



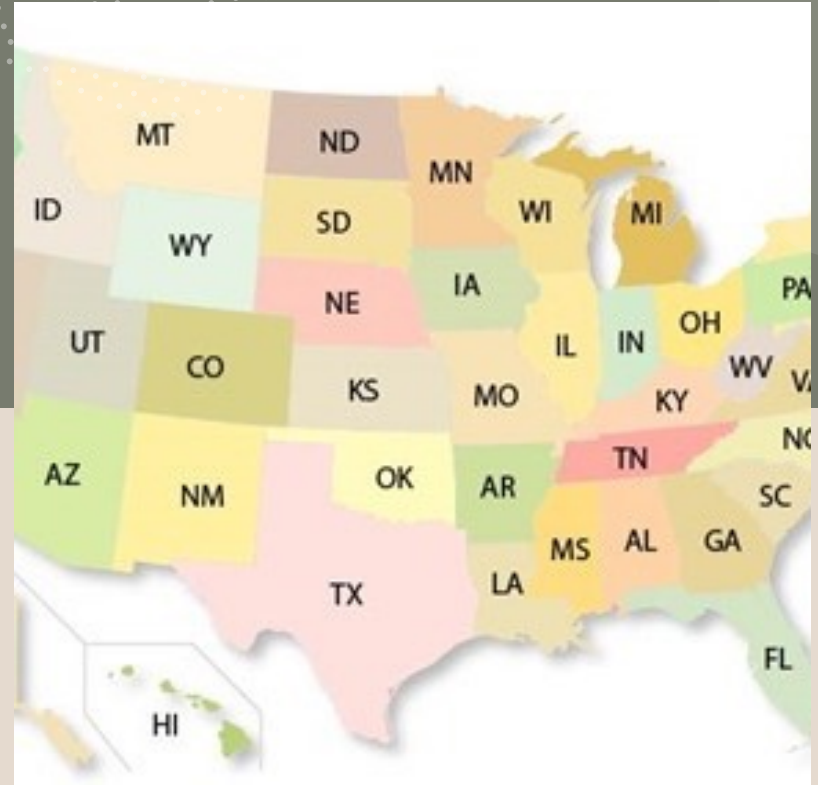
AASHTO Pavement Marking Test Deck

Pennsylvania Department of Transportation

Brenda Waters, Chief Chemist

introduction

- The American Association of State Highway and Transportation Officials Product Evaluation & Audit Solutions. Formally AASHTO/NTPEP is composed of state DOTs from 50 states, The District of Columbia, and Puerto Rico. Purpose is to allow industry and AASHTO members to access product evaluation data and manufacturing data through an online database.



Introduction cont.

- AASHTO Conducts a Test Deck Installation yearly
- Consist of cold weather decks and warm weather decks
 - Florida
 - Utah
 - Wisconsin
 - Pennsylvania
 - West Virginia



Primary Goal

- Acts as an INFORMATION hub only
- To provide Manufacturers and Producers an avenue to see how their product performs in the field over time and in the lab
- Provides state DOTs with research information needed when manufacturers and producers apply to be listed on QP List
- Totally eliminates the cost to state DOT's in performing own field and laboratory testing.
- Allows the different products to be evaluated under the same environment and conditions, as to not give any one manufacturer an edge.

Retroreflectivity & Durability

Asphalt				
Retroreflectivity		Durability		Re
Skip	Wheel	Skip	Wheel	Ski
231	220	10	10	247
225	210	10	10	252
219	209	10	10	249
201	180	10	10	246
	175	10	10	207
	123	9	9	129
		9	9	

What is a Test Deck?

An area on the highway where Pavement Marking Materials are applied on the road, transverse to the line of traffic, for the purpose of evaluating product performance over a given period. The products are exposed to equal amounts of wear generated by the continuous flow of traffic and allows for exposure to the same environmental stresses for the entire evaluation period.

➤ Years

- 6 months – Temporary tape
- 1 year – Waterborne/Solventborne paints
- 2 year – Experimental products (data is information only)
- 3 year – Waterborne/Solventborne paints, thermoplastics, preform thermoplastics, permanent tapes, and multiple component materials (polyurea, MMA, & epoxy)



What is a Test Deck? Cont.

- How the deck is organized
- Surface and Location
- By use of video log and maintenance IQ
 - Asphalt & Concrete 2 miles long, a ½ mile work zone
 - Easy to find asphalt
 - More difficult to find concrete (Wisconsin opposite)
 - Age of surface – at least 2 years open to traffic
 - Minimal cracking or surface deterioration
 - Slight to no grades
 - Slight to no curves
 - No intersections, minimal access points, and ramps
 - Must have full sun exposure
- Average Daily Traffic average (number of vehicles that pass by during a 24-hour period)
 - Must be a minimum of 5,000
 - Not more than 20,000
 - Must include the percentage of truck traffic
- Other items to consider when scouting a location
 - Joints in the pavement
 - Tined
 - Guiderail
 - Pollution
 - Residential
 - Any maintenance or repairs earmarked for the next 3 years



Installation and Materials

20XX

presentation title

06/04/2018



Installation and Materials cont.

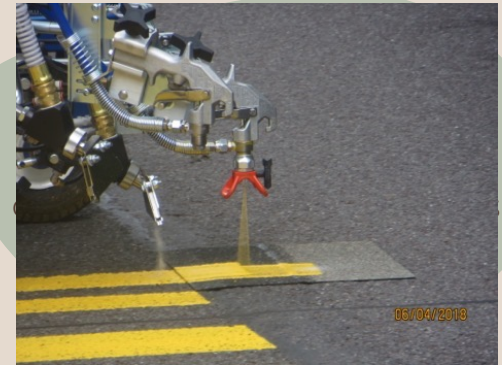


- Installation is conducted primarily in June
 - Temperature not too hot or too cool
 - Products have a min and max range of air/surface temperature and humidity
 - Healthier for workers as surface temp can reach over 100°F at 10am
 - More employees available (interns)
- Producers and Manufacturers from all over the nation (15 to 25)
 - Cost - \$4,500 to 6,500 per product to be evaluated
 - Single producer can spend \$100,000 to \$160,000 to install 25 products
 - Covers field and lab evaluation
 - Report preparation by host state
 - Program management by host state
 - Administrative management by AASHTO
 - Does not include travel, equipment, and personnel
- Products each with different criteria, calculations, and surface treatment to be applied (120 to 140 products)
 - Waterborne & Solventborne Paint
 - Thermoplastics
 - Preform Thermoplastics
 - Polymeric Tape permanent/temporary
 - Epoxies
 - Polyurea
 - MMA
 - Experimental

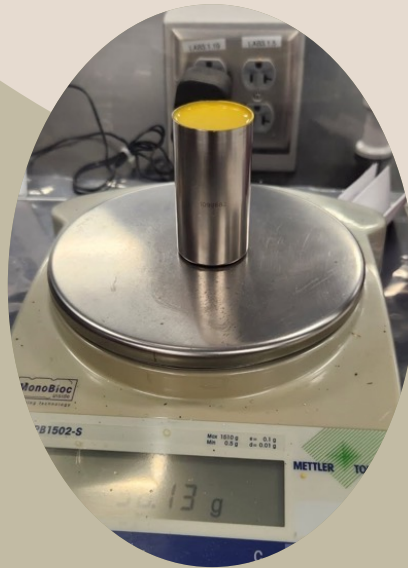
INSTALLATION AND MATERIALS CONT.

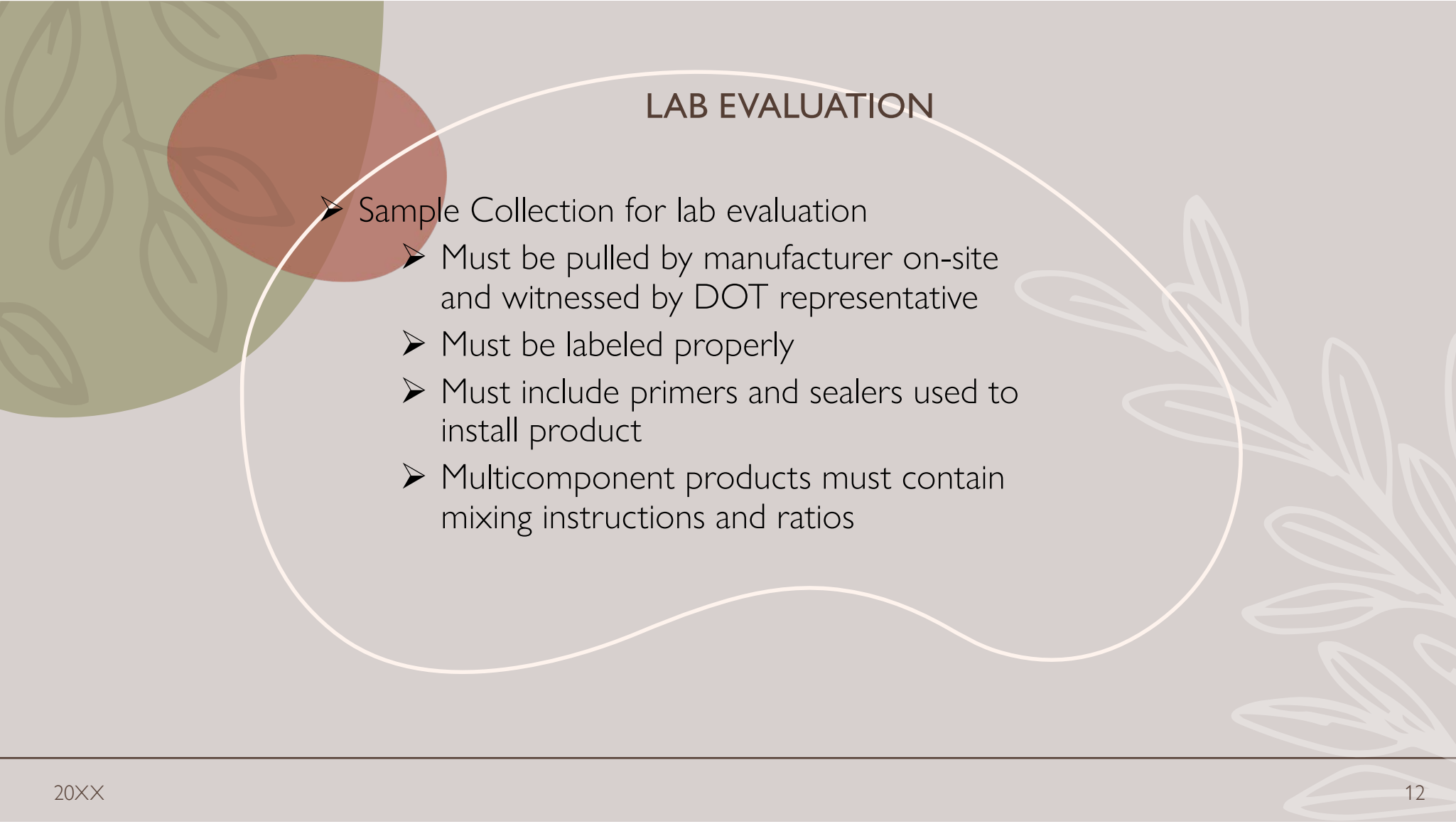
- Expected Delays
 - Weather
 - Surface must be dry for 24 hours
 - No product applied to wet or damp pavement
 - Temperature must be above 50°F and below manufacturer's maximum temperature
 - Pavement temperature, air temperature, and relative humidity are recorded every half hour
 - High/low temperature and high humidity can affect calibration, dry no-track, equipment performance and product performance
 - Can set back installation for days
 - Equipment failure
 - DOT & Industry
 - Manufacturer's product not delivered or supply insufficient
 - Manufacturers are required to bring a minimum amount of product to the test deck
 - Manufacturer fails to have enough trained staff

Installation



Lab and Field Evaluation





LAB EVALUATION

- Sample Collection for lab evaluation
 - Must be pulled by manufacturer on-site and witnessed by DOT representative
 - Must be labeled properly
 - Must include primers and sealers used to install product
 - Multicomponent products must contain mixing instructions and ratios

LAB EVALUATION CONT.

- Waterborne/Solventborne paints from all test deck installations are evaluated by PennDOT Materials lab
 - 4 lined 1-quart containers each product
 - Density as weight per gallon
 - Degree of settling
 - Infrared Spectrum
 - No-pick-up time
 - Pigment Content
 - TiO₂
 - Solids content
 - Viscosity
 - XRD on dry film (fingerprint)
 - Opacity & reflectance
 - Freeze thaw (cycles between -10°F and 25°F for 5 days)
 - Heat Stability(conditioned at 60°F for seven days)
 - Water resistance (immersed in water for 18 hours)
 - Rohm and Hass (90% humidity until dry)

LAB EVALUATION CONT.

- Thermoplastic evaluated by AASHTO appointed private lab
 - Four 5-lb block molten into 9x13x1 inch disposable pans
 - Specific gravity
 - Flowability (extended heat)
 - Softening point
 - Low temp stress resistance
 - Bead content and grading
 - Daylight reflectance (color)
 - Hardness
 - Lead content
 - TiO₂
 - Infrared scan of binder only
 - Alkyd identification

LAB EVALUATION CONT.

- Preformed Thermoplastic evaluated by AASHTO appointed private lab
 - Twenty-five linear feet
 - Tests performed are the same test conducted on hot mix thermoplastic
- Polymeric tape evaluated by AASHTO appointed private lab
 - Twenty-five linear feet
 - Tensile strength
 - Ultimate elongation
 - Retroreflectivity
 - Daylight reflectance
 - Skid resistance
 - Infrared adhesive layer and tape surface without the beads
 - 5% modulus
 - Binder content without beads
 - TiO₂

LAB EVALUATION CONT.

- Multi-Component Materials
 - 4 lined 1-quart containers of each base component plus the required amount of activator
 - Infrared of film and each component
 - %pigment of each component
 - %total solids of each component
 - Weight per gallon of each component
 - Drying time of reacted film
 - Epoxide number
 - Hardness
 - Yellow index
 - Daylight reflectance

LAB EVALUATION CONT.

- Experimental Materials
 - Not sampled for lab evaluation
- Glass beads
 - 50-pound bag unless host state supplies the beads
 - 1 bag of elements used
 - Roundness
 - gradation

FIELD EVALUATION CONT.

- Traffic paint
 - No track at 60 seconds, 90 seconds, and 120 seconds
 - 15/25 mil thickness and 4 inch in width
- Thermoplastic/Preform
 - 125 mil thickness and 6 inches in width
- Polymeric tape
 - 4 to 6 inches in width
- Multicomponent
 - 20 mil thickness and 4 inches in width
- Retention plates are held in the lab to verify thickness

FIELD EVALUATION CONT.

- All products get evaluated for field performance within 3 to 7 days after application, every 2 months after application for 6 months, then quarterly for 2 years
 - Retro reflectivity wheel and skip (18 and 9 inches)
 - Durability 1 to 10 rating (18 and 9 inches)
 - Daytime color
 - Nighttime color
 - Wet/dry Retroreflectivity
 - Pictures taken during every evaluation of all lines

MANAGING DATA

- All information collected from lab and field evaluation is placed in a large database
- Information takes several weeks to compile
- Requires the assistance of multiple staff
- Requires review by host DOT before released.
- Requires AASHTO review before data is finalized.
- Manufacturer/ Producer has a 30-day window to review data, add comments, dispute results.

How do we make the test deck a success

➤ DIST. MAINT. PERSONNEL

- Future maintenance plans for area of highway
- shed
- Equipment
- Product delivery
- Product housing
- Work zone set up

➤ HIGHWAY SAFETY

- Provide options for temporary traffic control WZ set-up

➤ TRAFFIC DIV.

- Approves final setup for WZ
- Facilitate request for speed reduction
- Facilitate Automated Work Zone Speed Enforcement (AWZSE)

IT TAKES A VILLAGE

➤ 6 MONTHS OR MORE TO LOCATE A SITE

➤ DIST. ENG. APPROVAL

- Present details
- Site
- Dates for install
- Length of project

➤ STATE POLICE

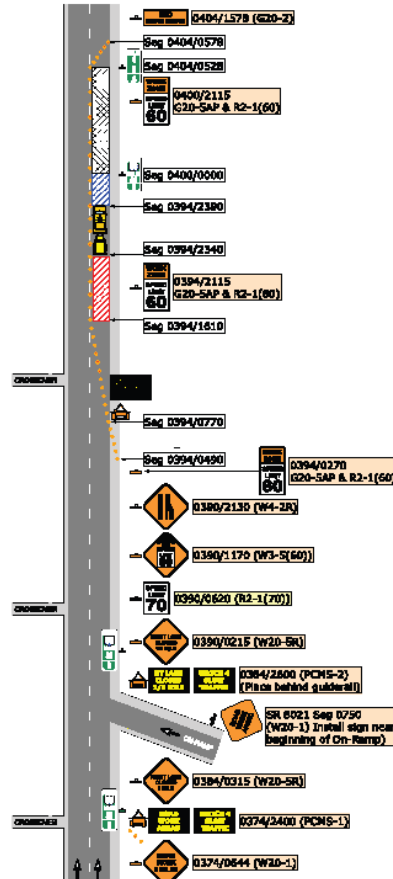
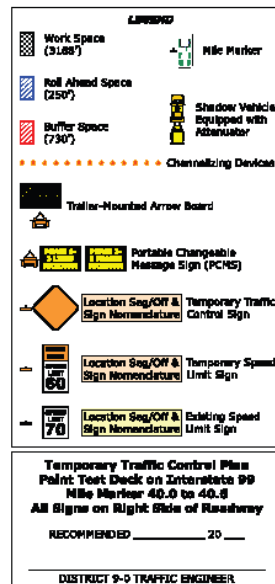
- Schedule troopers to be on-site
- Extra protection/safety while setting up WZ
- Enforce speed limit
- Duration of the day

NOTES:
1. Place channelizing device in accordance with Publication 213 PATR 402. TTC device may be adjusted slightly if warranted by field conditions.

2. PCMS messages should be approved by the District Traffic Engineer or Regional Traffic Management Center prior to being displayed.

3. 70 MPH Speed Limit signs shown shall be covered while temporary speed limit is in effect. See Pub 408 Section 501.3(a) for sign cover requirements.

4. This plan has no scale and existing Mile Markers are shown for reference purposes only.

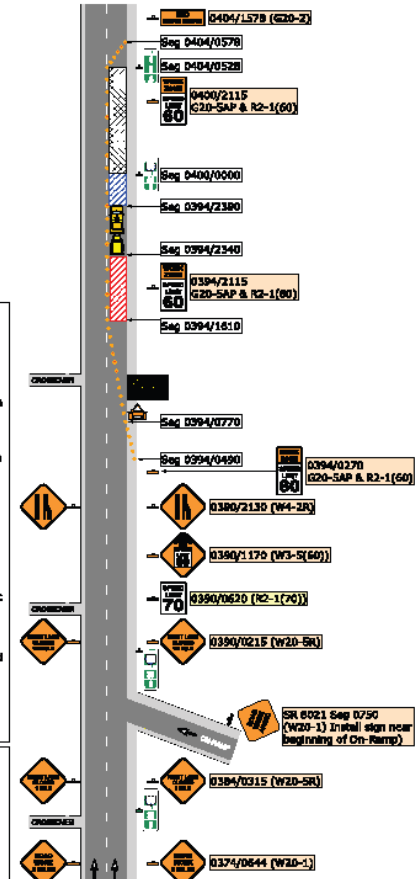
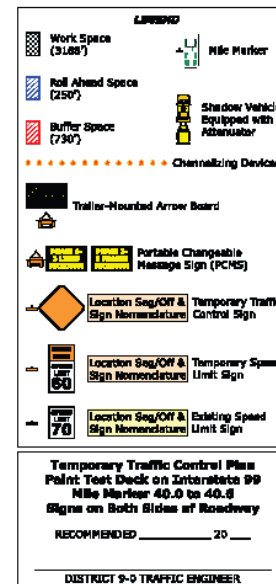


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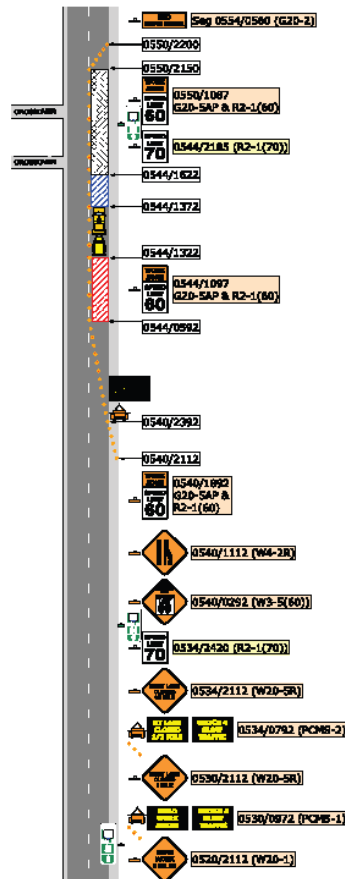
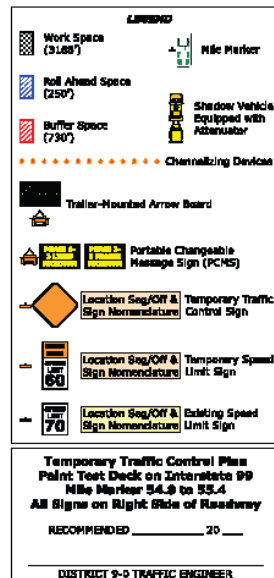
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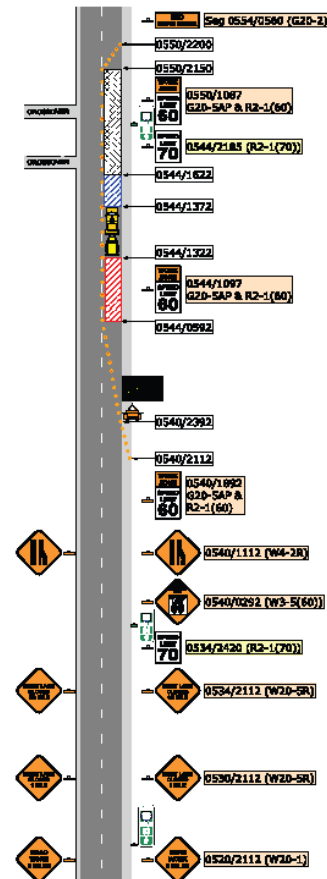
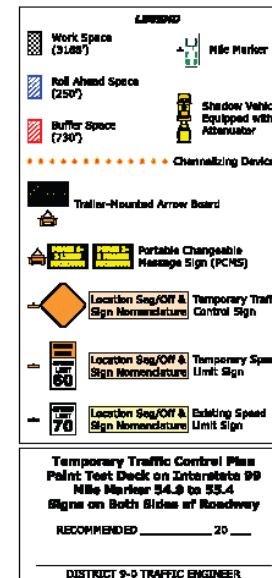
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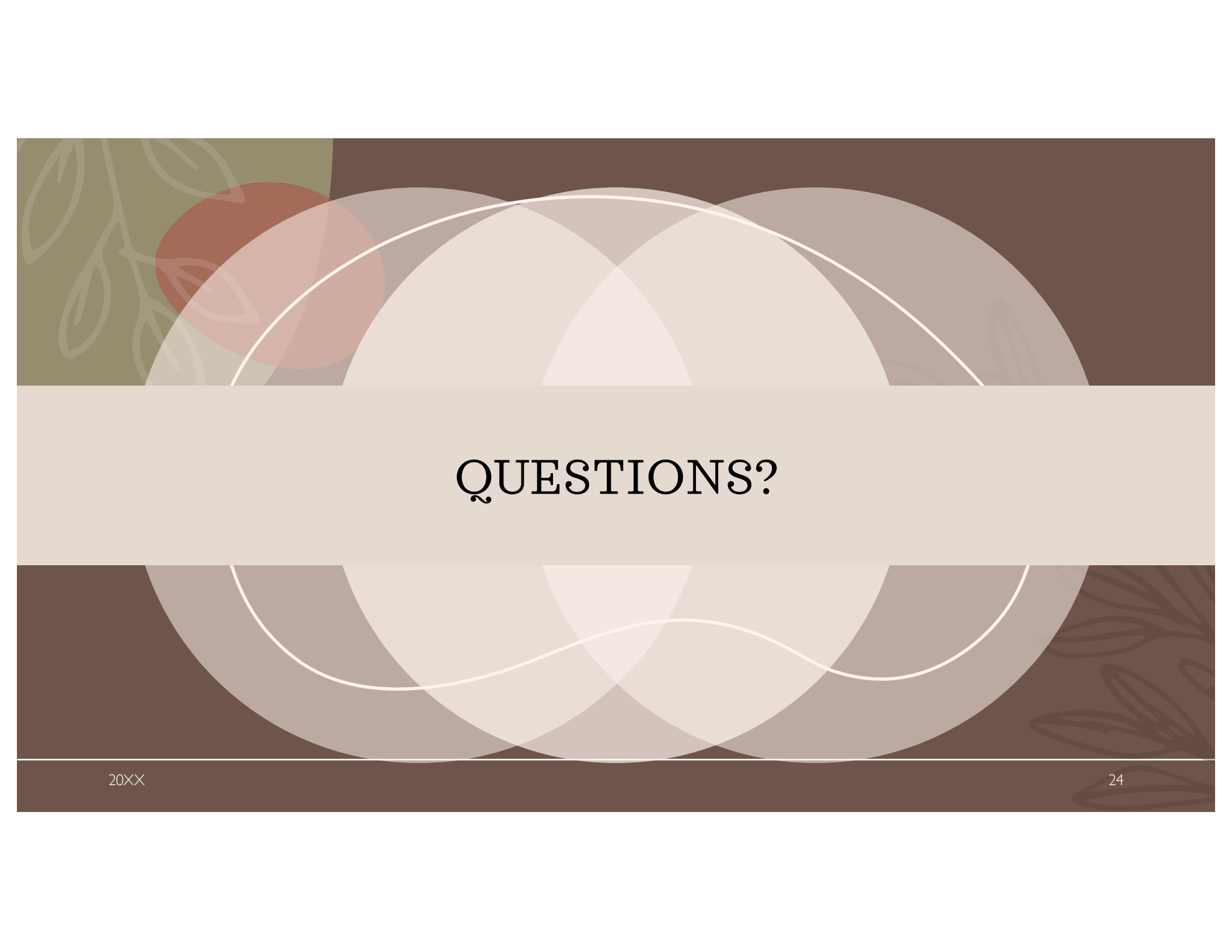
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The background features a series of overlapping circles in various shades of brown, tan, and olive green. In the top-left corner, there is a stylized illustration of a branch with leaves. The bottom-right corner also shows a faint foliage pattern. A horizontal light beige band spans the middle of the slide, containing the text.

QUESTIONS?

The background features a light beige base with large, soft-edged shapes in muted olive green and terracotta red. In the upper left, there are faint, grey line-art sketches of leaves or branches.

thank you

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