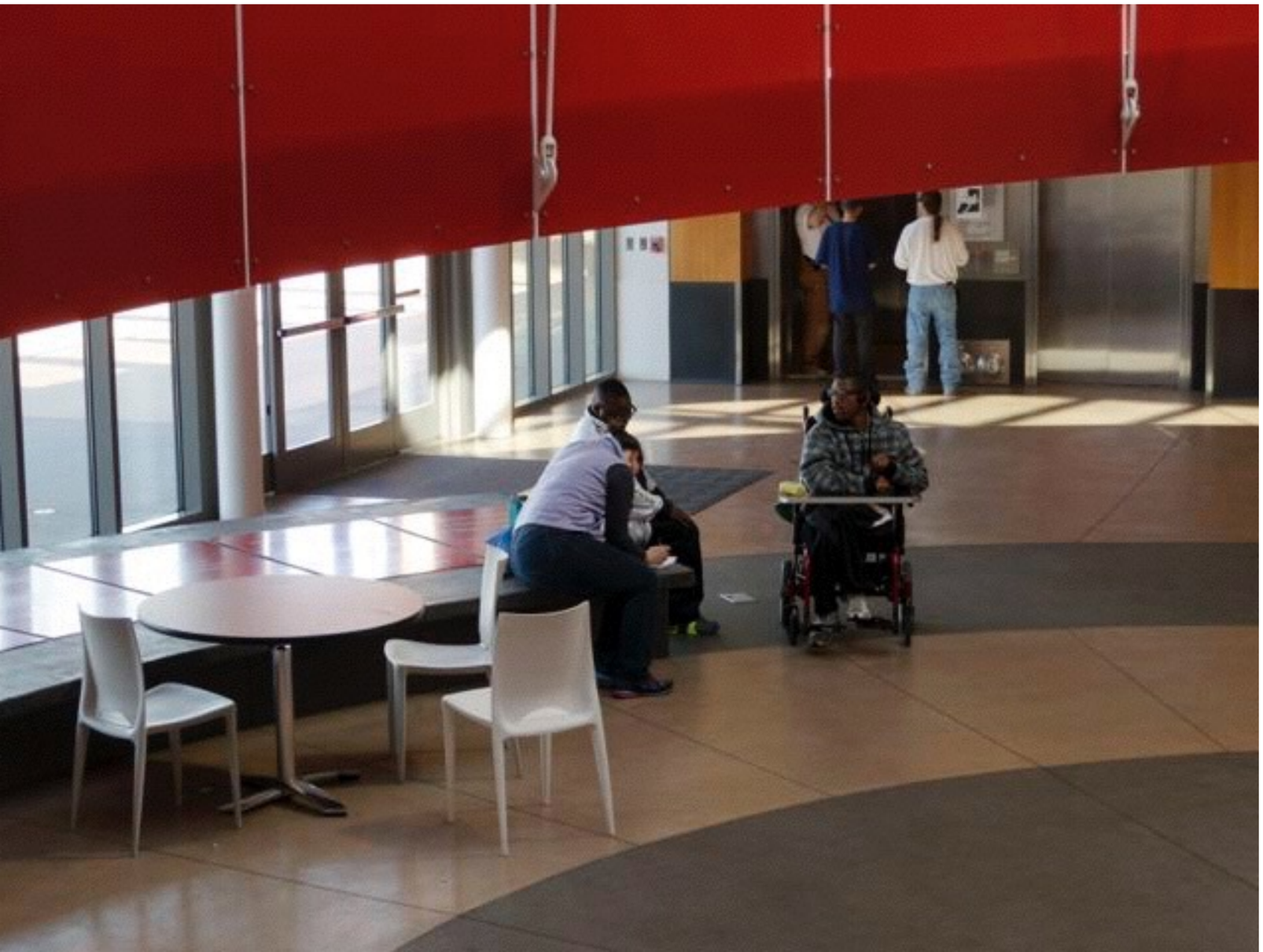
Visual Contrast

Universal Design: Vision - no protrusion hazards

PATTERNS:

No Protrusion Hazards

Avoid items that protrude more than 4" above 24" (ADA Standards = 27”) and below 80” so that blind and low vision users are safe.



VISION PATTERNS

No Protrusion Hazards

Safe Crossings

Effective Shorelines

90 Degree Corners

Visual Contrast

Universal Design: Mobility - We all use ramps

Universal Design: Curb Ramps - Mobility vs. Vision?

VISION PATTERNS

No Protrusion Hazards

Safe Crossings

Effective Shorelines

90 Degree Corners

Visual Contrast

Universal Design: Curb Ramps - Mobility vs. Vision?

VISION PATTERNS

No Protrusion Hazards

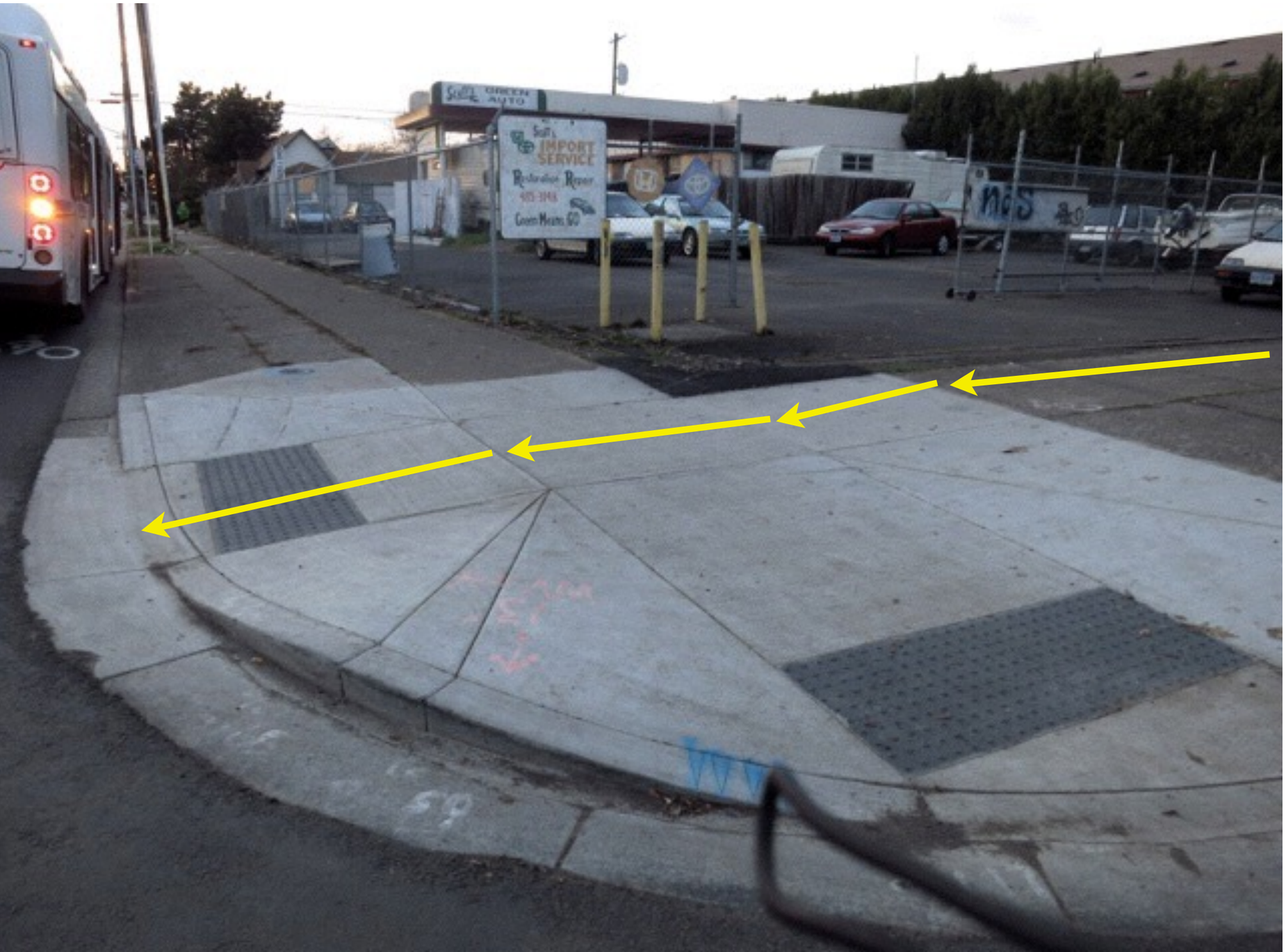
Safe Crossings

Effective Shorelines

90 Degree Corners

Visual Contrast

Universal Design: Curb Ramps - Mobility vs. Vision?



VISION PATTERNS

No Protrusion Hazards

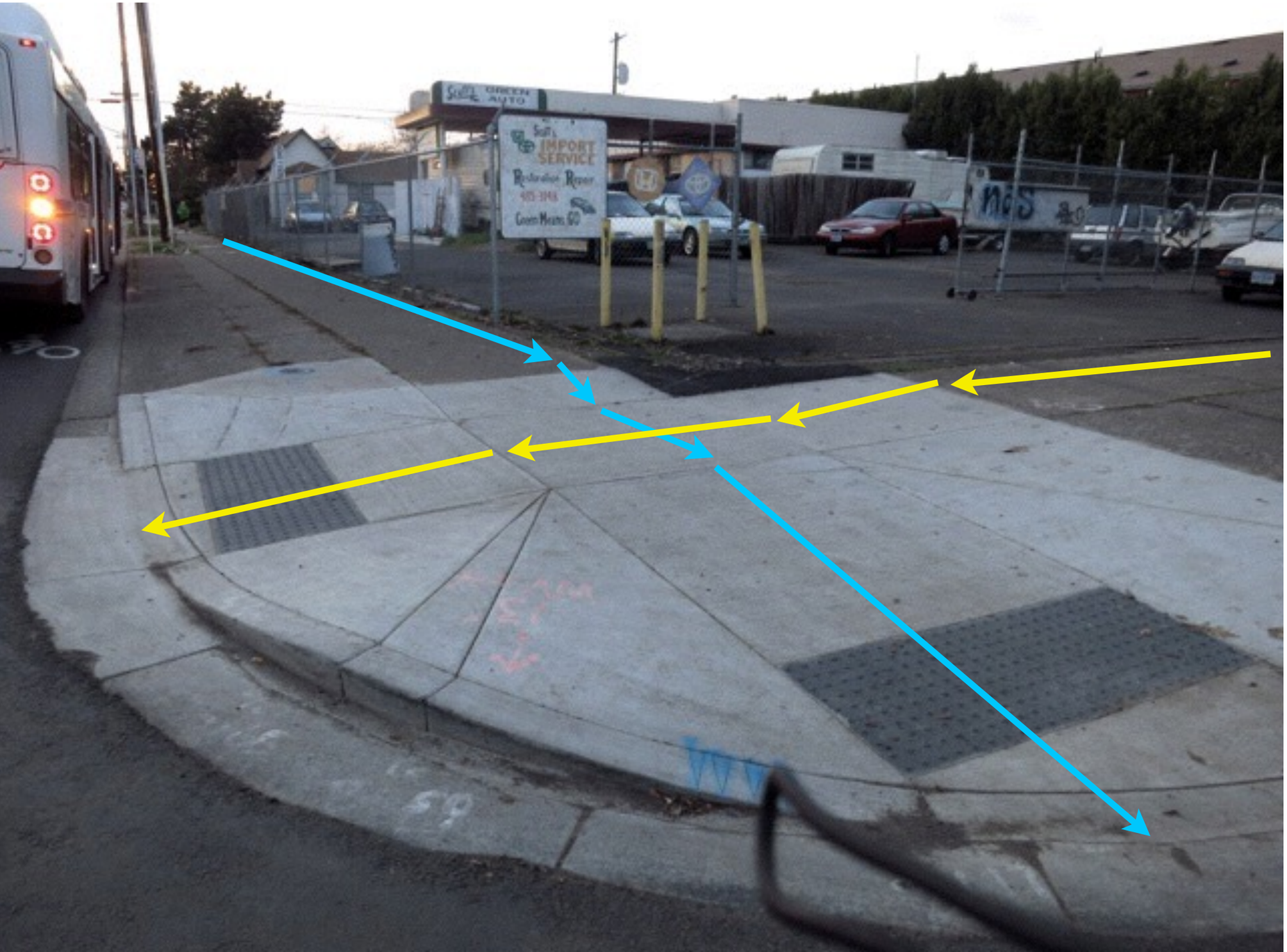
Safe Crossings

Effective Shorelines

90 Degree Corners

Visual Contrast

Universal Design: Curb Ramps - Mobility vs. Vision?



VISION PATTERNS

No Protrusion Hazards

Safe Crossings

Effective Shorelines

90 Degree Corners

Visual Contrast

Universal Design: Vision on Broadway

VISION PATTERNS

No Protrusion Hazards

Safe Crossings

Effective Shorelines

90 Degree Corners

Visual Contrast

Universal Design: Vision on Broadway

Shorelines

VISION PATTERNS

No Protrusion Hazards

Safe Crossings

Effective Shorelines

90 Degree Corners

Visual Contrast

Universal Design: Vision on Broadway

Shorelines

VISION PATTERNS

No Protrusion Hazards

Safe Crossings

Effective Shorelines

90 Degree Corners

Visual Contrast

Universal Design: Vision on Broadway

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No Protrusion Hazards

Safe Crossings

Effective Shorelines

90 Degree Corners

Visual Contrast

Universal Design: Vision on Broadway

Test for high reflectance contract by photographing in black and white

full vision **limited vision** blindness

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Visual Contrast

Universal Design: Vision - Lane Transit Station

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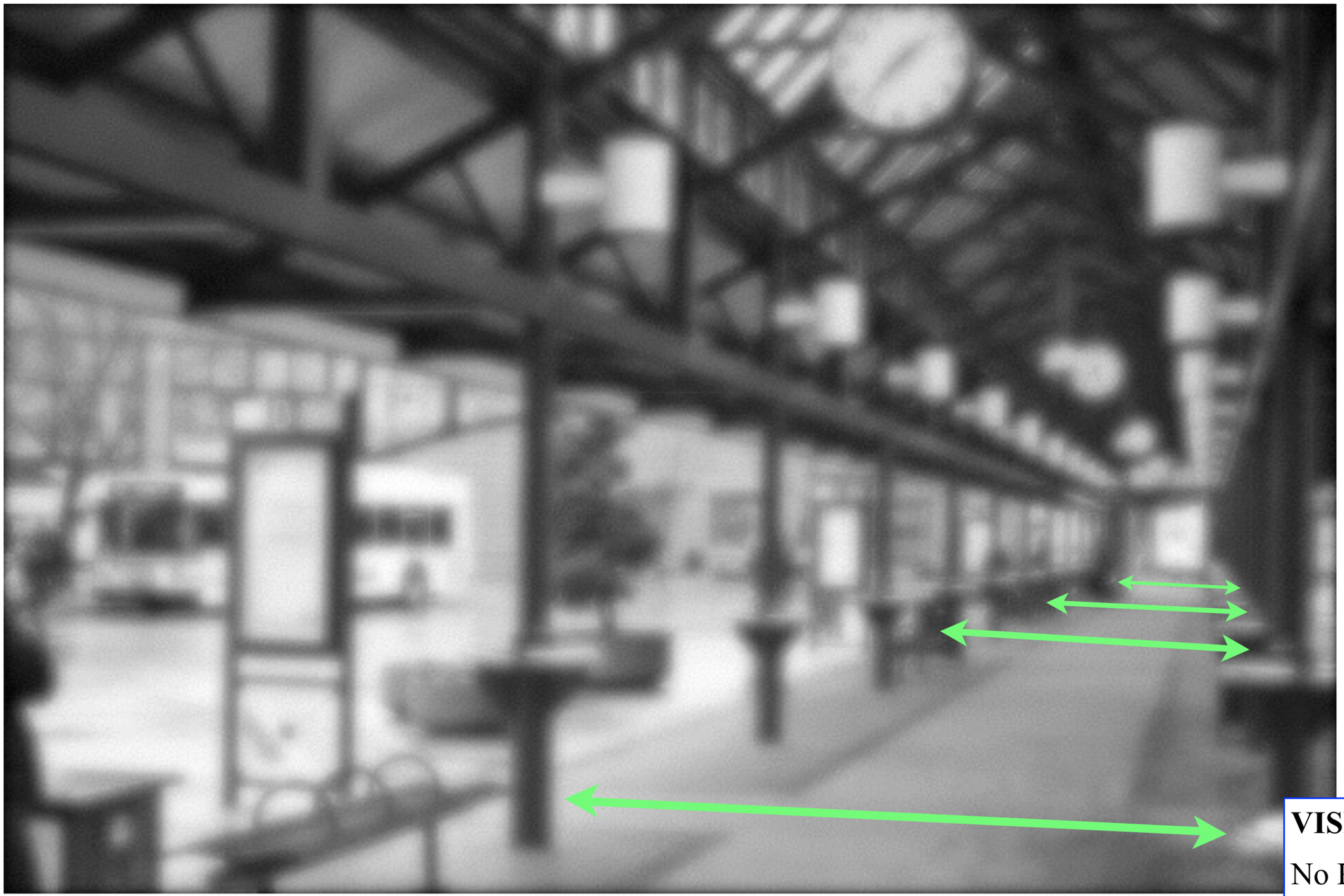
Universal Design: Vision - Lane Transit Station



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Visual Contrast

Universal Design: Vision - contrast guides stairs

SFMOMA
Snøhetta

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Universal Design: Vision - contrast guides stairs

SFMOMA
Snøhetta

PATTERNS: Visual Contrast

Use lighting and form, with contrast accents at top and bottom stair treads, to provide guidance and safety for as many people as possible.

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Universal Design: Vision at building entrances

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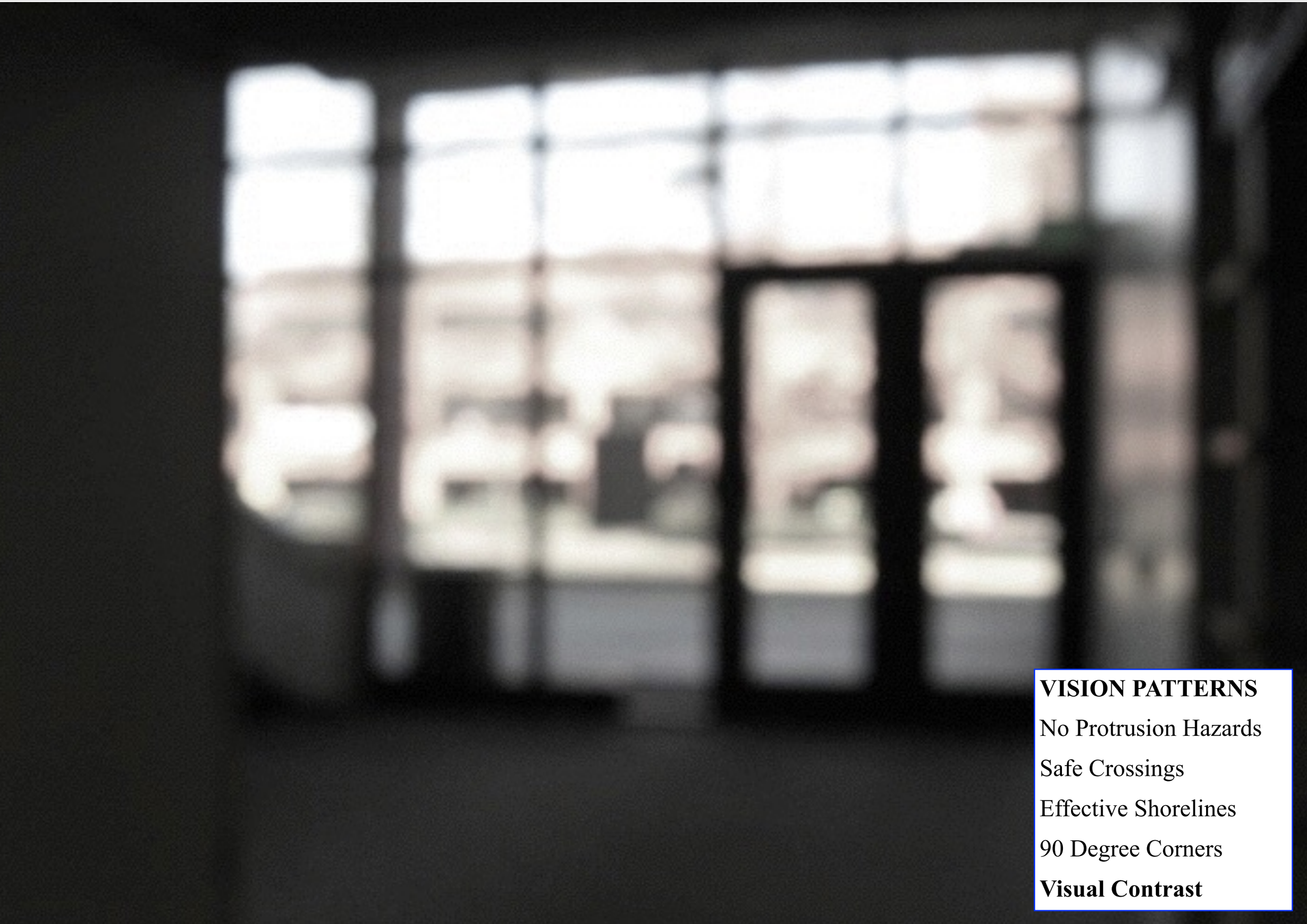

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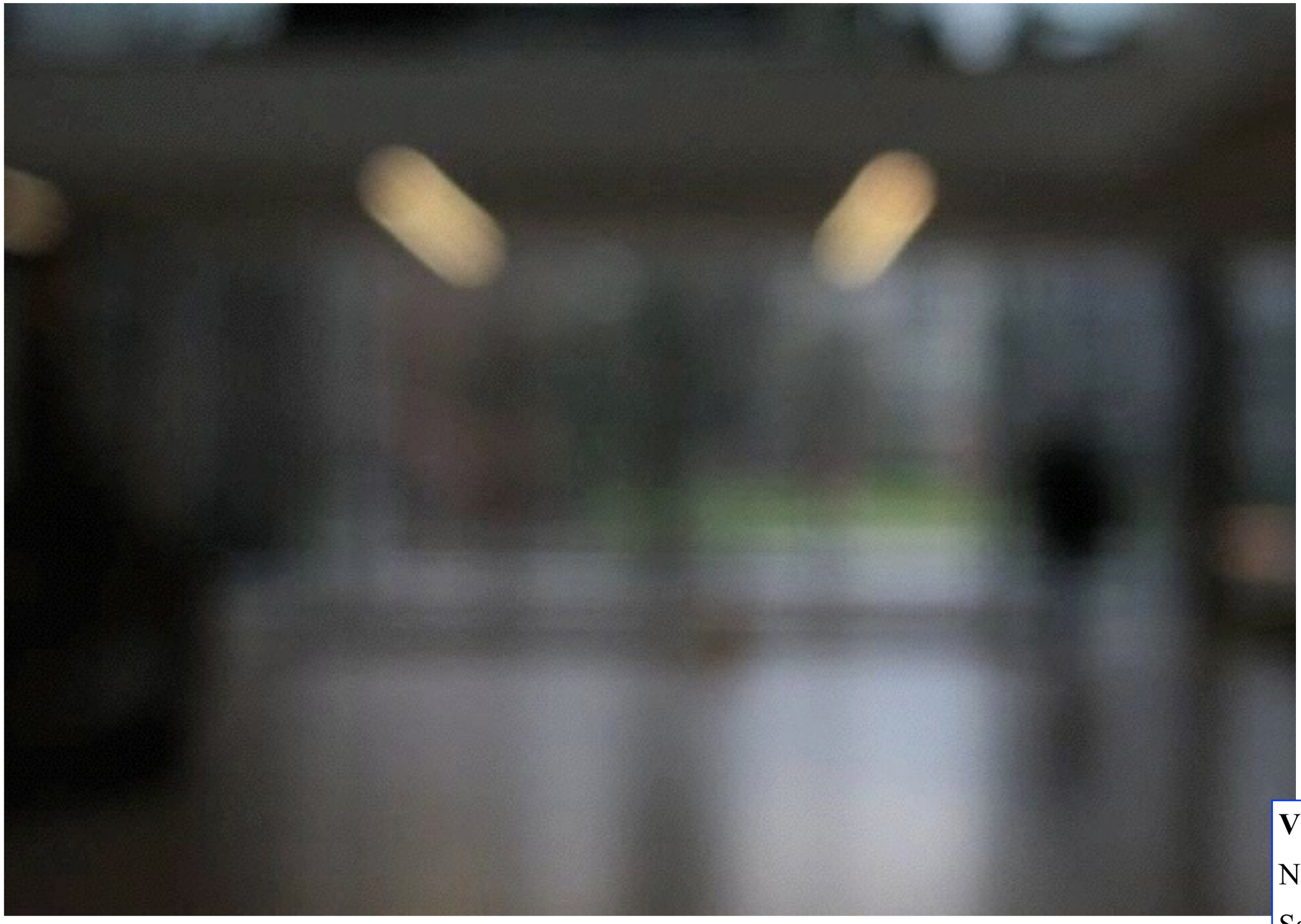

VISION PATTERNS

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Visual Contrast

Exercise #1: light control

Exercise #1: light control

Exercise #1: light switches

1. Equitable Use:

The design is useful and marketable to people with diverse abilities.

2. Flexibility in Use:

The design accommodates a wide range of individual preferences and abilities.

3. Simple and Intuitive:

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

4. Perceptible Information:

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

5. Tolerance for Error:

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

6. Low Physical Effort:

The design can be used efficiently and comfortably and with a minimum of fatigue.

7. Size and Space for Approach and Use:

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

(from http://www.design.ncsu.edu/cud/univ_design/princ_overview.htm and other sources)

Exercise #1: light switches

- **Is it universal?**
  - Is it designed for a wide range of abilities and needs?

- **Is it effective?**
  - Does it actually work for the specific needs?
  - Has it been tested or at least reviewed by representatives of a wide range of users?
  - Is it supported by research, design standards, or other sources?

- **Is it welcoming and inclusive?**
  - Does it feel natural and comfortable for all users?
  - Does it discriminate unnecessarily on the basis of ability?
  - Does it give the impression of disability-based discrimination?

- **Will the design solution be appreciated over time?**
  - Is it “loveable”? Is it delightful for all users?
  - Can it accommodate change through flexibility, adaptability, or adjustability?

Exercise #2: door knobs

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Exercise #3: mini-blind controls

Exercise #3: mini-blind controls

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Exercise #4: car radios

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Exercise #4: car radios

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Exercise #5: telephones

Exercise #5: telephones

Exercise #5: telephones

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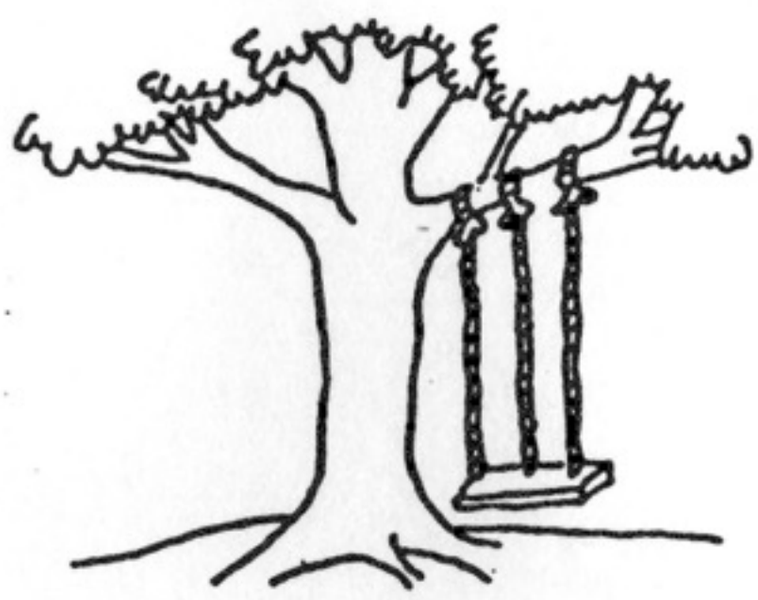
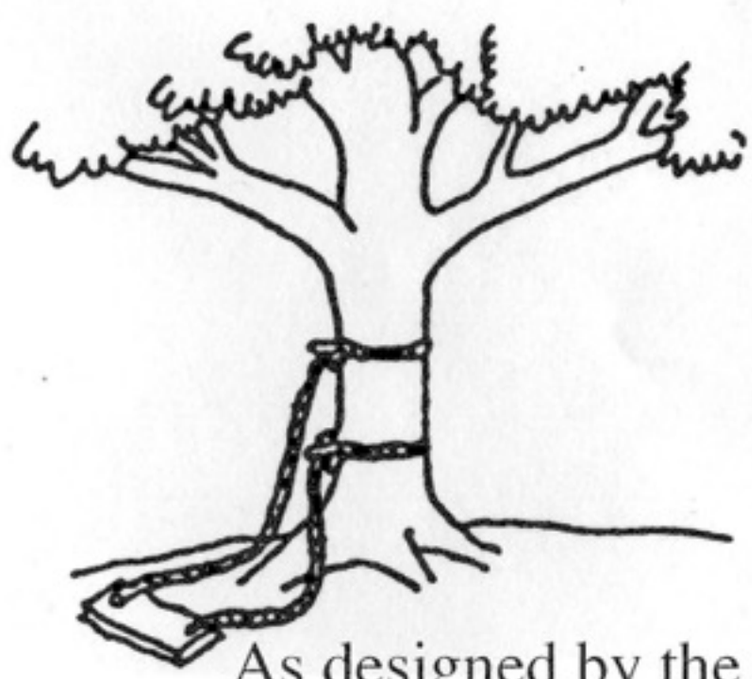
Parting thought #1

Parting thought #2

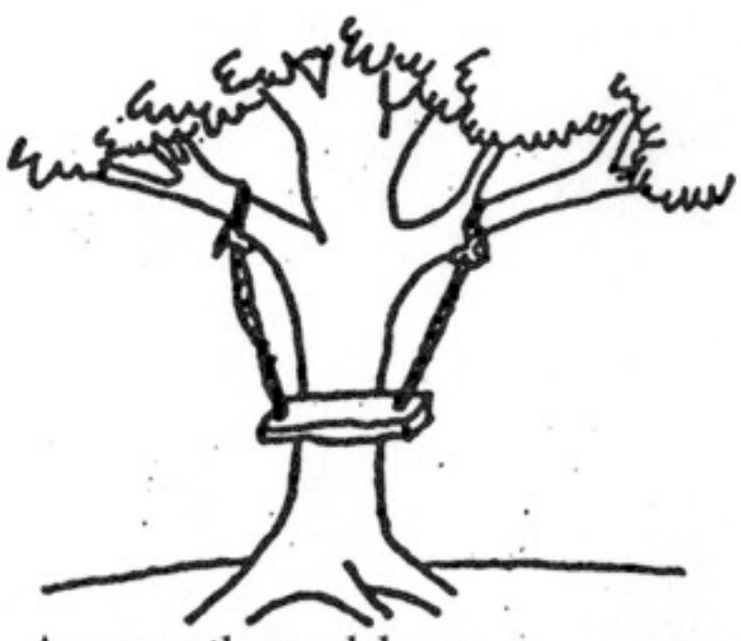
As proposed by
the project sponsor.



As specified in the
project request.

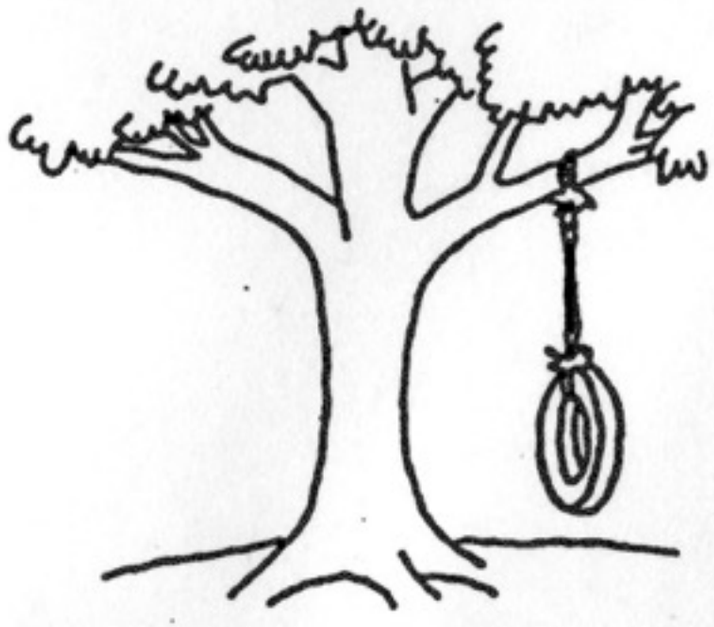


As designed by the
senior analyst.



As produced by
the programmers.

As installed at
the user's site.



What the user wanted.

http://pages.uoregon.edu/ftepfer/access/

Fred Tepfer
(with contributions from
Olivia Asuncion,
Molly Rogers, and
many others)