Webinar for Preliminary Design of Pedestrian Facilities

The presentation will start shortly. Audio will be available over the WebEx conference call. To listen on phone:

- Dial 1-866-776-3553 & use meeting ID 640 579 681.
- Press # when asked for a password to join.
- Please mute your phone.

We will open up a chat box for questions.

March 2016
Welcome to the Webinar on Preliminary Design of Pedestrian Facilities

We will be opening up a chat box and you can send us your questions.

We’ll spend about a half hour at the end of the presentation answering questions.

We will not be taking questions from the phone lines today.

At the end of the presentation we’ll post up a list of persons you can contact with questions, if we don’t get to your question during today’s webinar.

There will be a 20 question quiz at the end.

PE’s and RLA’s may earn 1.5 Professional Development Hours (PDH’s) for today’s course.

To qualify, you must be in a moderated group, sign the sign in sheet, and take the quiz.
This is the first in a series of 3 courses we are offering.
Each webinar is being given twice.
Today’s presenters are:

- Richard D. Wilder, PE, Director of the NYSDOT Design Services Bureau and member of the AASHTO Technical Committee on Geometric Design
- Kara E. Phillips, RLA, Associate Landscape Architect in the NYSDOT Design Services Bureau and manager of the NYSDOT Highway Design Manual
- Robert Speece, RLA, Senior Landscape Architect in the Design Quality Assurance Bureau and author of Highway Design Manual Chapter 17
While ADA applies to all public facilities, regardless of funding, this course is targeted to Construction Inspection Staff working on NYSDOT projects, Highway Work Permits on State Highways, and Local Federal Aid Projects.

The inspection staff should have some familiarity with the Americans with Disabilities Act (ADA) and the Public Rights-of-Way Accessibility Guidelines by reading ED 15-004, portions of HDM Chapter 18, the Section 608 Specs, and the 608 series standard sheets.
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The Americans with Disabilities Act (ADA) was signed over 25 years ago.

It is a wide-ranging law that prohibits discrimination based on any disability.
Guidelines for accessibility are developed by an independent federal agency called the United States Access Board. (It was formed in 1973 after the Architectural Barriers Act of 1968).

The 1991 ADAAG is primarily for buildings.

In 2006 a guide was developed for transportation facilities.

Even though the latest copy is dated 2011 and is only a proposed guide, it has been adopted by FHWA as a standard.

Implementing ADA is relatively complex and this short webinar is not going to answer all of your questions. But it should give you a basic understanding of the requirements and where to go for more information.
Why is NYSDOT spending so much attention to ADA.

First, it’s the right thing to do.

Rebuilding pedestrian facilities is costly in terms of money and resources

Facilities must be designed and built correctly the first time.

Important both financially and legally
To date, we've identified 43,000 curb ramps, but the number is closer to 50,000.

As shown in this map, they are statewide.

Although there are ramps at most locations, they do not meet the 1991 or the 2011 standards.
- Over 2,100 miles of sidewalk
- As shown in this map, they are statewide
- Many sections do not meet all of the 1991 or the 2011 standards.
Until 2011, ADAAG served as the guidelines for our facilities, and they still do when evaluating existing facilities on 1R jobs.

All new construction must meet the requirement of the Public Right of Way Accessibility guidelines – still, technically, “proposed” but FHWA has adopted them as the standard.

There is NO tolerance on values outside the range. A range is when there is a maximum value, such as 2% Max. Cross Slope. Construction tolerance must be “built in”
To ensure that pedestrian facilities are fully compliant with the law, ED 15-004 was issued. It is effective for all ongoing and future contracts. ED 15-004 applies to all Locally administered projects. It also applies to all HWP on State Highways.
While the contractor is responsible for compliance with the contract documents, Inspectors need to verify forms are set properly prior to the pour.
ED 15-004 established lower design and layout values to allow for construction tolerances.

This table shows a few examples.

Although the ADA limits haven’t changed, FHWA recently informed the Department that there are no tolerances beyond the ADA acceptance values.

For example, 2.1% cross slopes for sidewalks are not acceptable.
Department has designated staff to help manage ADA and pedestrian facility planning, design and construction.

The RD-designated licensed professionals to provide:
1. Field reviews.
2. Technical assistance, and
3. Process NSF justifications for pedestrian facilities

These are the “ADA Specialists”
This table shows the ADA and pedestrian staff.
ADA work required on 1R Projects is established by a 2013 Joint Technical Assistance document from Dept of Justice and FHWA.

Under the ADA, agencies aren’t required to address curb ramps and crossings for maintenance, but are required to do them when a highway is altered. There were problems with the interpretation of the law because DOJ’s definition of maintenance and alteration isn’t necessarily the same as that of DOT’s.

This document clarifies what constitutes an alteration, for ADA purposes. We call resurfacing maintenance, but for the purpose of ADA it is considered an alteration. As part of a resurfacing project, we must address pedestrian crossings (crosswalks and curb ramps) within the project limits.

1R projects don’t typically address sidewalks. . .and not all curb ramps; only those at intersections and mid-block crossings
The question often arises – whether or not driveway crossings need to be addressed as part of a 1R. The answer is sometimes.

Under ADA, altered streets, roads, and highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from street level pedestrian walkway [i.e., street, road or highway crosswalk].

So, driveway crossings that are considered intersections need to be addressed on 1R.

Driveways WITH a signal, stop or yield control are considered intersections.

Driveways WITHOUT a signal, stop or yield control are not intersections.
Driveway crossings WITH a signal, stop or yield control – are intersections - DO require curb ramp evaluations as part of 1R projects

Driveway crossings WITHOUT a signal, stop or yield control – are not intersections- do NOT require curb ramp evaluations as part of 1R projects
Not required to address noncompliant sidewalks or ped. signals on 1R projects.

If there are no existing prepared pedestrian paths, curb ramps are not required. Pedestrian paths aren't limited to concrete sidewalks. They could be HMA or stabilized gravel – any path deliberately prepared for pedestrian use.

In the photo shown here, there is a pedestrian crossing, but there are no sidewalks – the shoulder serves as the pedestrian path/ No curb ramps would need to be installed here on a 1R.
Existing curb ramps must meet (or be made to meet) 1991 ADAAG standards.

If they can’t meet standards because of a physical constraint, they can be justified as nonstandard features.

If they can’t be adjusted to meet standards, or justified, they need to be replaced. Full replacements are considered new construction, so they must meet the newer 2011 PROWAG standards.
Crosswalks are typically considered new construction on 1R and must meet the newer PROWAG standards. If they can’t meet the standards, they have to be formally justified as a nonstandard feature.
All of the required values for existing curb ramps and replacement crosswalks are listed on the Critical Elements for the Design, Layout and Acceptance of Pedestrian Facilities sheet (i.e., “Critical Elements” sheet).

This sheet is a reference tool. It doesn’t have to be formally filed, but it is strongly encouraged. Using it to evaluate existing facilities will ensure that all of the bases are covered.

It can be used electronically or as a hard copy. The Excel file for the sheet is located on the HDM Chapter 18 web page.

Note that there are two headings
- Brown heading – values for existing curb ramps that will remain on 1R jobs ONLY. These need to at least meet the older 1991 ADAAG standards.

- Blue heading – values for replacement curb ramps or crosswalks. These facilities are required to meet the newer PROWAG values.

For now we’ll stay with the brown heading: evaluating existing curb ramps on a 1R project to decide if they can stay, or need to be replaced.
Each of the critical elements of a curb ramp, as identified in the 1991 guidelines, is listed at the left. To the right are the dimensions or values that the element must meet.

There is NO tolerance for these values. The ramp either meets the values shown, or it doesn’t.
Each element has a standard inspection (measurement) method, referenced by letter to notes on the back of the sheet.

The inspection method is basically how the feature should be measured - will take a quick look at each of the elements and how to measure it.
Tools needed to evaluate ramps

- Digital level (4 ft.) - Don’t use total station or auto-level – not accurate enough
- Standard tape measure - for smaller dimensions and vertical measurements
- A reel tape measure – for longer dimensions
- Straight edge – A straight edge can help with slope measurements where the digital level won’t lie flush on the surface. Will talk about this later when we talk about measuring detectable warnings.
- Digital camera – Photos of each ramp are a good idea for reference back in the office. Not only as a design reference - also sometimes needed for a nonstandard feature justifications. Taking a picture of each ramp can often save you a second trip later.
The first critical curb ramp element is the minimum clear width – must be at least 36”
You’ll measure the width of the ramp surface, and make a parallel measurement 10 ft away, if the ramp length allows. Average the two.

Be sure to take a measurement at the narrowest spot or at any restriction points.
Measuring the clear width on another ramp configuration. Measure at the narrowest part and exclude the curb.
The next element is the ramp’s flare slope. There’s a maximum slope of 10% for flares in a walkable area.
A walkable area is any surface prepared for pedestrian use. A paved area that isn’t obstructed is walkable. A planted buffer strip or one obstructed by poles and signs is non-walkable.

In the photo, the area to the right isn’t prepared for pedestrian use, so the flare on that side has no maximum slope. On the left, there’s the mailbox, but someone could still walk around it fairly easily and cross the flare at a perpendicular. So the max. slope of the flare on this side is 10%.

Flare slope is measured parallel to the curb line. A minimum of 2 measurements should be taken on a flare that people are likely to walk over.
The next element is related to the last one. If a flare slope exceeds 10%, or there’s a curbed ramp edge, it must be in non-walkable area.
In the photo, the vertical curb beside the paved area is not compliant. This is a walkable area, and there should be a flare there with a max. slope of 10%. The curb on the other side is acceptable because it’s unpaved and not part of a pedestrian path.
The next element is a maximum ramp grade (a.k.a., running slope) of 8.33%
The grade or running slope is in the direction of pedestrian travel.

You’ll take 3 measurements with digital level – one at centerline and one 18” to each side
Average the 3 measurements – the average can’t exceed 8.33%
In a situation with limited space, the running slope can be as much as 10% for a 6” rise.
In this example, with the intersecting walk, wall, and approach to the building, there’s not much space to work with. That steep little ramp to the landing is okay if it’s no more than a 6” rise and doesn’t exceed 10%.

Same method of measurement as the previous one for grade or running slope – measure along centerline, measure 18” to each side, and average the 3 measurements.
The next element is the clear space for diagonal ramps – it must have a minimum dimension of 48” x 48”.

Clear space is only required for diagonal ramps in the 1991 standards.
Diagonal ramps typically enter intersection at an angle of about 45 degrees. They usually serve two crossings with one ramp. They tend to make disabled users more vulnerable if they place them in a traffic lane at the bottom of a ramp.

We’ll talk a little more about this later when we look at the newer guidelines, because they’re more specific about clear space.
For a 1R project, this is an example of a compliant clear space: it's located below the lower grade break of the ramp, outside of the vehicular traffic lanes, and completely with within the crosswalk markings.
This is a clear space on a different ramp configuration – it’s still below the bottom grade break, within the crosswalk markings and outside of the parallel vehicular traffic lanes. The clear space can overlap a dropped curb or detectable warning, as it does here.
The next element is grating spaces in the walking surface. They can’t exceed ½”.
Gratings aren’t typically found in the ramp itself, but a frequently located below the lower grade break. They may encroach on the lower surface of the ramp. It’s common to find them in a crosswalk at the base of the ramp, as shown here.

No grates with openings larger than ½” can be located in the walking surface. The longer dimension of the openings should be perpendicular to direction of travel, to avoid trapping a wheel, as illustrated in the photo at upper right.

The grate shown on the left here is noncompliant - it’s in the walking surface with openings that are over ½ wide, and it’s oriented in the wrong direction.
The last element for ramps on a 1R project is vertical changes – they can’t exceed ½”. From ¼” to ½” high, they have to be beveled at a maximum of 1:2.

To measure vertical changes, take at least 2 vertical measurements with tape or ruler.
This is one element that often be cost-effectively corrected to 1991 standards, either by beveling or adjusting pavement level.

The example shows a noncompliant lip was corrected with some asphalt. Whether it’s a patch or beveling, make sure that the treatment covers the entire width of the ramp, excluding the flares.
Detectable warnings aren’t included on the list of critical elements for existing ramps.

Detectable warnings were originally required in the 1991 ADAAG. Then the requirement was suspended, then Access Board deferred addressing them until the PROWAG.

Since this all spans 20 years, determining which guidelines were in effect at the time an individual ramp was built is problematic (and in some cases, impossible). They are not required on ramps built before the PROWAG guidelines became effective.
If you’re evaluating an existing ramp that does happen to have detectable warnings -

Make sure the level fits between the domes, or use a straight edge under the level, to measure the ramp slope.

If the detectable warning is damaged, but is not causing any problems (e.g., some domes have been sheared off) it can be left intact. If it were a surface application that has been partially pulled up, and is not compliant with the vertical change requirements of ADAAG, it should be removed.
The last line under the brown heading concerns crosswalks – it refers you to “New and Replacement Facilities” for crosswalk values, since they need to meet new construction requirements.
Now we’ll take a look at 2R and 3R jobs.

Requirements for these are under the blue heading on the “Critical Elements” sheet – new or replacement facilities need to meet the newer PROWAG values.
On 2Rs and 3Rs, we are required to address all ped. facilities in the public right-of-way.

Both PROWAG and the “Critical Elements” sheet cover many types of features. We encounter curb ramps, sidewalks and crosswalks most frequently, so we’ll focus on those today.
Existing curb ramps on 2R or 3R jobs must meet the newer 2011 standards, or be justified as a nonstandard feature.

There is no reason to bring noncompliant ramps up to old 1991 standards on a 2R or 3R project. We’ll either bring them into compliance with the new standards, or document why they can’t be.
The first thing you’ll notice about the new and replacement values – under the blue heading – is that there are a lot more elements in a curb ramp. The new guidelines got far more detailed than the old ones.

There are 2 columns of values. The first one is the more conservative values that you’ll use for design. The one you’ll use for evaluating existing curb ramps is the one on the right, Limits for Work Acceptance. These are the values absolutely required for a curb ramp to be considered compliant.
The methods of measurement are the same for running slope and width, but the values are a little different.
The minimum clear width of a curb ramp in the new guidelines is 48” min., instead of the 36” required for 1R/ADAAG.
The maximum running slope is 8.3%, instead of 8.33%. It’s a tiny difference, but with digital levels giving readings to the hundredth of a percent, 8.33% would not be compliant.
The new guidelines introduced a maximum cross slope for curb ramps.

Cross slope is measured perpendicular to the direction of pedestrian travel.

To measure, take one measurement with a digital level. If the ramp length allows, take a second parallel measurement 5 ft. away, and average the two measurements.
The maximum cross slope for a curb ramp depends on where it’s located.

If it’s at an intersection where vehicles have to slow down or stop, the maximum cross slope is 2%. This includes stop or yield intersections.

If it’s at an intersection where vehicles can continue through at speed, the maximum cross slope is 5%. This includes an intersection with any signal that isn’t flashing continuous red. Cars can continue through at speed on a green or yellow.

If it’s a midblock crossing, the ramp cross slope can match the grade of the highway.

This may seem counterintuitive – that the faster the cars are going, the steeper the permissible cross slope on the ramp –

The philosophy behind it is that vehicles travelling at speed won’t encounter unexpected inconsistencies in the grade of the road. You can safely create more of a table where vehicles have to slow or stop.
PROWAG also uses some different terminology than ADAAG.

We’re not going to go over every element – only the ones that are new or sometimes confusing.

Note the turning space at the top and the clear space at the bottom. Neither of these is referred to as a “landing”. They have different names because they have different functions.

The turning space is a level area where a turning maneuver is needed. It’s not always at the top of a ramp, but the clear space is always at the bottom, below the lower grade break.

Turning space and clear space can be confusing – we touched on clear space a little earlier, and will discuss it in terms of the new guidelines. First, we’ll go over turning spaces.
To determine if - and where - you need a turning space, you need to know what type of ramp it is.

PROWAG defines 2 types of curb ramp: Perpendicular and Parallel

A perpendicular ramp has a running slope that meets the curb or gutter at a right angle.
A perpendicular ramp requires a turning space at the top of the ramp, to orient to the ramp run on the way down, or clear the ramp on the way up.
The ramp run of a parallel ramp is in line with the pedestrian direction of travel.
A parallel ramp requires a turning space at the bottom to orient to the ramp run. This allows a turn to orient to the ramp on the way up, or to the crosswalk on the way down.
The guidelines acknowledge that there are ramps that combine elements of both perpendicular and parallel ramps.

Turning spaces are still needed at the bottom of parallel ramp segments, and at the tops of perpendicular segments.
On a perpendicular ramp, a 4’ x 4’ turning space is required at the top, if there’s no constraint at the back of the sidewalk.
If there IS a constraint at the back of the sidewalk, the turning space must be 4’ x 5’ (with the longer dimension furnished in the direction of the ramp run).

The logic here is that someone pushing a chair needs a little more space to square up with the ramp run, or to get themselves and the chair clear of the ramp if they’re coming up it.
On a parallel curb ramp without constraints, the turning space has to be 4’ x 4’.

If there are constraints, the Guidelines require a 4’ x 5’ dimension, but there is conflicting information on the direction of the 5’ dimension. It’s seems logical that the longer dimension should be oriented to the crossing, but the text and one of the graphics contradict each other. For the time being, a 5’ x 5’ turning space is recommended to be on the safe side.
The turning space has a maximum cross slope of 2%. Since the direction of travel varies on a turning space, the slope can’t exceed 2% in any direction.

You’ll measure the slope at the middle of the turning space, in the direction of the ramp run. Then take a measurement 18” to one side, another 18” to the opposite side, and average them.

Then you’ll want to do three similar measurements in the direction of sidewalk travel, and average them.

Neither of the averages can exceed 2%.
We talked about clear space earlier for 1R jobs. It’s also required on 2R and 3R, but it’s not specifically limited to diagonal ramps. The guidelines now state that a clear space for pedestrians must be furnished outside of the parallel vehicular travel lane – which is the vehicular travel lane parallel to the direction of pedestrian travel.
It’s only a real issue on a diagonal ramp. On perpendicular ramps, like this one, the clear space is well outside of the parallel traffic lane.

The idea is to keep the clear space outside of the lane where traffic can be travelling full speed while someone is entering the crossing. Right-turning traffic is less of a concern because it has slowed or stopped, and drivers are looking in the direction of the turn, toward the crosswalk.
On a diagonal ramp, both travel lanes are considered parallel to the direction of pedestrian travel. The clear space has to be outside of both, and entirely within the crosswalk markings.
In a situation like this—a diagonal ramp with a radial orientation—a pedestrian can come down anywhere along that radius, so a clear space must be furnished along the whole length.

This clear space is compliant—it’s below the lower grade break, outside of the parallel traffic lanes, and within the crosswalk markings.
Clear spaces and turning spaces can overlap, as long as the two separate functions are served in one space. They can also overlap a dropped curb and detectable warnings.
Detectable Warnings ARE required on 2R and 3R jobs

There has been a lot of confusion about the purpose and placement of these.

Before curb ramps were commonly used, the curb served a cue to alert visually impaired people when they were leaving the sidewalk and entering the road. Curb ramps took that cue away. The only purpose of detectable warnings is to take the place of the curb as a cue for that boundary. They have to be detectable underfoot, but for people with partial visual impairment, they should also contrast visually with the surrounding surface – light on dark or dark on light.

They are NOT a wayfinding device. The are not intended to give the visually impaired any indication of the direction they should travel.

They are used not only at street crossings and refuge islands, but also at at-grade rail crossings.
Detectable warnings are required at all street crossings. They shouldn’t be placed on most residential or commercial driveways, since the pedestrian right-of-way continues across driveways. However, they are required at commercial driveways that are stop or yield controlled, since the pedestrian right-of-way in these situations is similar to a street crossing.
On pedestrian refuge islands or medians, detectable warnings are only required when the path through the island is 6’ or longer. This allows for a stride or two between the warning fields. Otherwise, it’s difficult for those who rely on them to distinguish the end of one warning field from the beginning of the next.
The orientation of the domes is dictated by the slope of the ramp. This allows wheelchairs wheels to pass between the domes without undue resistance. The orientation is less critical if the running slope is less than 5%.

The revised 608 standard sheets offer more detail on the placement and orientation of detectable warnings. Where the detectable warning is on the ramp itself, it’s aligned with the ramp slope and grade break. This is shown on the two details at upper left.

Where it’s on a relatively level area below the bottom grade break, the orientation of the domes varies, as shown in the rest of the details.
A blended transition is a curb ramp with a slope of less than 5%.

It requires a detectable warning in the same conditions that a curb ramp would require them. Because the slope is less than 5%, the orientation of the domes is not as critical.

A blended transition is essentially an extension of the sidewalk. It doesn’t require a turning space but does require a clear space.

(Reference R304.4)
Existing crosswalks on 2R or 3R jobs must meet the newer 2011 PROWAG standards or be justified.
The critical crosswalk slopes are:
Running slope – parallel to pedestrian direction of travel (the cross slope of the road)
Cross slope – perpendicular to direction of pedestrian travel (the grade of the road)
The maximum running slope for crosswalks is 5%. Many shoulders are sloped at 6% and superelevated sections are sloped at up to 8%, so these will be nonstandard features, if the slopes can't be avoided.
Crosswalk cross slope maximums are identical to curb ramp cross slope maximums, for the same reasons.
Existing walks on 2R or 3R jobs, like everything else on 2R or 3R jobs, must meet the newer 2011 PROWAG standards or be justified.

The term “Pedestrian Access Route” – circled in red - is important. We typically use it interchangeably with the term “sidewalk,” but there is a distinction.
The Ped. Access Route is defined in the guidelines as a continuous clear path provided for persons with disabilities.

The guidelines require the Access Route to have a continuous clear width of 48”, excluding the curb. Where the clear width of the Pedestrian Access Route is less than 5 ft. wide, a 5 ft. x 5 ft. passing space is required every 200’ – driveways, crosswalks and other paved areas can serve as passing spaces.

It should be noted that the Department’s preferred sidewalk width is 5 ft. The minimum width of 4 ft should be used when 5 ft isn’t practicable.
The Pedestrian Access Route is sometimes within a larger Pedestrian Circulation Path. Other paved areas outside of the Access Route, where people may be expected to walk, are part of the Pedestrian Circulation Path. The Circulation Path may not meet all of the surface, slope and dimensional requirements of the continuous Pedestrian Access Route. It’s essentially what the old 1991 guidelines referred to as the “walkable area.”
The Pedestrian Circulation Path comes into play when considering curb ramp flares. If the flares are within the pedestrian circulation path – if people are likely to walk perpendicular across the ramp – the flares can’t exceed a 10% slope.

The photo at upper right is a good illustration of why the maximum slope is needed. This isn’t an unusual situation – the access route has been partially blocked. Pedestrian, including those with mobility or visual impairments, will have to cross over the upper portions of the flares. It’ll be a little more difficult to traverse than the sidewalk, but not so steep that it’s a complete barrier.
If the flares are clearly outside of the paved Pedestrian Circulation Path, they can be steeper than 10%, or a vertical surface can be used. In both of the situations shown, the curb or flare is against an unpaved area, so they’re okay.
Sidewalk running slope is measured much like curb ramp running slope.

You’ll measure at the centerline with a digital level, and then 18” to either side, and average the three measurements.

Where the highway grade is 5% or less, the maximum grade of the sidewalk is 5%.
Where the highway grade is greater than 5%, the grade of the sidewalk can match it.
The maximum cross slope of a sidewalk is 2%. You’ll measure perpendicular to the direction of travel with a digital level. You’ll take another measurement 10’ away, and average the two.
There are a few other things to watch for that may throw an existing facility out of compliance.

Horizontal openings in any part of the Ped Access Route can't exceed ½". The can be filled or caulked to bring them into compliance.
Horizontal openings include grates. Reticuline grate openings are around 2.5": they’re not compliant.

The grate at left is an ADA-compliant grate. Something this restricted typically won’t meet our needs for highway drainage.
The safest thing to do is keep grates out of the pedestrian access path. They can go under the outside stripe of a crosswalk, but should not be inside the stripes or under the bars. The grate shown here is compliant. It’s not within the continuous access path.
The maximum vertical lip is \( \frac{1}{2} \)". Lips must be beveled at a maximum of 1:2 from 1/4" to 1/2" to smooth the transition. They can be smoothed over a longer distance, as shown here, if they don't exceed the maximum slope for the facility.
These are just some of the elements we see most often. There are many others on the sheet, such as stairs, pedestrian ramps, pedestrian rail crossings, and accessible parking. If you run into any of these on a 2R or 3R project, the information for evaluating them is there.
The 608 Standard Sheets have been revised to reflect the design and layout values in ED 15-004. Changes include 3D views and new details. Where the standard sheets cannot be used directly, the sheets provide the notes and other information needed for the contractor and construction inspectors. Details should not duplicate notes on the standard sheets.
Type 1 is used where there is a sidewalk from the side street and there is at least two feet of snow storage. The bottom grade break terminates at the back of curb. Side flares are beneficial to prevent vegetation and sediment encroachment onto ramp.
Type 2 is used where there is no or minimal snow storage width, and is often the only type that works where the curb radius is large. The bottom grade break terminates at the max. 2% area formed by the curb radius. In this example the detectable warning is placed at the bottom of the ramp slope, since the bottom grade break is less than 5’ from back of curb.

Note that the narrow grass strip in the photo is not the ideal condition. A hybrid of Type 1 and Type 2 with at least one side flare on the street side would be an option in this situation as well.
Type 3 ramps are for where there are intersecting sidewalks and snow storage width exists. A min. 4’ x 4’ turning space is required at the base of the ramp slopes.

The curb ramp in the photo would be considered a hybrid of types 3 and 4. We will cover type 4 in a moment. Note the unconventional detectable warning placement on the curb ramps – this does not meet standard. Detectable warnings for this type will need to be placed radially at the edge of the back of curb or with two corners of the warning meeting the back of the curb.

A clear space outside of the vehicular travel lane that is contained completely by the crosswalk striping is also required.
Type 4 is used for where there are intersecting sidewalks in limited right of way. A minimum 4’ x 4’ turning space area is required at the base of the ramps.

If drainage is not handled well, sediment can readily accumulate in the turning space. This can happen on any ramp type where there is a turning space or landing (for lack of a better term) area prior to the grade break. However, it’s more problematic where wheelchair turning maneuverability is needed.

A clear space outside of the vehicular travel lane that is contained completely by the crosswalk striping is required. This can typically be accomplished with ramp types 3 and 4 by overlapping the turning space.
Type 5 breaks up the elevation drop and moves the turning space back and higher as with a perpendicular ramp. It is used where there is more right of way available but not as much is needed as would be to do a full perpendicular ramp.
Type 6 requires crosswalks to be placed farther back from the corner, but needs less right of way width. It would be used where there is no available snow storage width. The turning space at center can be at a reduced elevation to help lessen the distance of the crosswalks from the corner.
Since it is a perpendicular style ramp, Type 7 requires a minimum of 13’ from curb to back of turning space since there is an obstruction at the back of the turning space. This width is due to the effect of matching an 8.3% curb ramp slope with a consistent sidewalk/buffer zone cross slope of 2%. Designing for a 7.5% ramp with 1.5% sidewalk-buffer zone cross slope will require greater than 13’ width. Note that the width requirement will increase as the grade of the snow storage area increases.

8’-4” needed for curb ramp length for 7.5% ramp with 1.5% snow storage width
9’-1” needed for curb ramp length for 7.5% ramp with 2% snow storage width.
Type 8 is used when one of the other ramp types will not work. It is not preferred since the ramp directs persons away from the crosswalks and requires redirection in the roadway within the clear space. The crosswalks need to be striped to provide for this space.

The same issue exists for ramp length as with type 7. 12 ft. min. will be needed to fit ramp in to back of turning space with no obstruction.
Type 9 is used for separated crossings at intersections and midblock crossings where there is no snow storage width. The slope of the turning space would follow the roadway running grade for this curb ramp type.
Type 10 is used where there is some available buffer zone width. It is a combination of a parallel and perpendicular ramp.

The slope for the turning space for this ramp type should not exceed 2% since the turning space is not at roadway grade and there is the ability to warp the lower ramp to meet the roadway grade.
Type 11 is used where there is enough available width to provide a perpendicular style ramp. Minimum of 8’ could be needed to fit the ramp in.
Note that for this configuration the right hand side curb ramp could also be a parallel curb ramp type where space is constrained.
Type 13 should be fairly self-explanatory. The flares should be 10% max. if buffer zone is considered part of the pedestrian circulation route.
Proposed new configuration 14 is for the fairly common situation where a sidewalk transitions to a walkable shoulder. Similar to midblock crossings, the base of the curb ramp slope, which is not quite a turning space, should match the street running grade.
Allows new ramps and sidewalks to meet ADA and only have the transition piece removed when doing future sidewalk improvements.
We will now cover ROW for pedestrian facilities.

ROW acquisition typically involves field survey, title searches, public involvement, developing maps, appraisals and acquisitions. The process takes approximately 24 months.

1R projects typically take 3 to 6 months to go from initiation to PS&E. Since field survey, title searches and acquisitions take 24 months, ROW acquisitions are outside the scope of 1R work.

2R and above projects typically take 2 or more years to progress. ROW is within the scope of these projects.

Now we can go into more detail on 1R projects and how to address curb ramps and property boundaries.
This is the process consolidated into a flow chart. The text is a bit small, but we’ll go through each step.
Kara covered how to inspect ramps. Ramps that are compliant to the 2011 PROWAG and on State facilities need to be identified as such in a table and sent to the ADA Coordinator. This will allow the transition plan to be updated.

Likewise, ramps that are compliant to the 1991 ADAAG and on State facilities need to be identified as such in a table and also sent to the ADA Coordinator.

Curb ramps that do not meet the 1991 ADAAG will require replacement or justification as part of a 1R project.

Once the locations have been identified, terrain data and ROW information is needed.

The next webinar series on Final Design will cover terrain data, including methods of measurement, points to collect, accuracies, precision, etc.
ROW Work is done under the supervision of a licensed Land Surveyor. Work includes the review of record plans, ortho imagery, highway work permits, GIS databases, highway type, the 23 NYS Session Laws, & survey grade tax maps. Where an AHB or HB can be determined, a scaled CADD drawing is to be provided to the designer.

AHB’s and HB’s determined by the Regional Land Surveyor do not require a 2’ to 3’ buffer space between the work and boundary line. The designer then determines the curb ramp type and determines whether a compliant curb ramp can fit with the terrain and other constraints.

We have 4 categories based on whether the proposed curb ramp can fit within the highway boundary. The first category is when a compliant curb ramp will fit within the AHB/HB line. In this category, the ramp is to be included in the 1R project or built prior to the 1R work. The proposal should include a detail showing the curb ramp and the AHB/HB line. The next webinar series on Final Design will cover what to include in the detail.
The second category is when the AHB/HB can not be readily determined. The AHB is to be shown at the back of the sidewalk.

If a compliant ramp can fit within the concrete footprint, then the designer is to notify the property owner of the proposed work.

The proposal should include a detail showing the curb ramp and the AHB line at the back of the existing concrete footprint.
If a compliant ramp can’t fit within the concrete footprint, and there is a curb ramp, the work should be deferred and a NSF justified based on ROW.

This will avoid the construction of noncompliant curb ramps that must be replaced within 3 years.

Deferred curb ramps are to be corrected within 3-years.
If there is NO existing curb ramp, then the preferred option is to defer the 1R Project until ROW can be acquired.

This will enable all ramps to be corrected at once and avoid having to go back to the same location and disrupt pedestrians and motorists.
If deferring the project is not possible:

The AHB should be shown at the back of the sidewalk. The designer is to justify the curb ramp as a nonstandard feature based on ROW and the best possible ramp is to be constructed within the concrete footprint.

During design, notify adjacent property owners of anticipated work.

The ramp location is to be made fully compliant within 3 years.

**NOTE:** This may be acceptable for isolated ramps, but NOT where there are more than a few (3-8) locations within a 1R project.
The third category is for when we can determine the AHB or HB and the proposed curb ramp will be outside the boundary line.

If there is a curb ramp, the work should be deferred and a NSF justified based on ROW.

This will enable all ramps to be corrected at once an avoid having to go back to the same location and disrupt pedestrians and motorists.

Deferred curb ramps are **to be corrected within 3-years**.
If there is NO existing curb ramp, then the preferred option is to defer the 1R Project until ROW can be acquired.

This will enable all ramps to be corrected at once and avoid having to go back to the same location and disrupt pedestrians and motorists.

If deferring the project is not possible:

The designer is justify the curb ramp as a nonstandard feature based on ROW and the best possible ramp is to be constructed within the boundary line.

During design, notify adjacent property owners of anticipated work.

The ramp location is to be made fully compliant within 3 years.

**NOTE:** This may be acceptable for isolated ramps, but NOT where there are more than a few (3-8) locations within a 1R project.
The last category is for curb ramps that are non standard for reasons other than ROW.

A NSF justification is needed and the best possible ramp is to be included in the plans.

Kara will cover the documentation for a NSF later in this presentation.
Grading can be minimized by using an optional curb as shown in the 608 Standard Sheets.

Very useful where a grading release has not been obtained and the ramp is close to the Highway Boundary.

Where PAR larger than 48” are used, they should be narrowed to as little as 48” to ensure compliance with PROWAG and avoid unnecessary NSF’s.
Grading Releases

- HC 92 Permission to grade and establish turf.
- Refer to EI 11-010.
- Desirable to obtain in Design
- Plans should not show work beyond the AHB/HB. Desirable to include as supplemental info.
- Include table of signed releases in plans with copies in ProjectWise.

Releases should be obtained during final design, shown in a table and the forms included as supplemental information for the contractor.
For projects that can acquire ROW, PE and fee takings should allow for future maintenance work and should include portions of the embankment or support for the pedestrian facility.

Temporary easements should be used where construction will occupy private lands.
Now that we’ve looked at evaluating existing facilities, and how much ROW you have to work with, we’ll go over what to do if an existing or proposed pedestrian feature doesn’t meet the ADA compliance limits.
On the Critical Elements sheet, the acceptance limits are in the columns with the yellow arrows. To the right of them is a column asking if these values have been met.

Enter a Y or Yes if the values are met. Enter an N or No if they aren’t.

You’ll use the 1991 limits for existing curb ramps on a 1R job, or PROWAG limits for everything else
If you’ve entered “no,” there are a few possible options

If it’s a minor thing like a small lip, you might be able to grind the concrete or make an adjustment.

If it’s something that doesn’t have an easy, cost-effective easy fix, and there’s no physical reason it can’t meet the limits, it needs to be replaced.

If there’s a good reason it can’t meet the limits – such a physical constraint - the feature is justifiable.
The next column over is for the justification of any features that can not meet the acceptable limits for a good reason. You’ll enter the type of justification here in this column.

We’ll try to catch as many of these as possible in design, but it’s inevitable that some constraints won’t be identified until construction. In this case, a justification still needs to be done. Construction will do the justification, but may contact the designer to help determine best possible solution in light of a newly discovered constraint.
There are 7 basic justifications for a nonstandard feature + one “Other” category. These are listed in the Notes, by letters A through H, on the back of the Critical Elements sheet. These are the letter codes that should be entered in the “Justified” column.
A. Underlying terrain – for a situation where the existing topography is too steep or grade separation too great to achieve compliant slope

B. ROW Availability – when permission to access private property is denied or sufficient ROW cannot be acquired, so there isn’t enough room to put in a compliant facility
C. Underground structures – e.g., there’s a vault or other underground feature that can’t be moved or adjusted within the scope of the project. It will dictate the elevation of features above or around it.

D. Adjacent developed facilities – e.g., an existing building or other structure may necessitate steeper slopes or smaller dimensions than ideal.
E. Drainage – Standing or frozen water affects accessibility. Debris deposited by water is also a problem. In situations where a facility won’t drain reliably at compliant slopes, steeper slopes are justified

F. Presence of a Notable Natural Feature – e.g., To preserving some large, highly-valued street trees, short segments of walk that are less than the minimum clear width of 4 ft. may be justified
G. Presence of a Notable Historic Feature – e.g., in a case where a historic structure or retaining wall would have to be removed to accommodate a 4 ft. wide accessible route, a narrower route may be justified.

H. Other – any unavoidable constraint of technical infeasibility that doesn’t fit into the other criteria, e.g., the presence of cemetery or religious site
A Justification of Nonstandard Features form has to be completed for each noncompliant feature.

The form is electronic, and can be found on webpage for Highway Design Manual Chapter 2.
Part 1 of the form asks for detailed location information – this will be used to establish a database of nonstandard features in GIS, and to update the departments ADA transition plan.
Only one form is needed per feature, even if it has multiple noncompliant elements. If a curb ramp is too steep, too narrow, and has too much of a cross slope, you’d just need one form for that ramp.
It includes the 8 types of justifications we just went over. You just check the one you’re using, and enter a brief description if it’s an “H. Other”
Part 4 asks if there’s a possibility that the nonstandard feature could be made compliant on a future project, or if the constraints making it noncompliant are pretty permanent.

If the first answer is checked, the feature should go on the department’s ADA Transition Plan.
There’s also a column on the Critical Elements sheet concerns the Department’s ADA Transition plan.

This column only needs to be filled out for elements that will be nonstandard when construction is complete.

Enter a Y or Yes if the first button in that Part 4 question is selected, and the feature needs to go on the transition plan to be addressed later.
The last part of the form is for approval of the justification. It included instructions on who needs to approve it, and how to file it. No signatures are required – the form and approval are all done electronically.

Regional Director approves for NYSDOT-let and permit projects using criteria A through G.

Deputy Chief Engineer (Design) approves anything using H. “Other”

Responsible Local Official approves Locally Administered Projects (copy to region)
The DAD will need to address the condition of existing pedestrian facilities within the scope of the project.

If known prior to design approval, nonstandard feature justifications can be prepared in preliminary design and should be referenced/mentioned in the DAD, but they are only included in the project file.

Where a pedestrian route is disrupted during construction discuss how pedestrian traffic is intended to be maintained consistent with the existing level of accessibility. For example if a pedestrian detour is an option being evaluated, discuss if it is accessible and if not whether it can be made accessible. And from that point discuss other options.

See the DAD shells for sample statements.
To tie up the ADA process for Inspection-

Copies of the completed “Critical Elements” sheets should be kept in the contract files

Any Nonstandard Feature Justification Forms for facilities on state highways are to be placed in ProjectWise by the Regional ADA Specialists (the filing instructions on are on the form)

Once the contract work is completed, the ADA reporting table of constructed sidewalks and curb ramps along state highways should be completed (in Excel format) and sent to Regional ADA Coordinator. These are used to update the ADA Transition Plan.
References

- Engineering Directive 15-004
- HDM Chapter 18 web page
  - FAQ on ADA Topics
  - Critical Elements for the Design and Layout of Pedestrian Facilities Sheet
- 608 Standard Sheets – Sidewalks, Driveways, etc.
- ADA Specialists

References that may be useful
Resources include

AccessBoard Website – guideline we use most often for the public ROW
DOJ website – Guidelines for Government sites and facilities – tends to apply more to buildings
Our own website for Highway design Manual Chapter 18 - Pedestrian Facilities
Quiz

1. Which of the following pedestrian facilities typically need to be addressed on a 1R project?

A. Sidewalks  
B. Curb ramps  
C. Crosswalks  
D. Pedestrian signals
### Quiz

1. Which of the following pedestrian facilities typically need to be addressed on a 1R project?

   - A. Sidewalks
   - B. Curb ramps
   - C. Crosswalks
   - D. Pedestrian signals
## Quiz

2. On a 1R project, which type of driveway would need its curb ramps addressed?

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<td>A.</td>
<td>One with a stop, yield, or signal control</td>
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<tr>
<td>B.</td>
<td>One without a stop, yield, or signal control</td>
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</tbody>
</table>
2. On a 1R project, which type of driveway would need its curb ramps addressed?

A. One with a stop, yield, or signal control
B. One without a stop, yield, or signal control
Quiz

3. TRUE or FALSE? On a 1R project, curb ramps need to be built even if there are no existing pedestrian paths.
Quiz

3. **TRUE or FALSE?** On a 1R project, curb ramps need to be built even if there are no existing pedestrian paths.

   **FALSE**
Quiz

4. **TRUE or FALSE?** On a 2R or 3R project, pedestrian facilities should be brought into compliance with 1991 ADAAG standards.
Quiz

4. **TRUE or FALSE?** On a 2R or 3R project, pedestrian facilities should be brought into compliance with 1991 ADAAG standards.

**FALSE**
Quiz

5. On a curb ramp with a slope of **over 5%**, detectable warning domes should be oriented to:

A. the crosswalk  
B. the ramp’s running slope/grade break  
C. orientation of the domes isn’t critical  
D. the detectable warning on the opposite side of the crossing
5. On a curb ramp with a slope of over 5%, detectable warning domes should be oriented to:

   A. the crosswalk  
   B. the ramp’s running slope/grade break  
   C. orientation of the domes isn’t critical  
   D. the detectable warning on the opposite side of the crossing
Quiz

6. **TRUE OR FALSE?** A turning space is required at the top AND bottom of EVERY curb ramp.
**Quiz**

6. **TRUE OR FALSE?** A turning space is required at the top AND bottom of EVERY curb ramp.

   **FALSE**
Quiz

7. On a 1R project, the AHB can be determined from available documents. A compliant curb ramp can be built within the AHB. Which of the following should be done?

A. Defer the project
B. Show the AHB and compliant curb ramp in the contract documents.
C. Perform “hard survey” to determine the HB.
D. Only show the AHB and compliant curb ramp in the contract documents IF there is a 2 ft. “buffer” between them.
Quiz

7. On a 1R project, the AHB **can** be determined from available documents. A compliant curb ramp **can** be built within the AHB. Which of the following should be done?

A. Defer the project

B. **Show the AHB and compliant curb ramp in the contract documents.**

C. Perform “hard survey” to determine the HB.

D. Only show the AHB and compliant curb ramp in the contract documents IF there is a 2 ft. “buffer” between them.

CATEGORY I - Proposed compliant curb ramp inside AHB/HB. Deliver PS&E w/ curb ramp. Show AHB/HB and curb ramp in contract documents.
8. If curb ramp location improvements are deferred on a 1R project, how soon do they need to be let?

A. There is no set timeframe
B. Within 1 year of the pavement maintenance contract letting
C. Within 3 years of the pavement maintenance contract letting
D. Within 5 years of pavement maintenance contract letting
Deferred curb ramp location improvements to be let within 3-years of pavement maintenance contract letting.
Quiz

9. **TRUE OR FALSE?** The completed “Critical Elements” sheet for each pedestrian feature should be included in the Design Approval Document.
Quiz

9. **TRUE OR FALSE?** The completed “Critical Elements” sheet for each pedestrian feature should be included in the Design Approval Document.

**FALSE**
Quiz

10. Which curb ramp configuration type is this most like?
Type 1. The buffer zone between the curb and sidewalk makes it more Type 1 than Type 2.
Quiz

11. What could be done here?
Lots of constraints here such as retaining wall, hydrant and tree. The end result would probably need to be justified. If possible, perhaps use a modified Type 4 and transition the sidewalk on left adjacent to curb, ramp down to turning space at corner and ramp up to meet intersecting sidewalk from the right. This slope will be nonstandard.

Or utilizing type 5, lower top turning space as much as possible and move it as far from the street as possible and replace stairs with curb ramp. The resulting ramp slope will need a nonstandard feature justification.
Quiz
12. What needs to be corrected on this blended transition?
Excessive width of detectable warning surface as shown is not recommended, but PROWAG states 2’ min. width in the direction of travel.
Quiz

13. What curb ramp type would you recommend for this location?
Type 4 is most likely candidate to work in this situation, but note that drainage structure likely to impact ability to get a compliant slope on right hand side.
Quiz

14. Which curb ramp type is this?
Due to intersection with other sidewalk the two curb ramps at one corner qualify as Type 5.
Quiz

15. Which curb ramp type works here?
15. Which curb ramp type works here?  
Type 10
More Questions?

Copies of this presentation will be posted on the NYSDOT Highway Design Manual Chapter 18 Internet page.

https://www.dot.ny.gov/divisions/engineering/design/dqab/hdm/chapter-18

Type 6 Curb Ramp
The End