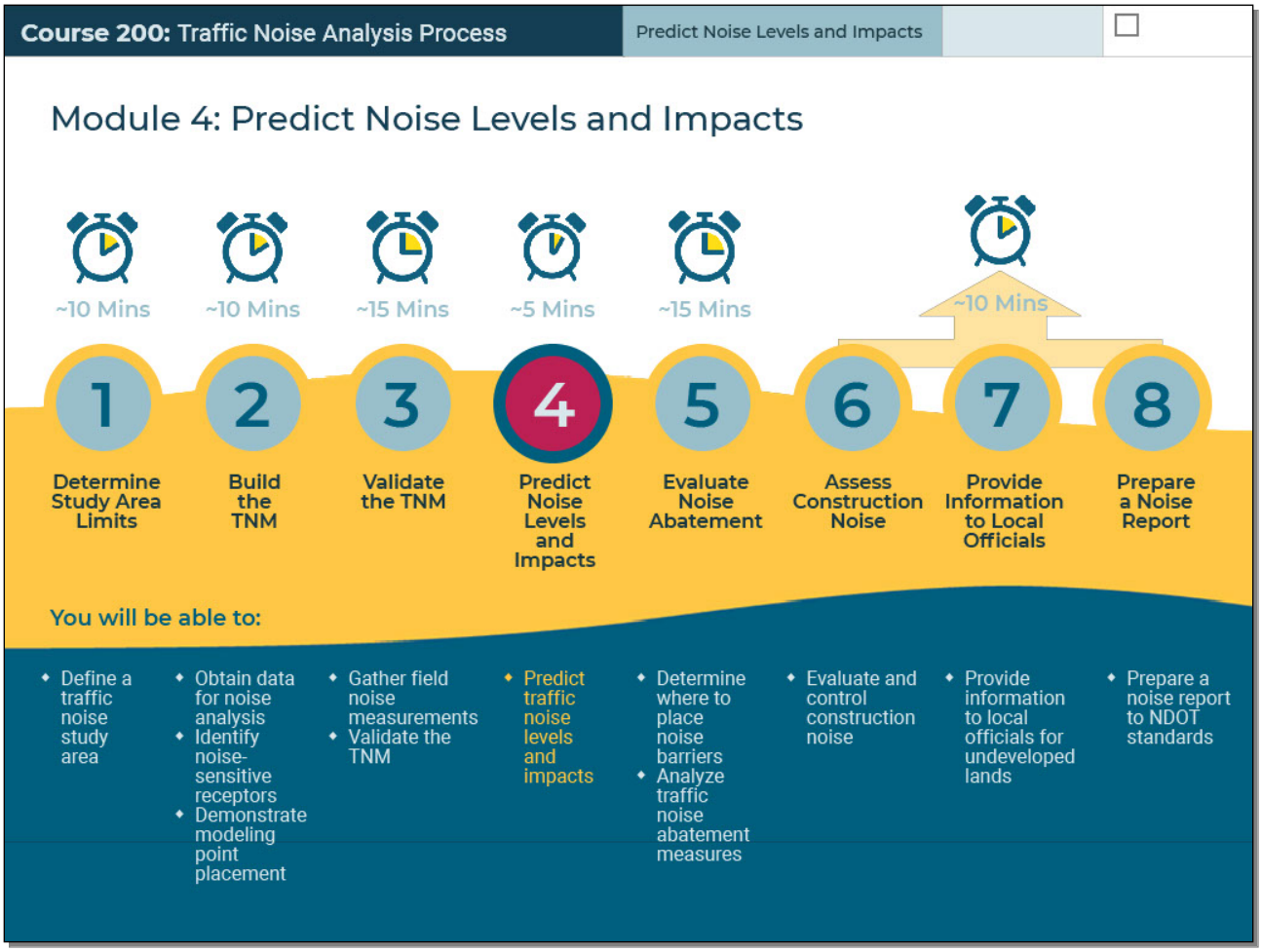
Slide 1 - Slide 1



Audio Script and Notes to Reviewers

Welcome to Module Four. In this module, you will learn how to predict traffic noise levels and impacts.

Text Captions

You will be able to:

Predict Noise Levels and Impacts

- Predict traffic noise levels and impacts

Determine Study Area Limits

- Define a traffic noise study area

Build the TNM

- Obtain data for noise analysis
- Identify noise- sensitive receptors
- Demonstrate modeling point placement

Validate the TNM

- Gather field noise measurements
- Validate the TNM

Evaluate Noise Abatement

- Determine where to place noise barriers

- Analyze traffic noise abatement measures

Assess Construction Noise

- Evaluate and control construction noise

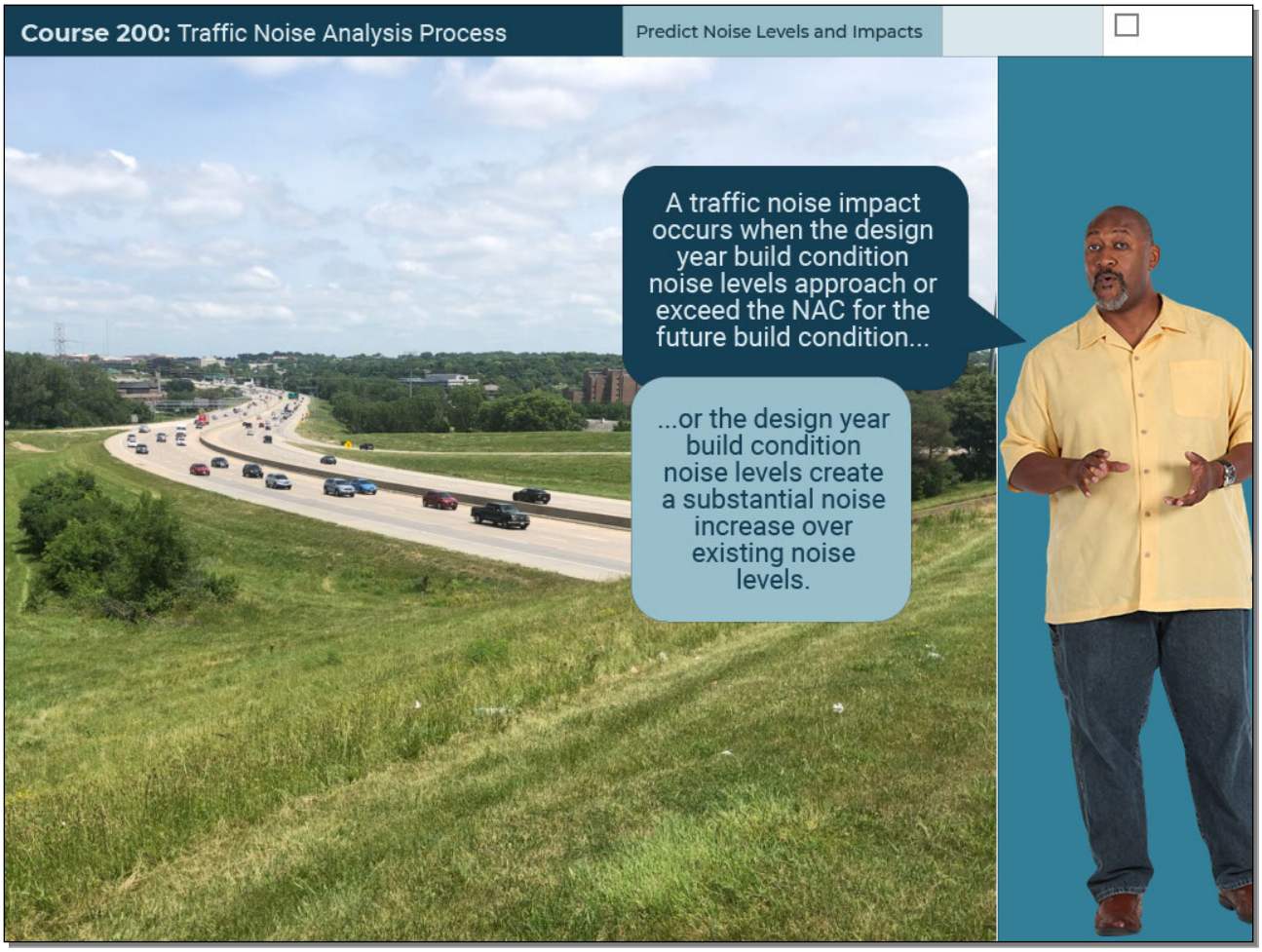
Provide Information to Local Officials

- Provide information to local officials for undeveloped lands

Prepare a Noise Report

- Prepare a noise report to NDOT standards

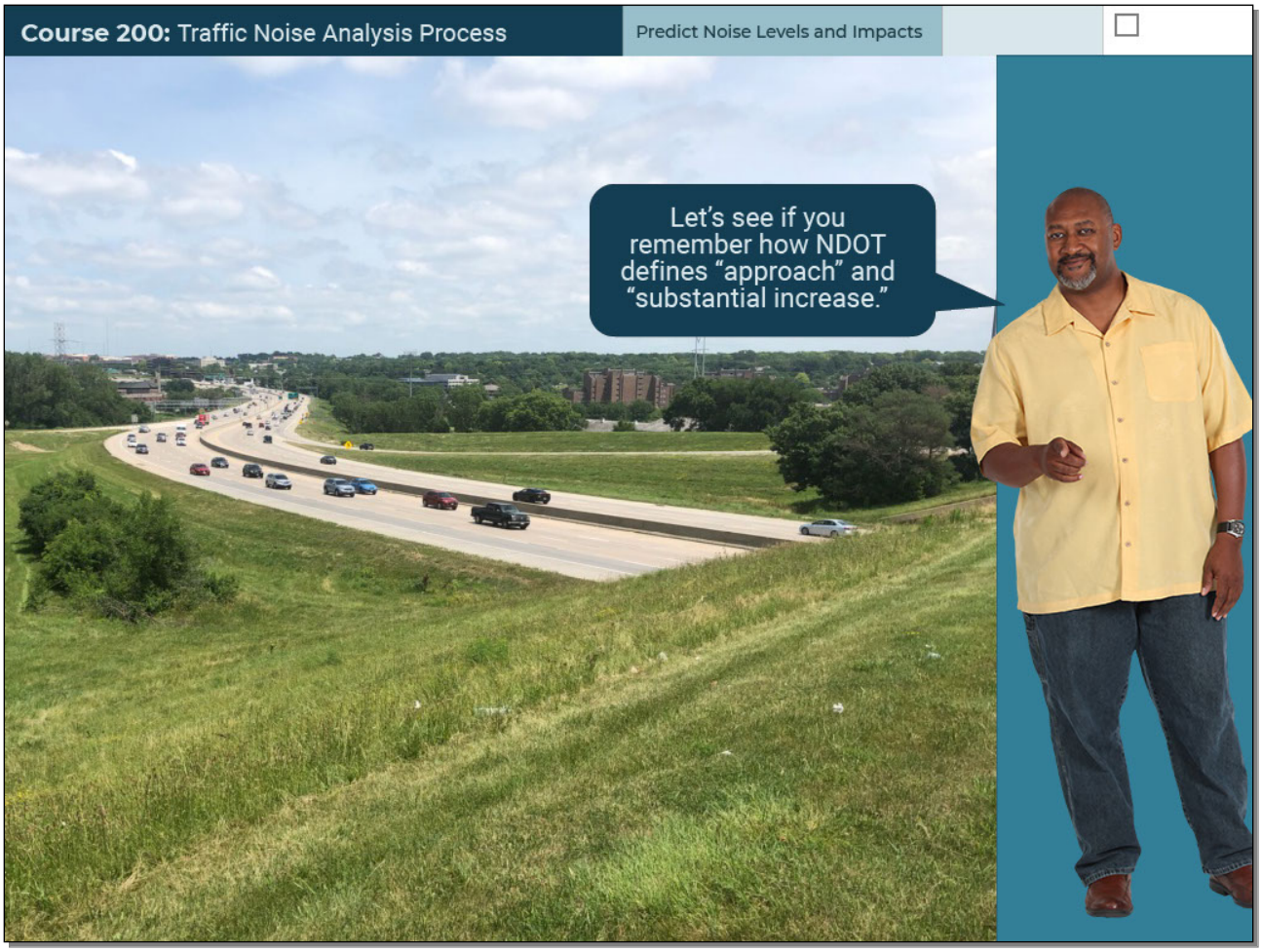
Slide 2 - Slide 2



Audio Script and Notes to Reviewers
Recall from the Level One-hundred course that a traffic noise impact occurs when the design year build condition noise levels approach or exceed the NAC for the future build condition. Or the design year build condition noise levels create a substantial noise increase over existing noise levels.

Text Captions
A traffic noise impact occurs when the design year build condition noise levels approach or exceed the NAC for the future build condition...
...or the design year build condition noise levels create a substantial noise increase over existing noise levels.

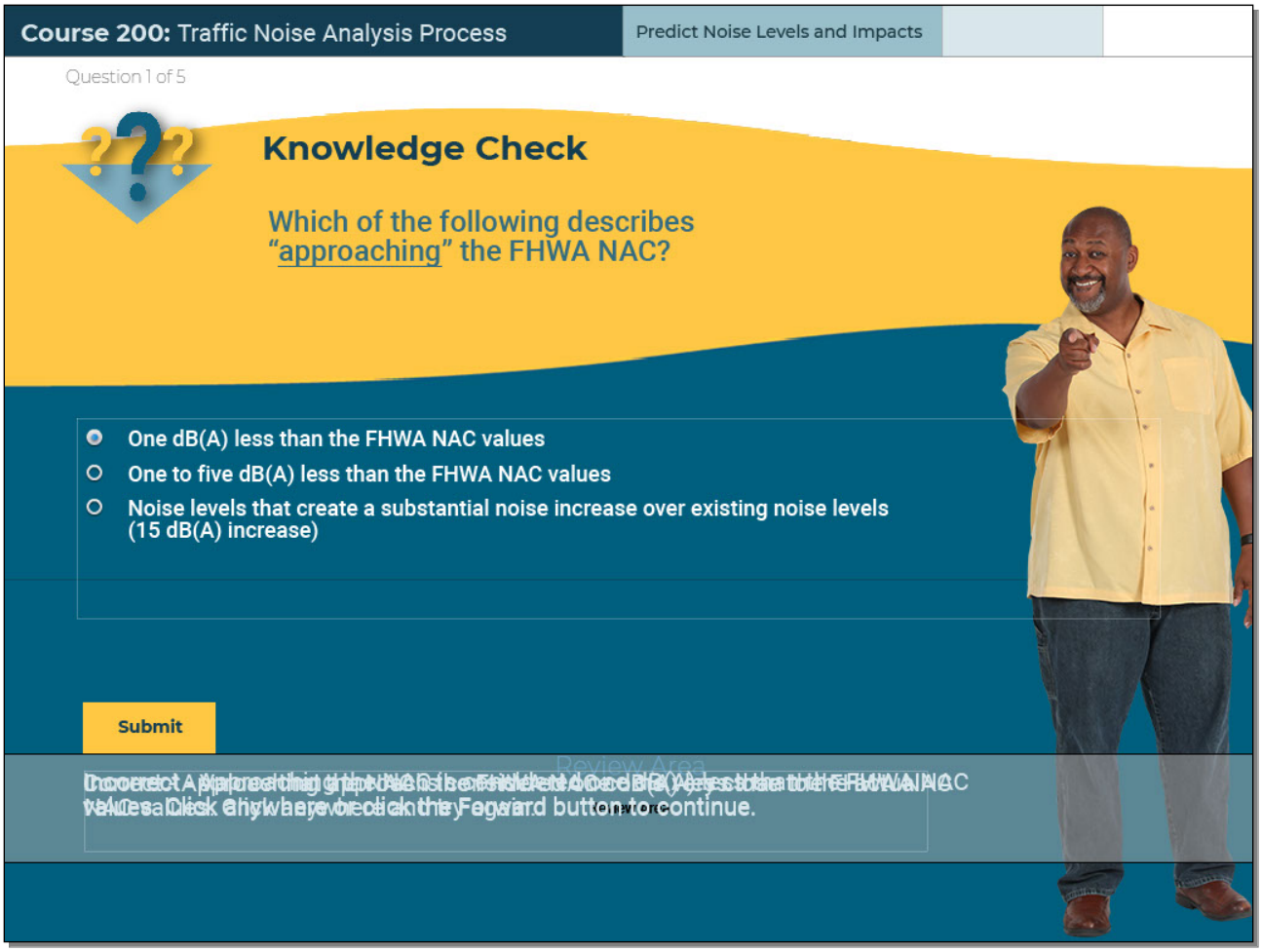
Slide 3 - Slide 3



Audio Script and Notes to Reviewers
Let's see if you remember how NDOT defines "approach" and "substantial increase."

Text Captions
Let's see if you remember how NDOT defines "approach" and "substantial increase."

Slide 4 - Slide 4



Audio Script and Notes to Reviewers
Which of the following describes approaching the F-H-W-A NAC?

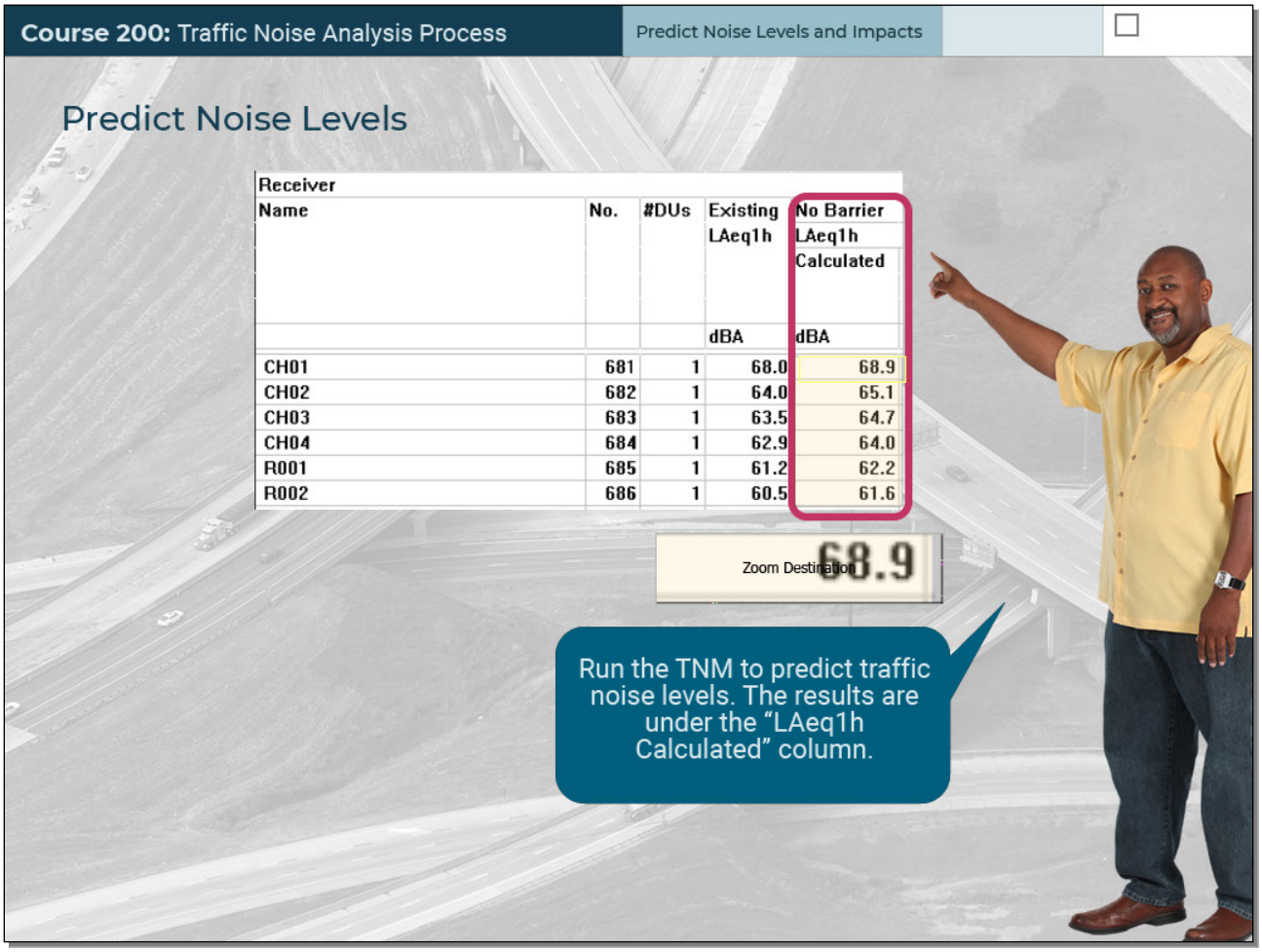
Text Captions
Knowledge Check
Which of the following describes "approaching" the FHWA NAC?
Correct - Approaching the NAC is considered one dB(A) less than the FHWA NAC values. Click anywhere or click the Forward button to continue.
1st incorrect feedback: Incorrect - Values that approach the FHWA NAC come very close to the actual NAC values. Click anywhere and try again.
2nd incorrect feedback: Incorrect - Approaching the NAC is considered one dB(A) less than the FHWA NAC values. Click anywhere or click the Forward button to continue.

Slide 5 - Slide 5

Audio Script and Notes to Reviewers
Which of the following describes a substantial increase over existing noise levels?

Text Captions
Knowledge Check
Which of the following describes a "substantial increase" over existing noise levels?
Correct - A substantial increase is15 dB(A) or higher. Click anywhere or click the Forward button to continue.
1st incorrect feedback: Incorrect - A substantial increase exceeds 10 dB(A). Click anywhere and try again.
2nd incorrect feedback: Incorrect - A substantial increase is15 dB(A) or higher. Click anywhere or click the Forward button to continue.

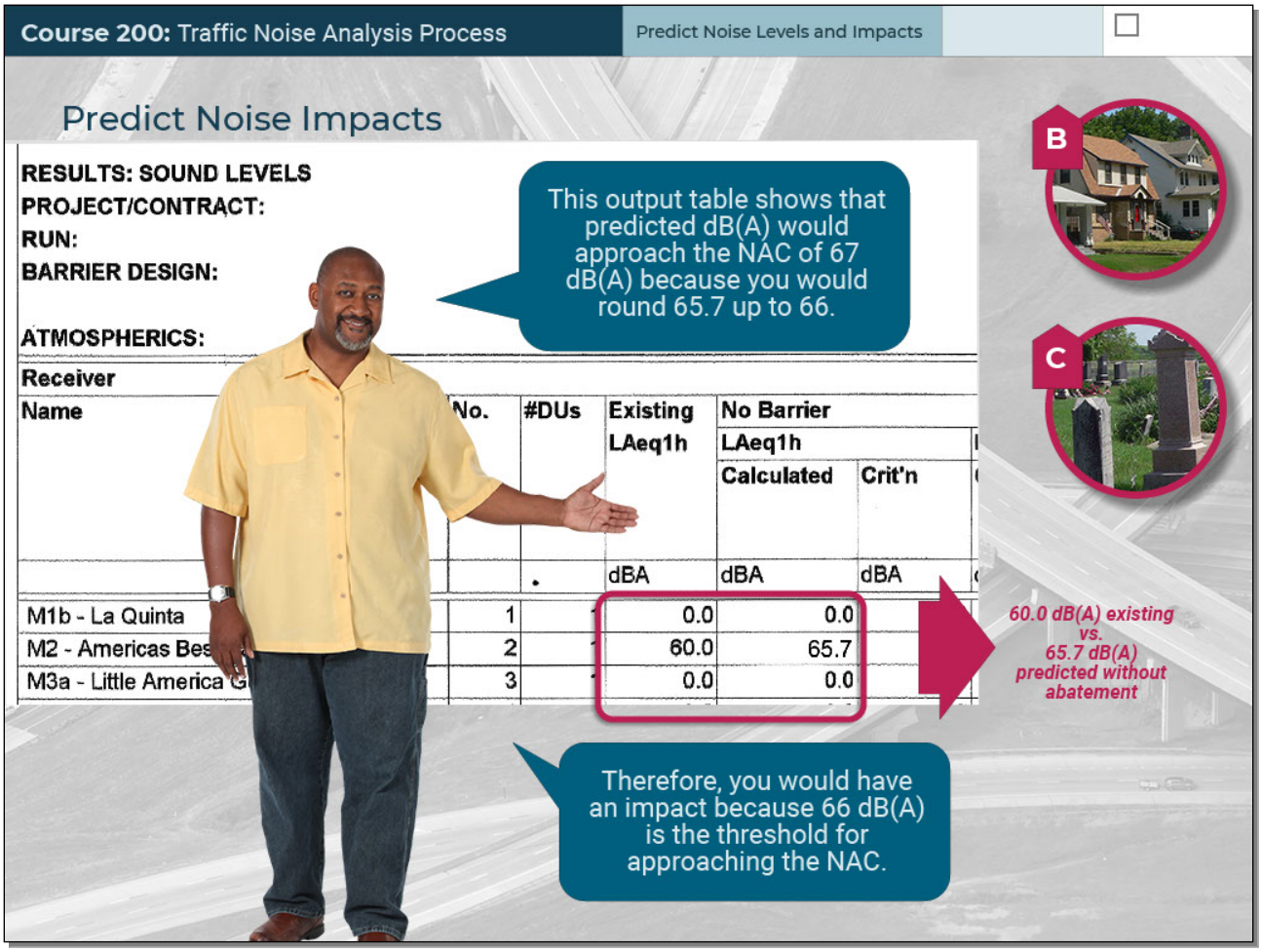
Slide 6 - Slide 6



Audio Script and Notes to Reviewers
To determine impacts, run the T-N-M to predict traffic noise levels. The results are under the L-E-Q Calculated column.

Text Captions
Predict Noise Levels
Run the TNM to predict traffic noise levels. The results are under the "LAeq1h Calculated" column.

Slide 7 - Slide 7



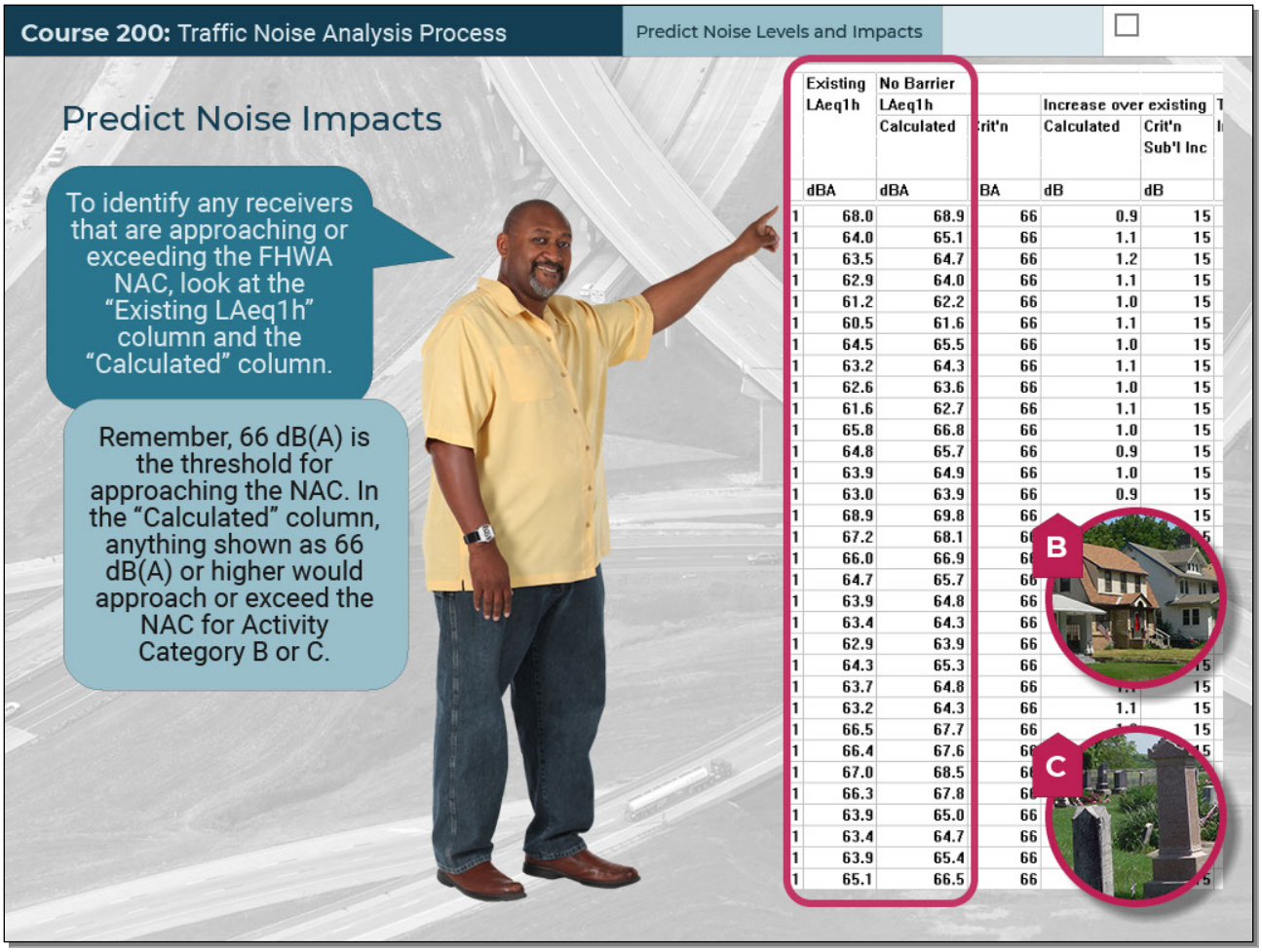
Audio Script and Notes to Reviewers

This output table shows that predicted d D-B-A would approach the Nac of sixty-seven D-B-A because you would round sixty-five-point-seven up to sixty-six. Therefore, you would have an impact because sixty-six D-B-A is the threshold for approaching the Nac.

Text Captions

Predict Noise Impacts
60.0 dB(A) existing vs. 65.7 dB(A) predicted without abatement
This output table shows that predicted dB(A) would approach the NAC of 67 dB(A) because you would round 65.7 up to 66.
Predict Noise Impacts
Therefore, you would have an impact because 66 dB(A) is the threshold for approaching the NAC.

Slide 8 - Slide 8



Audio Script and Notes to Reviewers

To identify any receivers that are approaching or exceeding the F-H-W-A Nac, look at the Existing L-E-Q column and the Calculated column. Remember, sixty-six D-B-A is the threshold for approaching the Nac. In the Calculated column, anything shown as sixty-six D-B-A or higher would approach or exceed the Nac for Activity Category B or Activity Category C.

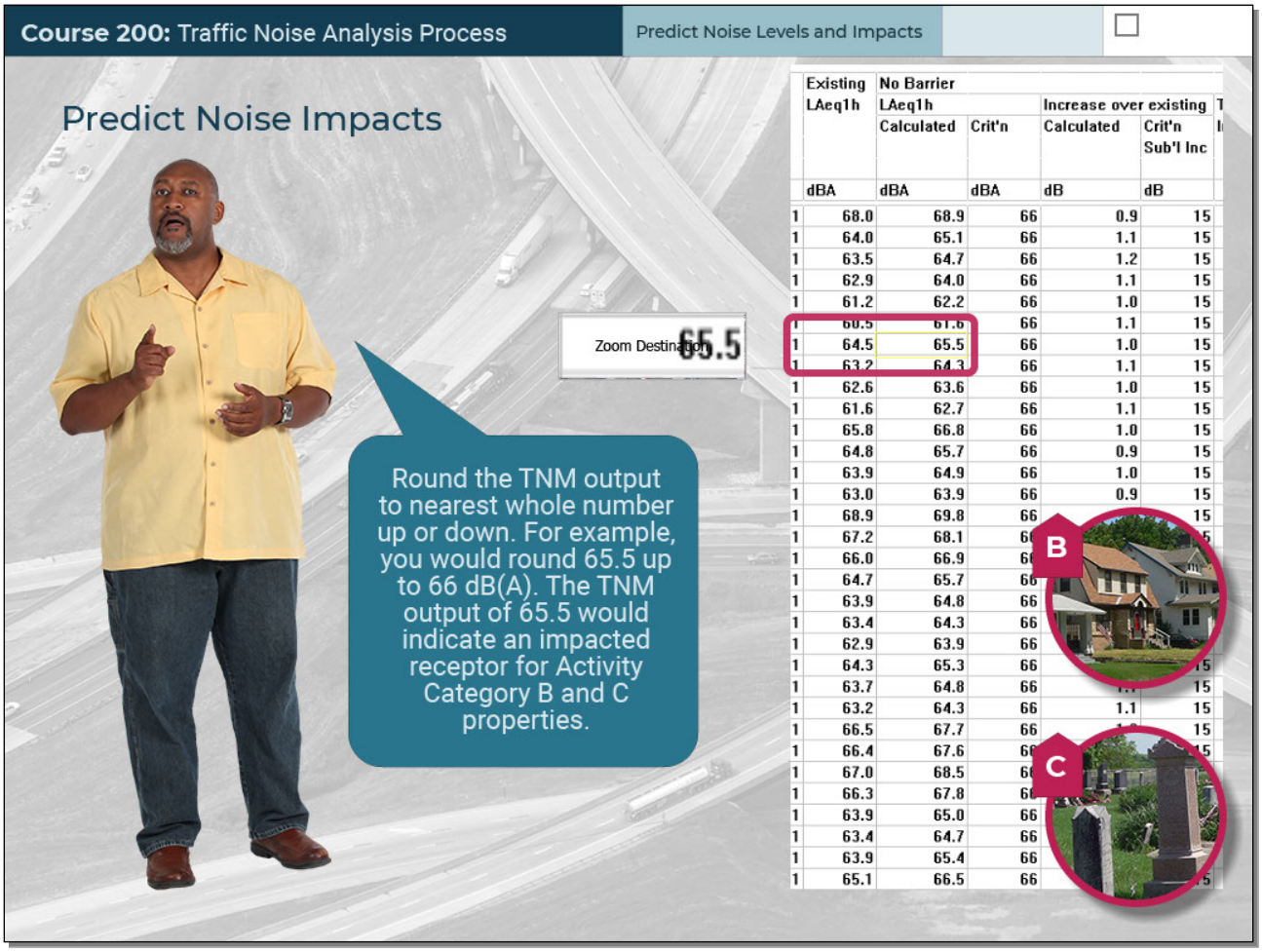
Text Captions

Predict Noise Impacts

To identify any receivers that are approaching or exceeding the FHWA NAC, look at the "Existing LAeq1h" column and the "Calculated" column.

Remember, 66 dB(A) is the threshold for approaching the NAC. In the "Calculated" column, anything shown as 66 dB(A) or higher would approach or exceed the NAC for Activity Category B or C.

Slide 9 - Slide 9



	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc
	dBA	dBA	dBA	dB	dB
1	68.0	68.9	66	0.9	15
1	64.0	65.1	66	1.1	15
1	63.5	64.7	66	1.2	15
1	62.9	64.0	66	1.1	15
1	61.2	62.2	66	1.0	15
1	60.5	61.6	66	1.1	15
1	64.5	65.5	66	1.0	15
1	63.2	64.3	66	1.1	15
1	62.6	63.6	66	1.0	15
1	61.6	62.7	66	1.1	15
1	65.8	66.8	66	1.0	15
1	64.8	65.7	66	0.9	15
1	63.9	64.9	66	1.0	15
1	63.0	63.9	66	0.9	15
1	68.9	69.8	66		15
1	67.2	68.1	66		
1	66.0	66.9	66		
1	64.7	65.7	66		
1	63.9	64.8	66		
1	63.4	64.3	66		
1	62.9	63.9	66		
1	64.3	65.3	66		
1	63.7	64.8	66		15
1	63.2	64.3	66	1.1	15
1	66.5	67.7	66		15
1	66.4	67.6	66		
1	67.0	68.5	66		
1	66.3	67.8	66		
1	63.9	65.0	66		
1	63.4	64.7	66		
1	63.9	65.4	66		
1	65.1	66.5	66		

Audio Script and Notes to Reviewers

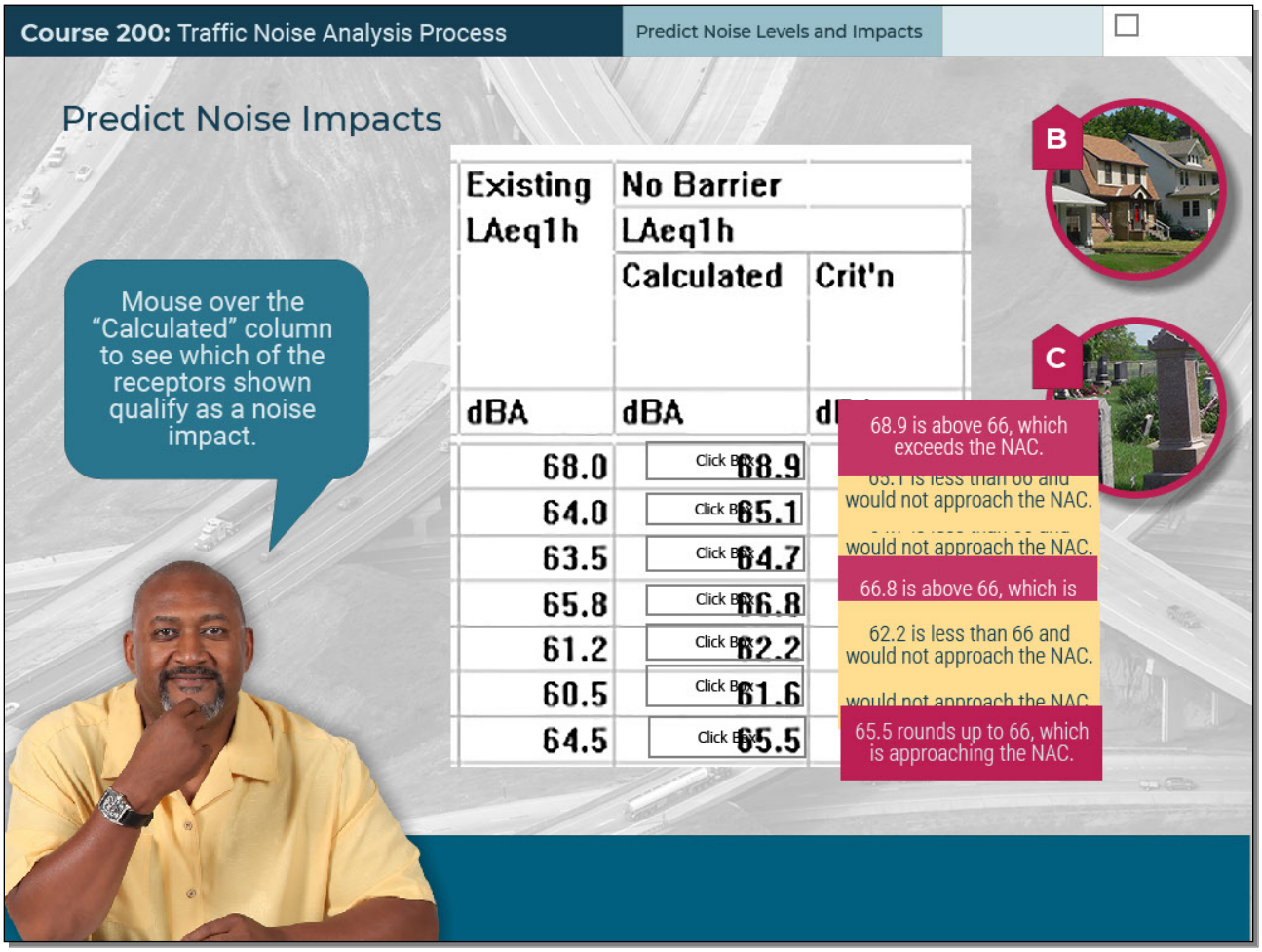
Round the T-N-M output to nearest whole number up or down. For example, you would round sixty-five-point-five up to sixty-six D-B-A. The T-N-M output of sixty-five-point-five would indicate an impacted receptor for Activity Category B and C properties.

Text Captions

Predict Noise Impacts

Round the TNM output to nearest whole number up or down. For example, you would round 65.5 up to 66 dB(A). The TNM output of 65.5 would indicate an impacted receptor for Activity Category B and C properties.

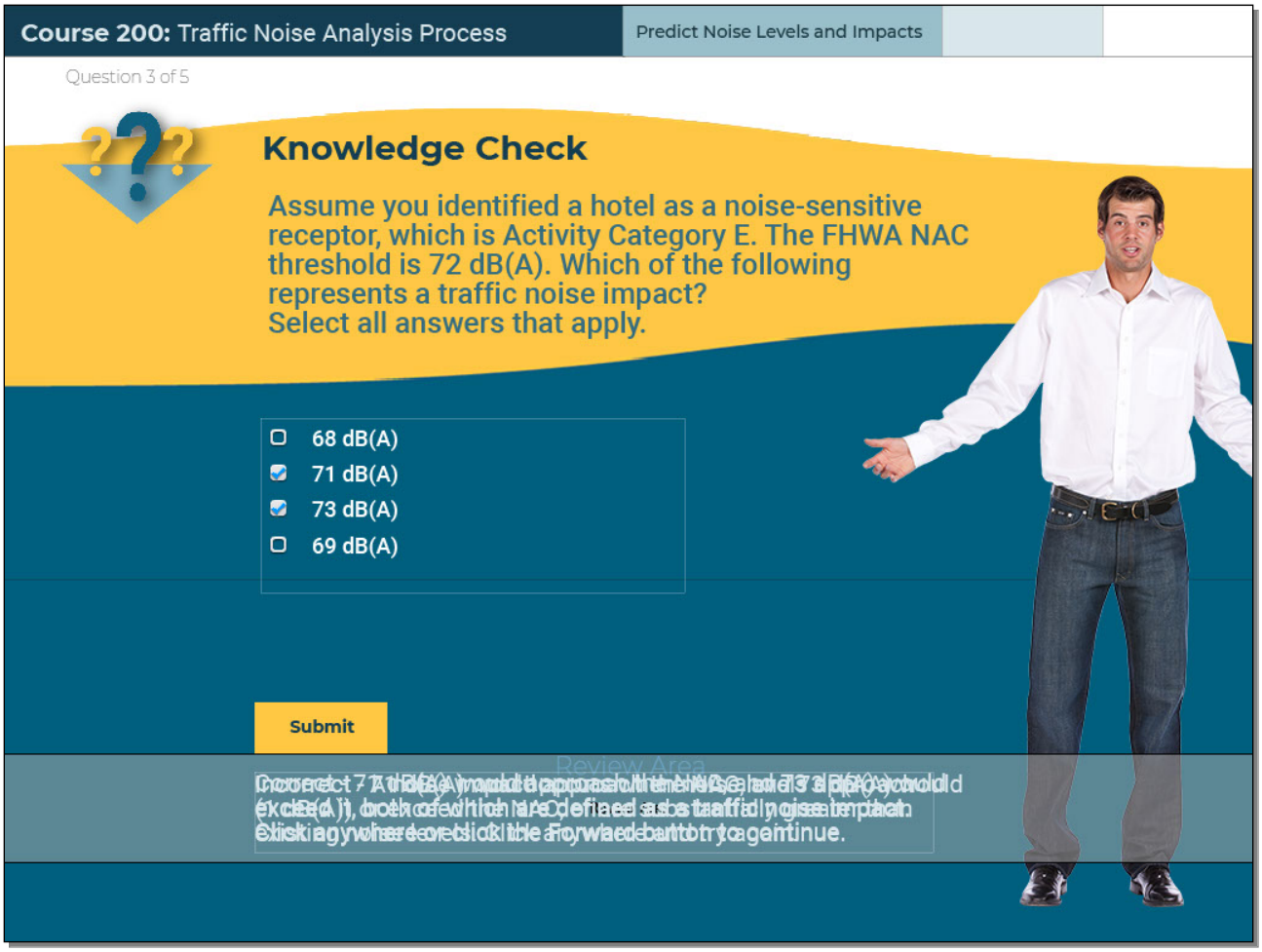
Slide 10 - Slide 10



Audio Script and Notes to Reviewers
Mouse over the Calculated column to see which of the receptors shown qualify as approaching the Nac.

Text Captions
Predict Noise Impacts
Mouse over the "Calculated" column to see which of the receptors shown qualify as a noise impact.
64.7 is less than 66 and would not approach the NAC.
61.6 is less than 66 and would not approach the NAC.
66.8 is above 66, which is approaching the NAC.
65.1 is less than 66 and would not approach the NAC.
68.9 is above 66, which exceeds the NAC.
62.2 is less than 66 and would not approach the NAC.
65.5 rounds up to 66, which is approaching the NAC.

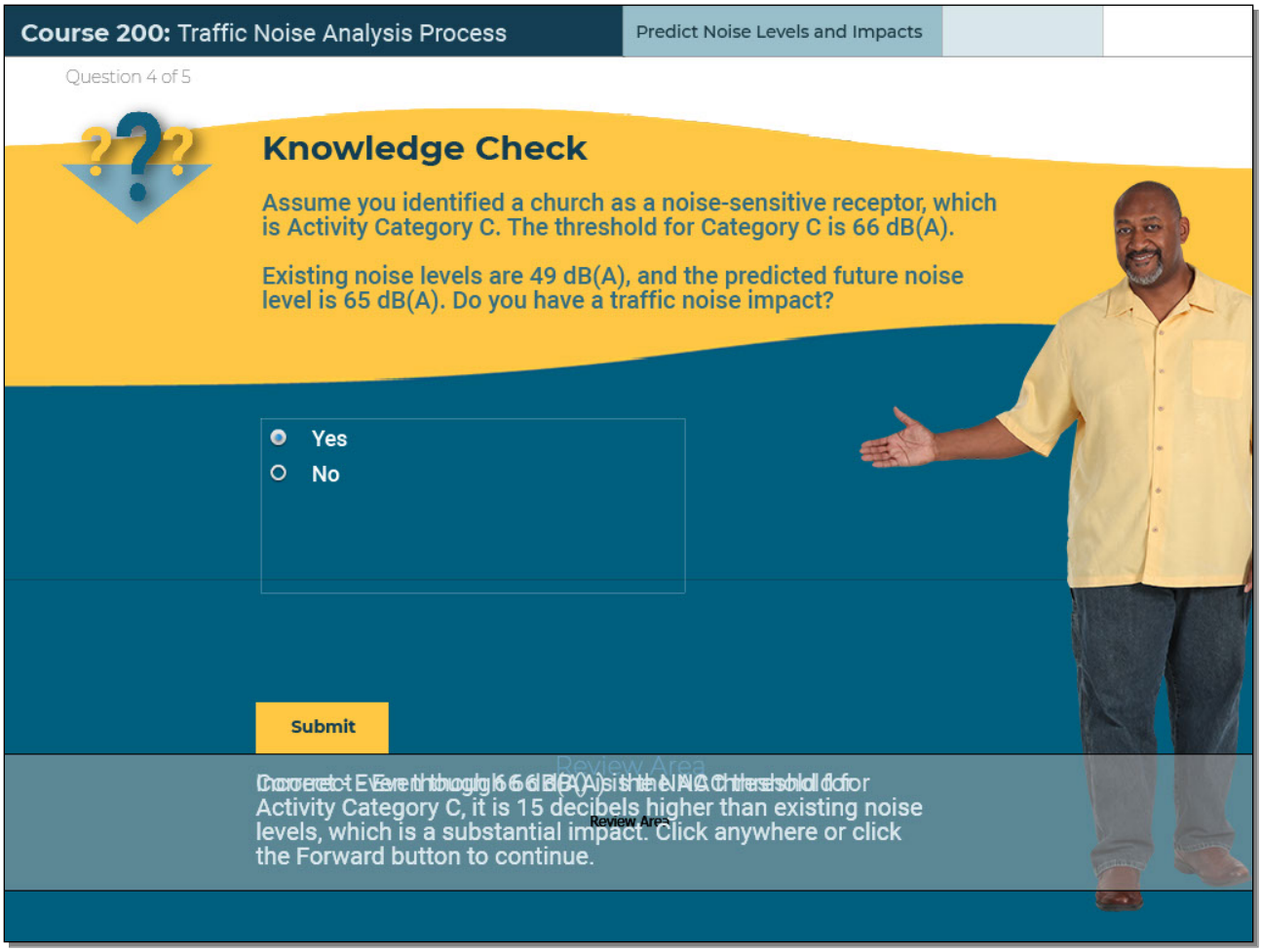
Slide 11 - Slide 11



Audio Script and Notes to Reviewers
Assume you identified a hotel as a noise-sensitive receptor, which is Activity Category “E”. The Noise Abatement Criteria threshold is seventy-one D-B-A. Which of the following represents a traffic noise impact?

Text Captions
Knowledge Check
Assume you identified a hotel as a noise-sensitive receptor, which is Activity Category E. The FHWA NAC threshold is 72 dB(A). Which of the following represents a traffic noise impact?
Select all answers that apply.
Correct - 71 dB(A) would approach the NAC, and 73 dB(A) would exceed it, both of which are defined as a traffic noise impact. Click anywhere or click the Forward button to continue.
1st incorrect feedback: Incorrect - A noise impact occurs when noise levels approach (1 dB(A)) or exceed the NAC, or are substantially greater than existing noise levels. Click anywhere and try again.
2nd incorrect feedback: Incorrect - 71 dB(A) would approach the NAC, and 73 dB(A) would exceed it, both of which are defined as a traffic noise impact. Click anywhere or click the Forward button to continue.

Slide 12 - Slide 12



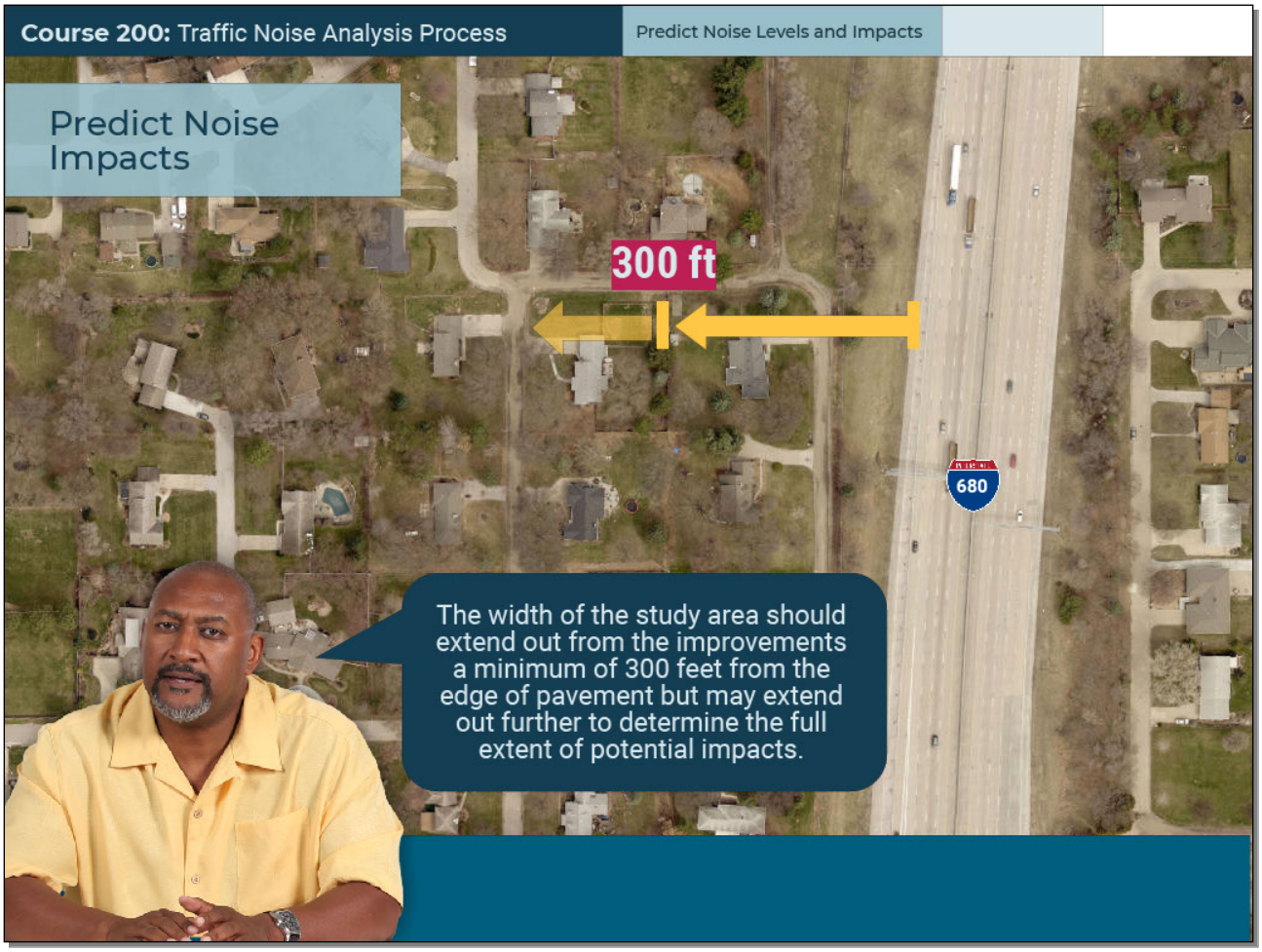
Audio Script and Notes to Reviewers

Assume you identified a church as a noise-sensitive receptor, which is Activity Category “C”. The threshold for Category “C” is sixty-six D-B-A. Existing noise levels are forty-nine D-B-A, and the predicted future noise level is sixty-five D-B-A. Do you have a traffic noise impact?

Text Captions

Knowledge Check
Assume you identified a church as a noise-sensitive receptor, which is Activity Category C. The threshold for Category C is 66 dB(A).
Existing noise levels are 49 dB(A), and the predicted future noise level is 65 dB(A). Do you have a traffic noise impact?
Correct - Even though 66 dB(A) is the NAC threshold for Activity Category C, it is 15 decibels higher than existing noise levels, which is a substantial impact. Click anywhere or click the Forward button to continue.
Incorrect - Even though 66 dB(A) is the NAC threshold for Activity Category C, it is 15 decibels higher than existing noise levels, which is a substantial impact. Click anywhere or click the Forward button to continue.

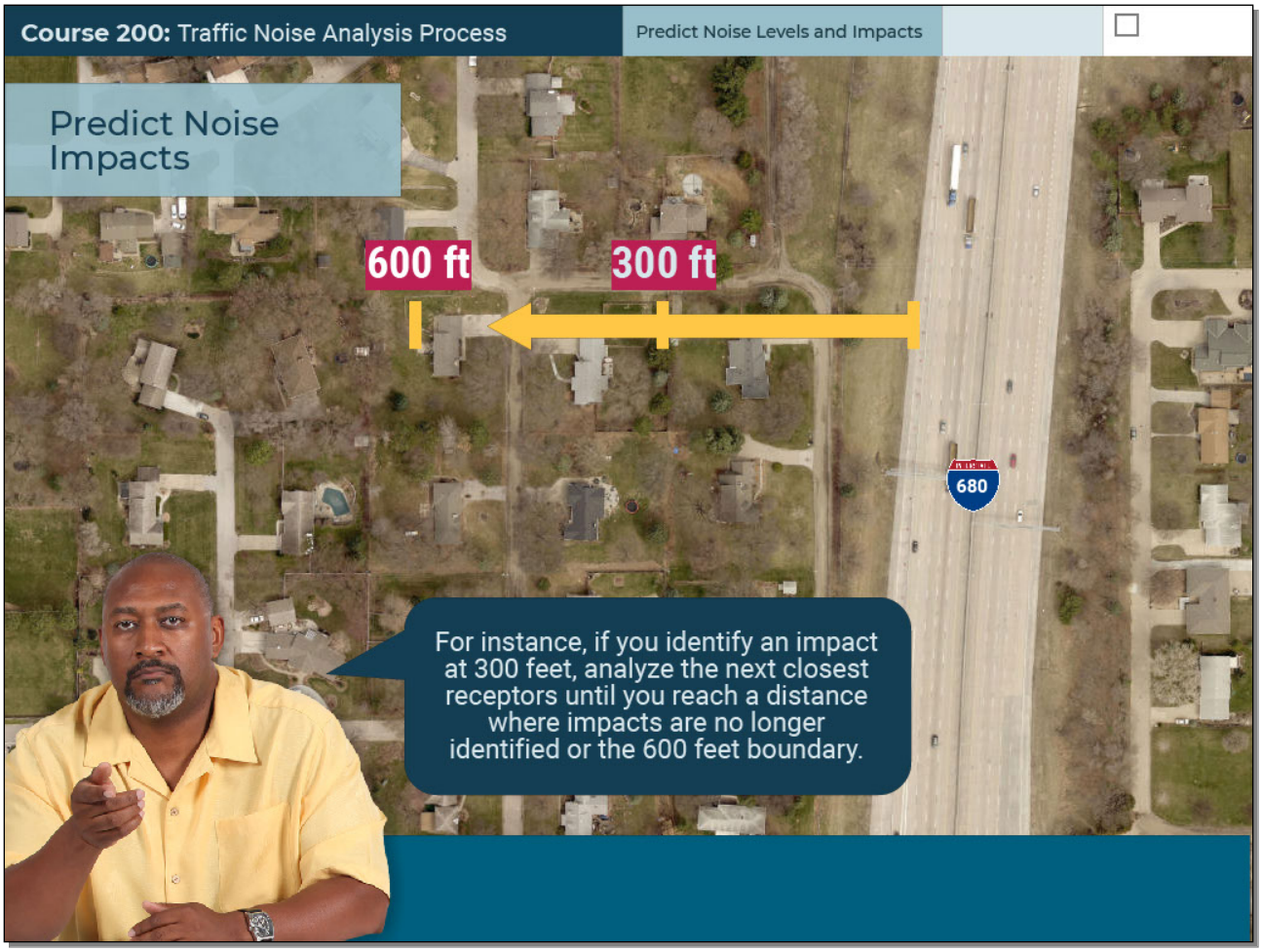
Slide 13 - Slide 13



Audio Script and Notes to Reviewers
In addition, as noted in the NDOT Noise Policy, the width of the study area should extend out from the improvements a minimum of 300 feet from the edge of pavement but may extend out further to determine the full extent of potential impacts.
NOTE TO WILL: This slide and the next one are a result of comments on slide 23 Module 2 of your previous review.

Text Captions
Predict Noise Impacts
The width of the study area should extend out from the improvements a minimum of 300 feet from the edge of pavement but may extend out further to determine the full extent of potential impacts.

Slide 14 - Slide 14



Audio Script and Notes to Reviewers
For instance, If you identify an impact at 300 feet, analyze the next closest receptors until you reach a distance where impacts are no longer identified or the 600 feet boundary.

Text Captions
Predict Noise Impacts
For instance, if you identify an impact at 300 feet, analyze the next closest receptors until you reach a distance where impacts are no longer identified or the 600 feet boundary.

Slide 15 - Slide 15

Audio Script and Notes to Reviewers
If a Category C property is impacted, you must calculate the number of receptors to be analyzed for noise abatement. To determine the number of receptors, divide the Category C frontage length by the average frontage length of Category B properties within the project area.

Text Captions
Predict Noise Impacts
If a Category C property is impacted, you must calculate the number of receptors to be analyzed for noise abatement.
To determine the number of receptors, divide the Category C frontage length by the average frontage length of Category B properties within the project area.

Slide 16 - Slide 16

Audio Script and Notes to Reviewers
The receptor locations represented by modeling points will be areas of frequent human use within six-hundred feet of the edge of the roadway. If impacts occur farther than six-hundred feet from the roadway, extend the study area to include the farthest impacted receptor.

Text Captions
Predict Noise Impacts
The receptor locations represented by modeling points will be areas of frequent human use within 600 feet of the edge of the roadway.
If impacts occur farther than 600 feet from the roadway, extend the study area to include the farthest impacted receptor.

Slide 17 - Slide 17

Audio Script and Notes to Reviewers

Select the area of frequent human use that is the most noise sensitive as the first modeling point, followed by the next most noise sensitive area of frequent human use. Continue this process until all the modeling points have been placed.

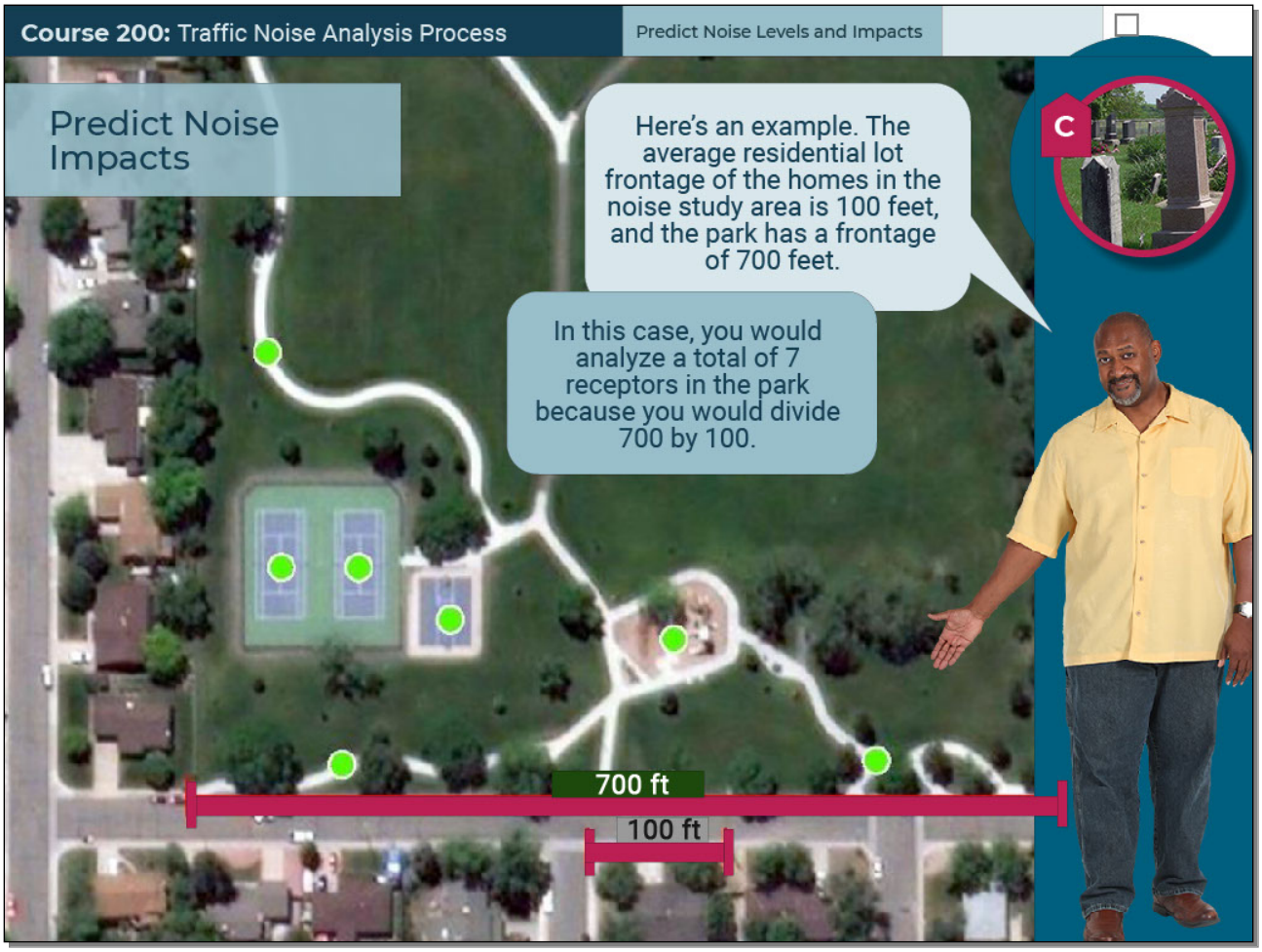
Text Captions

Predict Noise Impacts

Select the area of frequent human use that is the most noise sensitive as the first modeling point, followed by the next most noise sensitive area of frequent human use.

Continue this process until all the modeling points have been placed. Coordinate with NDOT to determine which areas of frequent human use are the most sensitive.

Slide 18 - Slide 18



Audio Script and Notes to Reviewers

Here's an example. The average residential lot frontage of the homes in the noise study area is one-hundred feet, and the park has a frontage of seven-hundred feet. In this case, you would analyze a total of seven receptors in the park because you would divide seven-hundred by one-hundred.

Reviewer: I added the last part that says "because you would divide 700 by 100," since that seemed like what this was showing. But this doesn't seem to jive with the previous slide about dividing the # of land uses. Are we dividing feet or number of units? Should probably make that clearer.

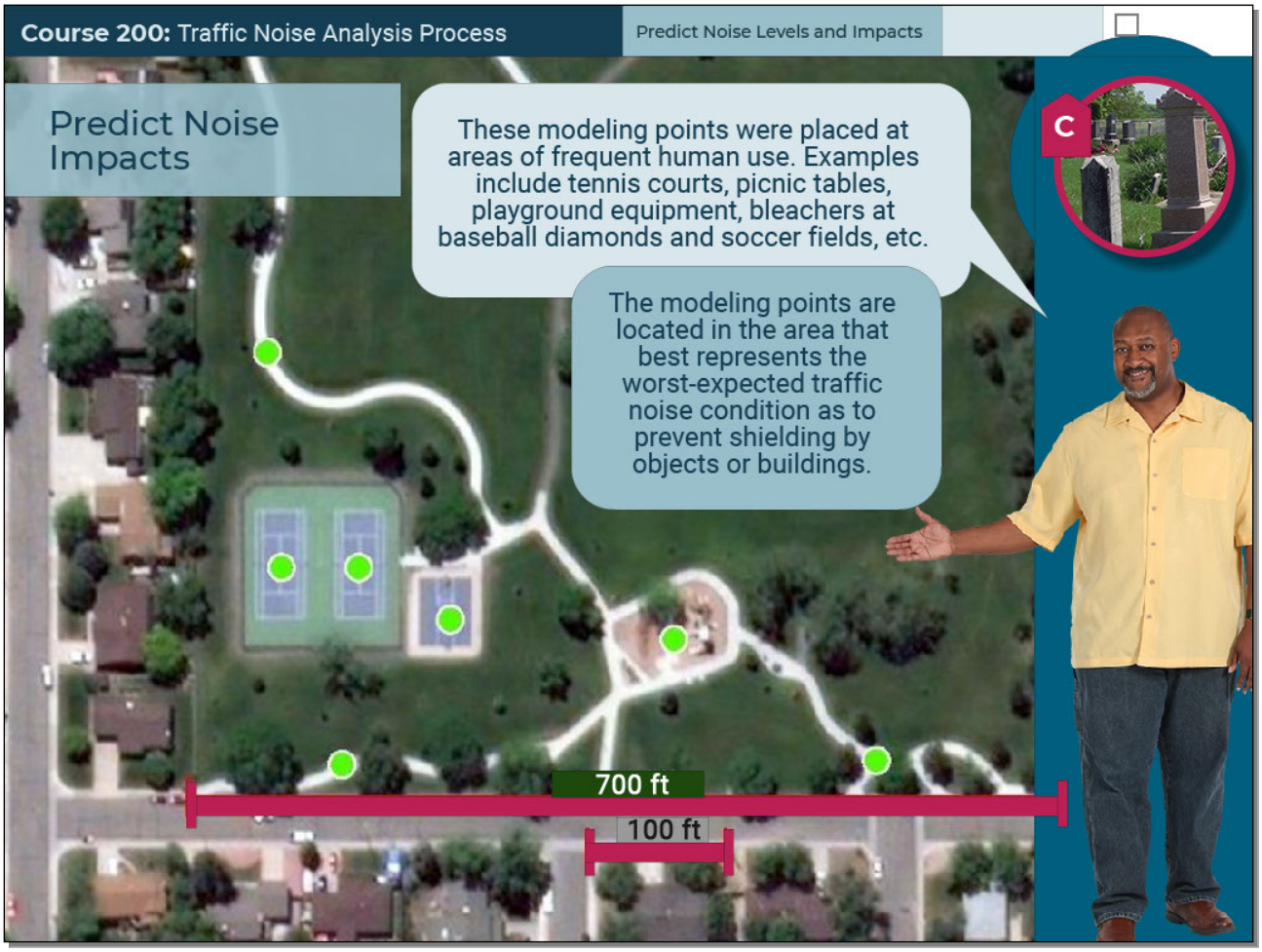
Text Captions

Predict Noise Impacts

Here's an example. The average residential lot frontage of the homes in the noise study area is 100 feet, and the park has a frontage of 700 feet.

In this case, you would analyze a total of 7 receptors in the park because you would divide 700 by 100.

Slide 19 - Slide 19



Audio Script and Notes to Reviewers

These modeling points were placed at areas of frequent human use. Examples include tennis courts, picnic tables, playground equipment, bleachers at baseball diamonds and soccer fields, etcetera. The modeling points are located in the area that best represents the worst-expected traffic noise condition as to prevent shielding by objects or buildings.

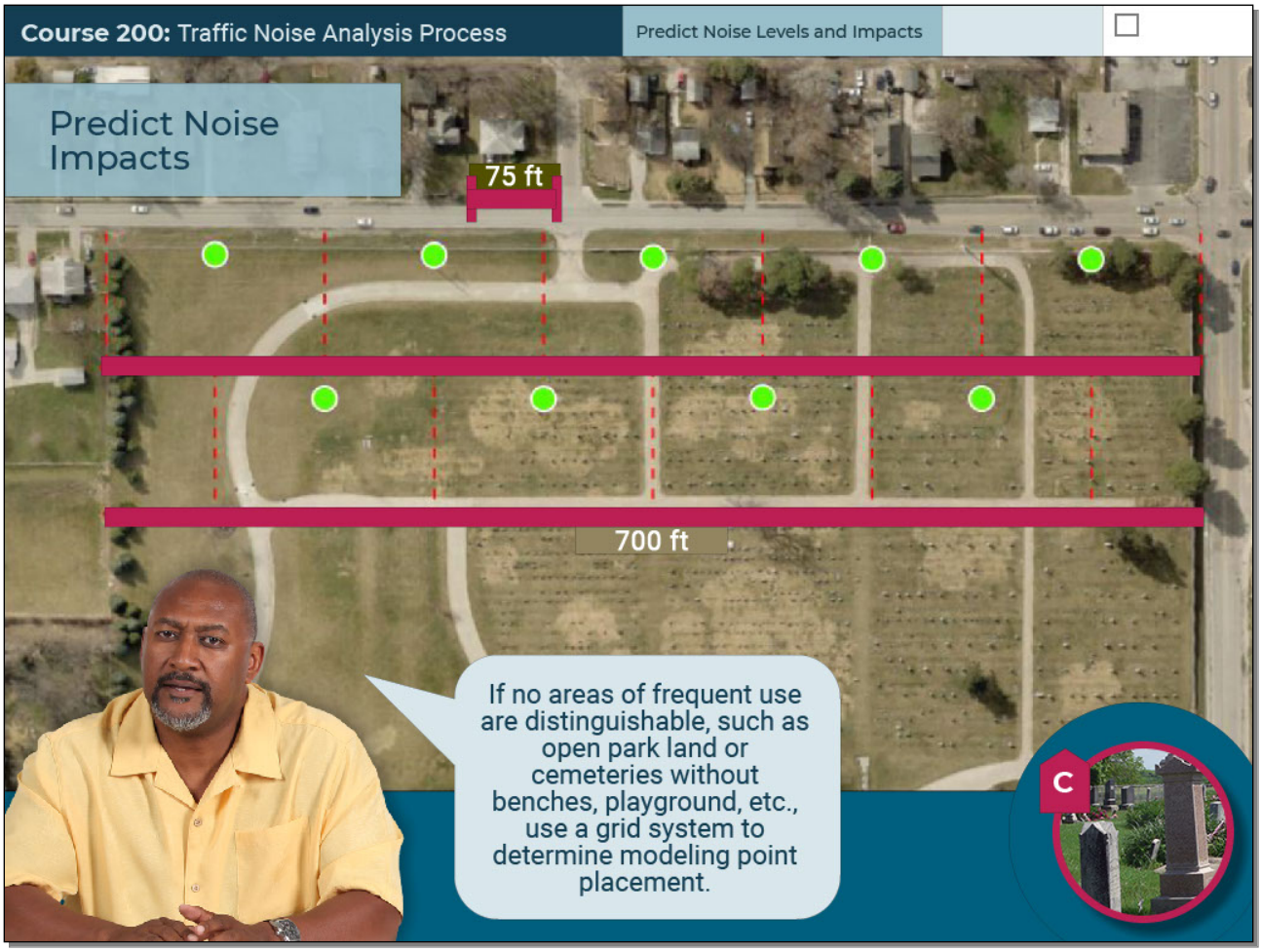
Text Captions

Predict Noise Impacts

These modeling points were placed at areas of frequent human use. Examples include tennis courts, picnic tables, playground equipment, bleachers at baseball diamonds and soccer fields, etc.

The modeling points are located in the area that best represents the worst-expected traffic noise condition as to prevent shielding by objects or buildings.

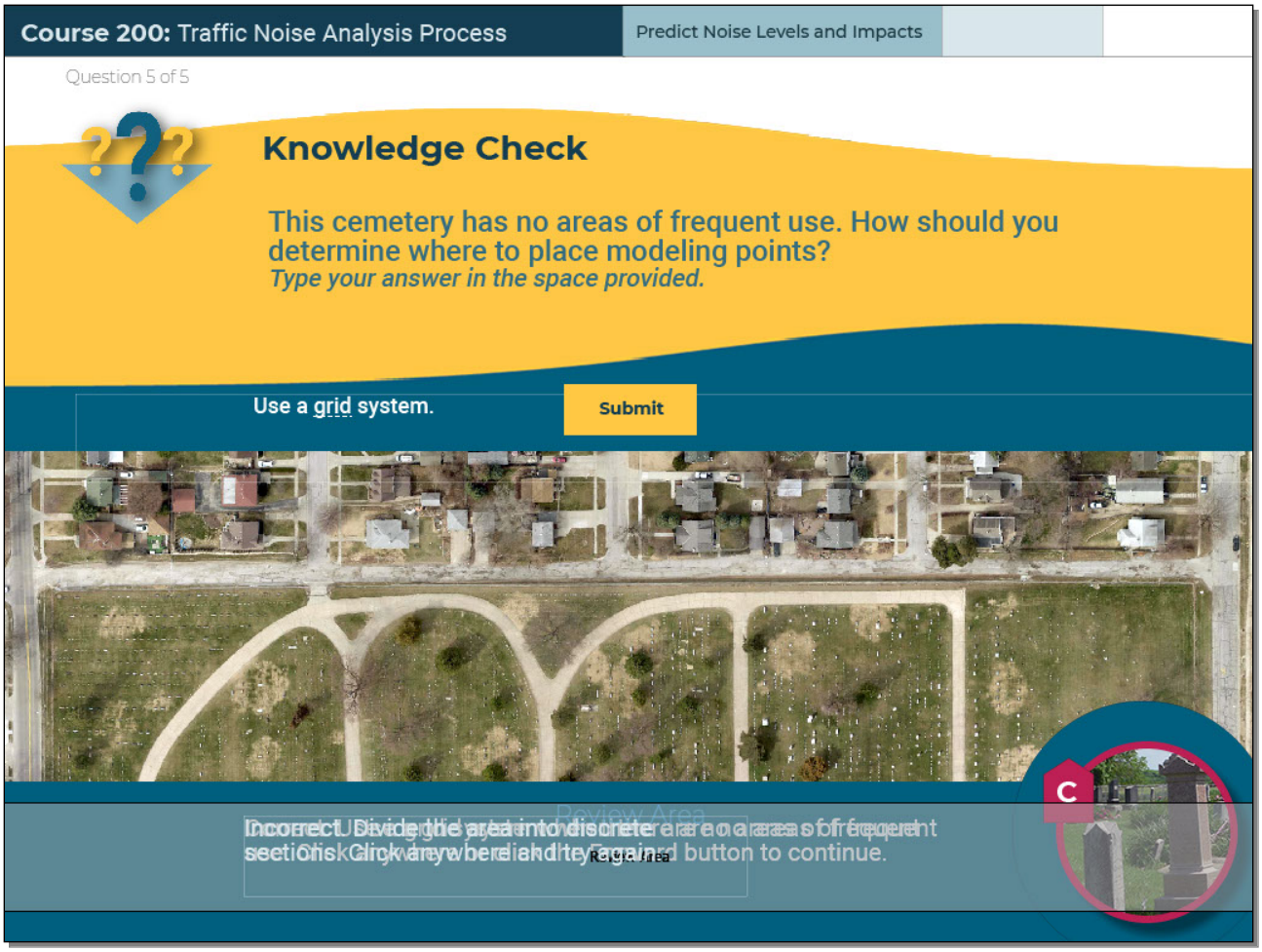
Slide 20 - Slide 20



Audio Script and Notes to Reviewers
If no areas of frequent use are distinguishable, such as open park land or cemeteries without benches, playground, etcetera, use a grid system to determine modeling point placement.

Text Captions
Predict Noise Impacts
If no areas of frequent use are distinguishable, such as open park land or cemeteries without benches, playground, etc., use a grid system to determine modeling point placement.

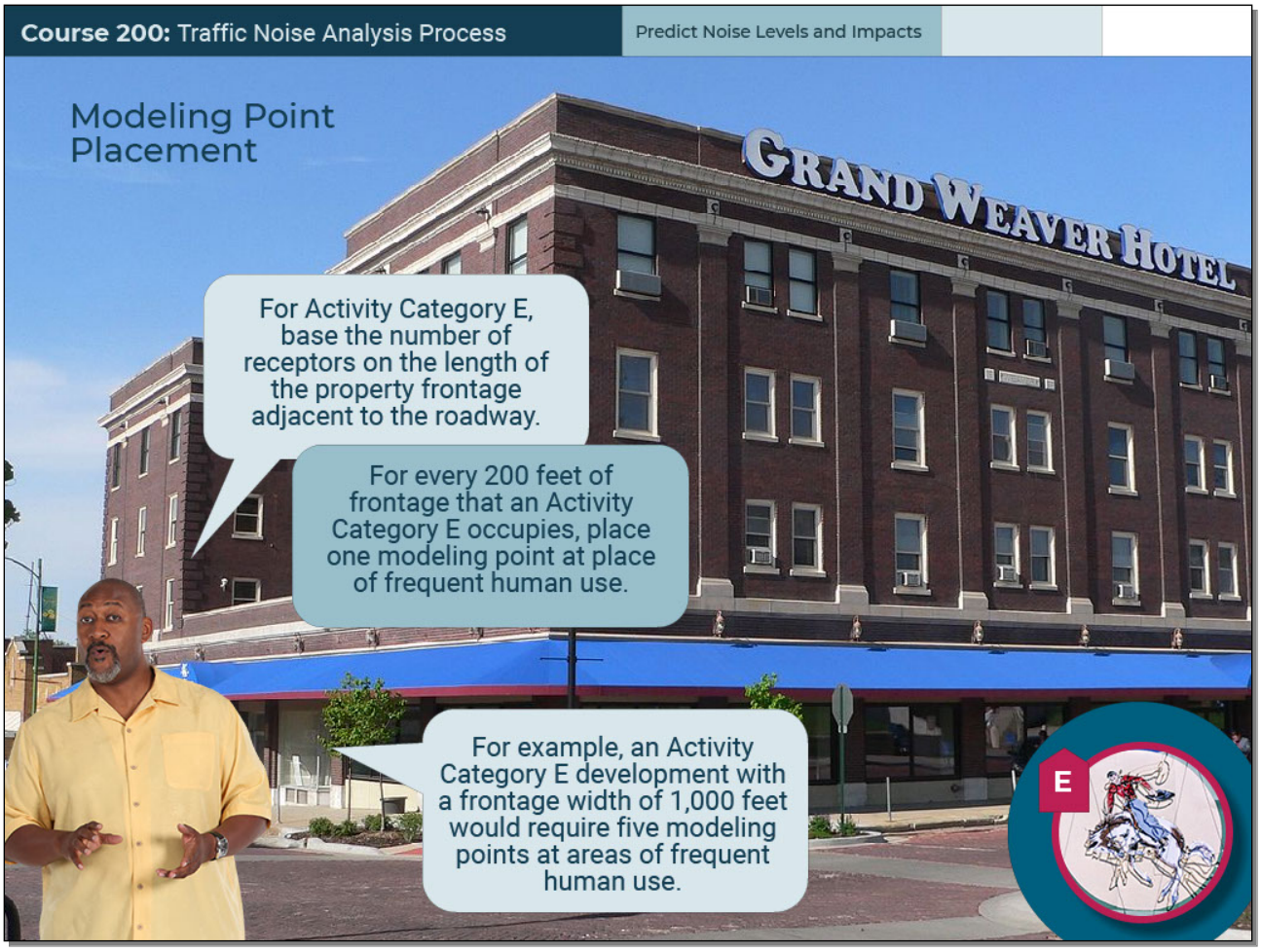
Slide 21 - Slide 21



Audio Script and Notes to Reviewers
This cemetery has no areas of frequent use. How should you determine where to place modeling points?
Reference note: This is Holy Sepuchre cemetery in Omaha.

Text Captions
Knowledge Check
This cemetery has no areas of frequent use. How should you determine where to place modeling points?
Type your answer in the space provided.
Use a grid system.
Correct. Use a grid system when there are no areas of frequent use. Click anywhere or click the Forward button to continue.
1st incorrect feedback: Incorrect. Divide the area into discrete sections. Click anywhere and try again.
2nd incorrect feedback: Incorrect. Use a grid system when there are no areas of frequent use. Click anywhere or click the Forward button to continue.

Slide 22 - Slide 22



Audio Script and Notes to Reviewers

Base the number of receptors on the length of the property frontage adjacent to the roadway. For every two-hundred feet of frontage that an Activity Category E occupies, place one modeling point at place of frequent human use. For example, an Activity Category E development with a frontage width of one-thousand feet would require five modeling points representing receptors at areas of frequent human use.

Text Captions

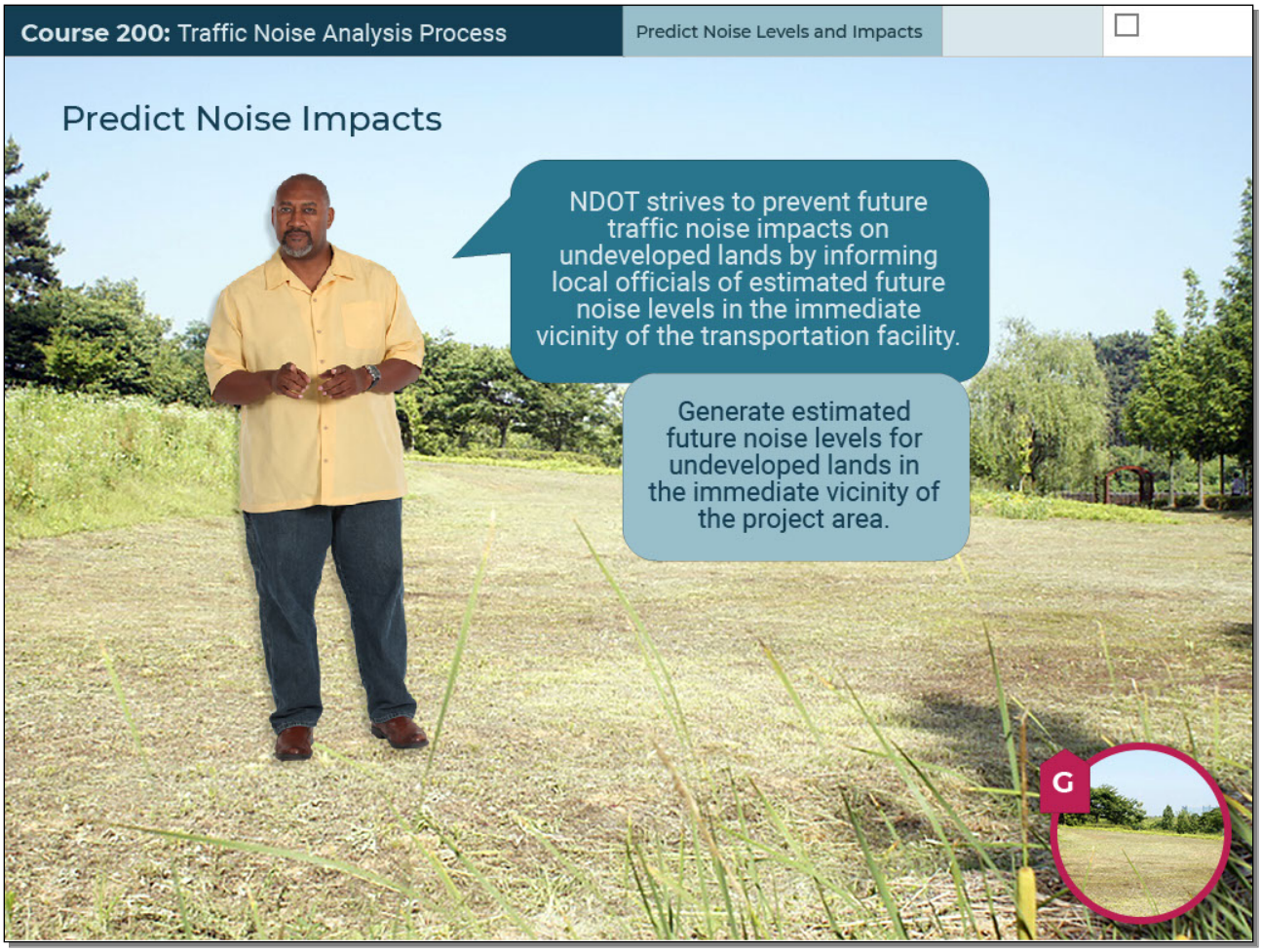
Modeling Point Placement
For Activity Category E, base the number of receptors on the length of the property frontage adjacent to the roadway.
For every 200 feet of frontage that an Activity Category E occupies, place one modeling point at place of frequent human use.
For example, an Activity Category E development with a frontage width of 1,000 feet would require five modeling points at areas of frequent human use.

Slide 23 - Slide 23

Audio Script and Notes to Reviewers
The Magnolia Hotel in Omaha has a frontage of two-hundred-sixty-six feet, so you would place one modeling point in this example. You would place a second one if the frontage was closer to four-hundred feet.

Text Captions
Modeling Point Placement
This hotel has a frontage of 266 feet, so you would place one modeling point. You would place a second one if the frontage was closer to 400 feet.

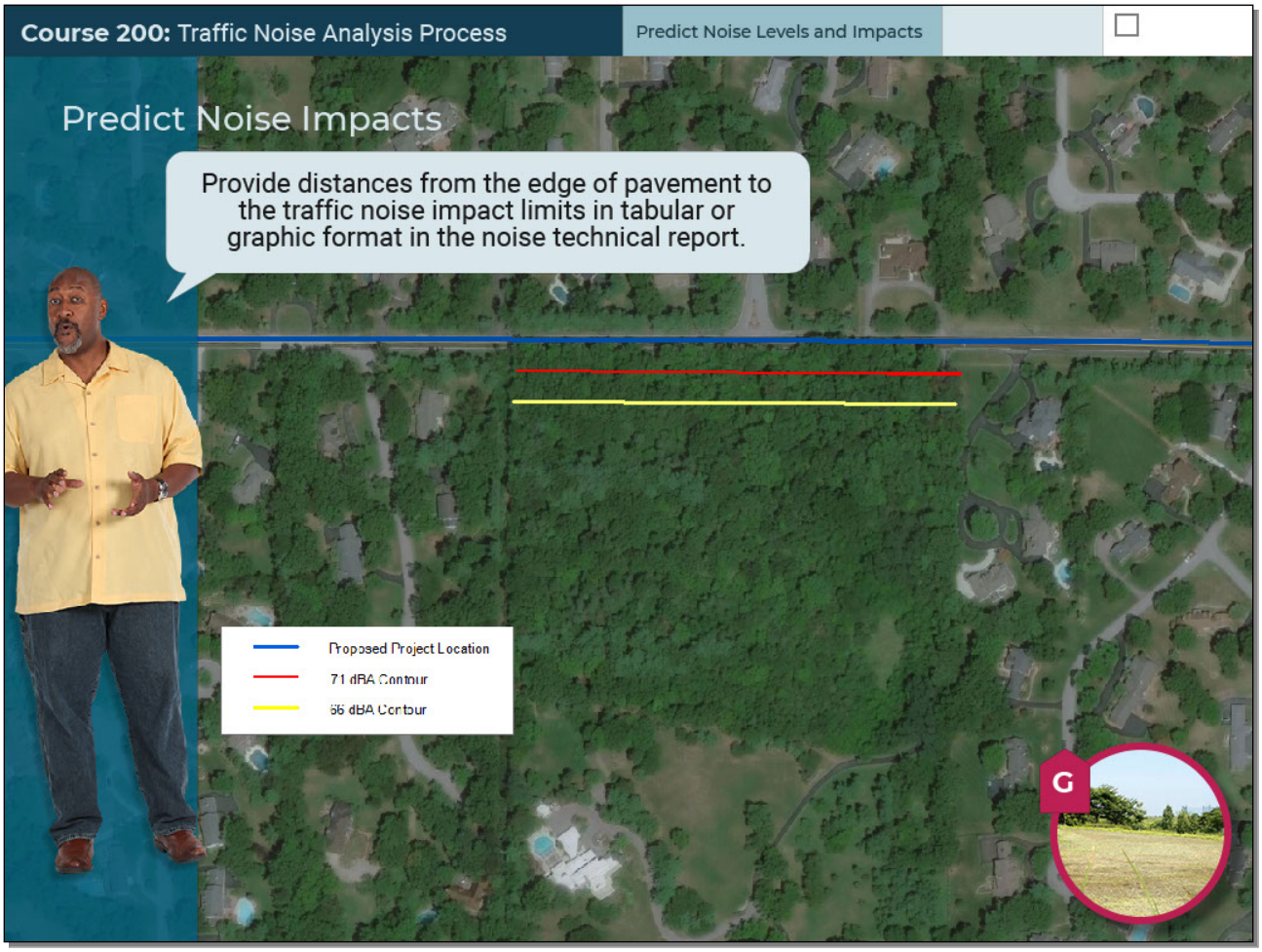
Slide 24 - Slide 24



Audio Script and Notes to Reviewers
N-dot strives to prevent future traffic noise impacts on undeveloped lands by informing local officials of estimated future noise levels in the immediate vicinity of the transportation facility. Generate estimated future noise levels for undeveloped lands in the immediate vicinity of the project area.

Text Captions
Predict Noise Impacts
NDOT strives to prevent future traffic noise impacts on undeveloped lands by informing local officials of estimated future noise levels in the immediate vicinity of the transportation facility.
Generate estimated future noise levels for undeveloped lands in the immediate vicinity of the project area.

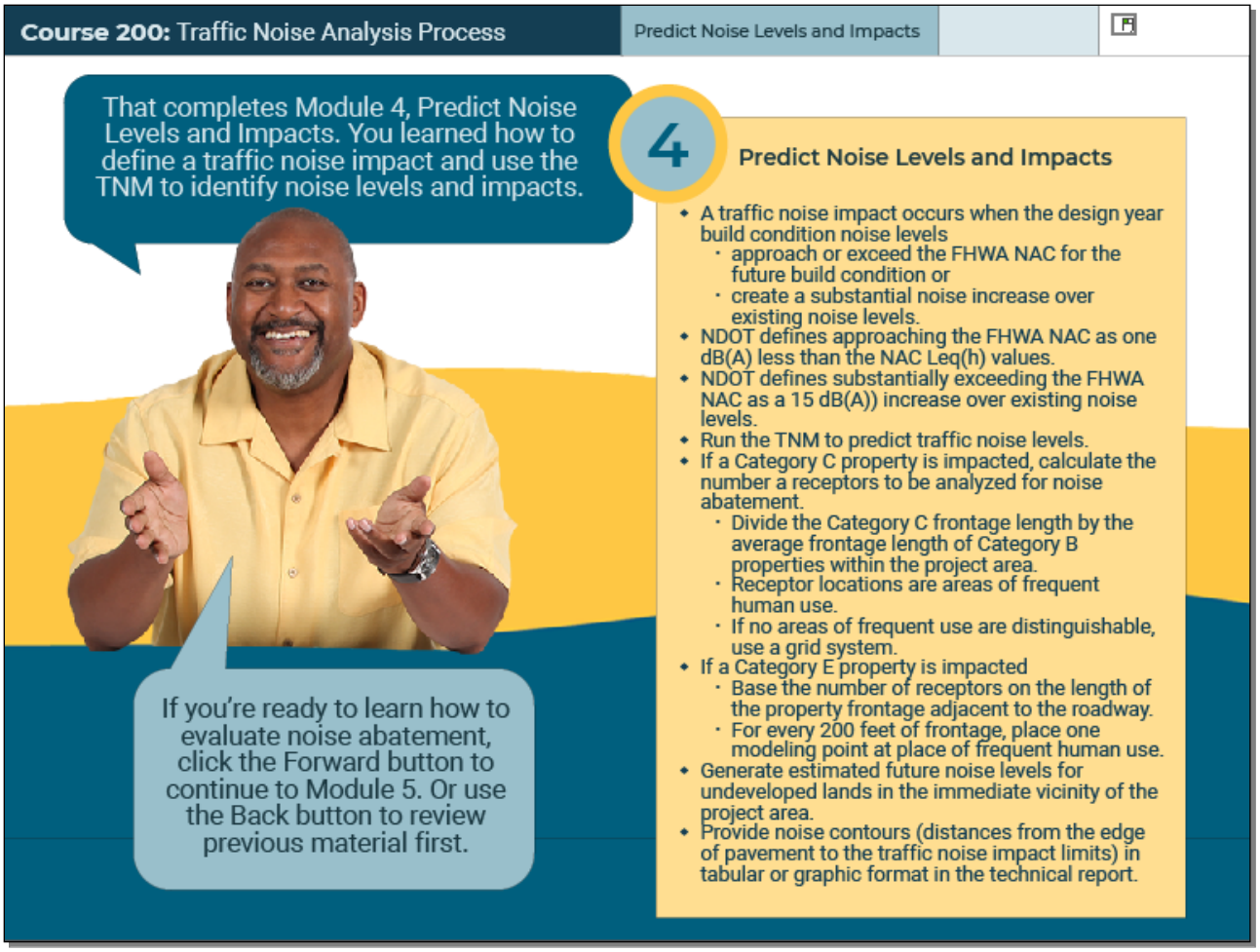
Slide 25 - Slide 25



Audio Script and Notes to Reviewers
Provide distances from the edge of pavement to the traffic noise impact limits in tabular or graphic format in the noise technical report, for example, sixty-six D-B-A or seventy-one D-B-A.

Text Captions
Predict Noise Impacts
Provide distances from the edge of pavement to the traffic noise impact limits in tabular or graphic format in the noise technical report.

Slide 26 - Slide 26



Audio Script and Notes to Reviewers

That completes Module Four, Predict Noise Levels and Impacts. In Module Four, you learned how to define a traffic noise impact as approaching or exceeding the F-H-W-A Nac, or as a substantial increase over existing noise levels. You also learned how to use the T-N-M to identify noise levels and impacts. Here's a quick summary. If you're ready to learn how to evaluate noise abatement, click the Forward button to continue to Module Five. Or use the Back button if you'd like to review some of the previous material first.

Text Captions

That completes Module 4, Predict Noise Levels and Impacts. You learned how to define a traffic noise impact and use the TNM to identify noise levels and impacts.

4 Predict Noise Levels and Impacts

- A traffic noise impact occurs when the design year build condition noise levels
  - approach or exceed the FHWA NAC for the future build condition or
  - create a substantial noise increase over existing noise levels.
- NDOT defines approaching the FHWA NAC as one dB(A) less than the NAC Leq(h) values.
- NDOT defines substantially exceeding the FHWA NAC as a 15 dB(A)) increase over existing noise levels.
- Run the TNM to predict traffic noise levels.
- If a Category C property is impacted, calculate the number a receptors to be analyzed for noise abatement.

- Divide the Category C frontage length by the average frontage length of Category B properties within the project area.
- Receptor locations are areas of frequent human use.
- If no areas of frequent use are distinguishable, use a grid system.

- If a Category E property is impacted
  - Base the number of receptors on the length of the property frontage adjacent to the roadway.
  - For every 200 feet of frontage, place one modeling point at place of frequent human use.
- Generate estimated future noise levels for undeveloped lands in the immediate vicinity of the project area.
- Provide noise contours (distances from the edge of pavement to the traffic noise impact limits) in tabular or graphic format in the technical report.

If you're ready to learn how to evaluate noise abatement, click the Forward button to continue to Module 5. Or use the Back button to review previous material first.