

65th Annual New Jersey Asphalt Paving Conference

Presented By:

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Outline

- Introduction
- Projects
 - Completed
 - Current
 - Future
- Clean Construction Program



Port Authority Facility Map



An aerial night-time photograph of a major airport. The terminal building is brightly lit, and numerous commercial aircraft are parked at the gates. A large highway interchange with multiple overpasses is visible in the foreground, with long-exposure light trails from cars creating a sense of motion. The airport is situated next to a body of water, and some urban development is visible in the lower-left corner.

Airports

Airports

Current and Completed Major Projects

- LaGuardia
 - New Terminal B Arrivals and Departures Hall (2020)
 - Rehabilitation of Runway 4-22 and Associated Taxiways (2020)
 - Rehabilitation of Taxiway A from Taxiway K to E (2021)
- John F. Kennedy International
 - Reconstruction of Runway 13L-31R and Associated Taxiways (2019)
- Newark Liberty International
 - Rehabilitation of Runway 4R-22L and Associated Taxiways (2021)
 - New Terminal A (2018-Current)



Newark Liberty Airport Runway 4R-22L

Primary Landing Runway

- Estimated \$84.2 Million Cost
- Electrical Upgrades
- 3" Mill and Overlay
4" Mill and Overlay in Keel Section
- 73,000+ Tons of Asphalt



Newark Liberty Airport Runway 4R-22L

- Design
 - Shoulders - PG 64-22 Warm Mix
 - Runway/Taxiway Proper - PG 76-22
- Construction
 - Truck Coordination
 - Echelon Paving
 - Material Transfer Vehicle
- 3 Month Closure
 - Opened 9/27/21



New Newark Liberty Airport Terminal A



New Newark Liberty Airport Terminal A

REDESIGNED ROADWAY NETWORK



Ports



Port Newark

Port Street Corridor Improvements

- \$176 Million Modernization Project
- Increase Efficiency
- Alleviate Traffic
- Increase Safety
- Improve Air Quality



Clean Construction Program

**PORT
AUTHORITY
NY NJ**
AIR LAND RAIL SEA



Background

PRESS
RELEASE



In September 2020, the PANYNJ Announced its Clean Construction Program

- **Incorporation of LEED and Envision-equivalent standards** during infrastructure design
- **Specification for low carbon concrete:** reduces the required cement content in certain concrete mixes by 25%, significantly reducing its carbon intensity and allowing for lower-carbon alternatives
- **Pilot projects** to develop low carbon concrete and materials
- **Requirement for Environmental Product Declaration:** enables systematic collection of environmental data directly from construction contractors to help inform more environmentally focused material selection
- **Waste matching for concrete, asphalt and soil:** creates a platform for waste matching across Port Authority construction sites to reduce waste sent to landfills and the truck trips required to bring materials to and from construction sites
- **Requirement for low emissions vehicles on-site:** specifies that large diesel construction equipment must be Tier 4 or newer to ensure the cleanest models available are used for agency projects



The Clean Construction Program builds on our already industry-leading practices to further reduce carbon emissions from construction (embodied carbon), promote the reduction and reuse of construction and demolition waste (circular economy), and reduce the air quality impacts of construction activity.

Accomplishments to Date:

- ➔ Socialized our policy
 - Outreach – met with regional contracting associations and material suppliers before making changes to Contract documents
- ➔ Started tracking
 - Developed a Carbon Management System to calculate the CO2e based upon Mix Designs or EPDs, and Contractor Quantity Submittals
- ➔ Codified and established workflows
 - Updated our Contract Books to include the Embodied Carbon Clause which requires the submission of database importable files (*Electronic Data Deliverables - EDD*) for quantities of incoming materials (daily yardage/tonnage tallies reported monthly) along with corresponding EPDs (*Environmental Product Declarations*)

EDD-Electronic Data Deliverables

- Contractor to populate and upload EDD monthly
 - Daily quantities delivered to construction site:
 - Asphalt
 - Concrete
 - Steel
 - Aluminum
 - Wood
 - Tying Contractor deliverables to monthly payments
- 3.) Field Delivery Tickets: The field delivery tickets obtained by the Contractor shall be used to populate the EDD. The EDD shall show the daily quantities delivered to the construction site, by material type, reported on a monthly basis, as shown in Figure 2. These files shall be submitted monthly, together with the Contractor's monthly payment request. In most instances for repetitive deliveries of the same materials, only the material quantity information will require updating in the EDD. Each mix and material shall receive its own line on the EDD for each day that it is delivered to the site. If the same mix or material is delivered several times on the same day, they shall be combined into one line with the sum of the delivered quantities. For months in which applicable materials are not delivered, no submission is necessary.
- a. EDDs shall be uploaded to the Authority's Microsoft *SharePoint* or other submittal platform site at the link provided by the Engineer. EDDs that are not submitted in the proper file format will not be accepted.
 - b. The Authority will audit randomly selected EDD submissions for accuracy against the field delivery tickets. The Contractor shall maintain the original field delivery tickets and provide them promptly to the Engineer upon request.
- 4.) Failure to submit the EDDs on a monthly basis will result in the Engineer, at his discretion, withholding out of any payment such sums as he deems necessary or desirable, all as more fully provided in the clause of the Form of Contract entitled "Withholding of Payments".

EPD-Environmental Product Declarations

- Capturing Data from sources of Embodied Carbon
- Focus on incoming Construction Materials
- Contractor will reach out to asphalt supplier for plant and mix specific EPD

B. Embodied Carbon

In order to comply with the Authority's greenhouse gas emissions reduction goals, and to quantify and reduce the impact of embodied carbon emissions, the Contractor and his subcontractors and suppliers shall comply with the EPD and EDD submittal requirements for data related to the embodied carbon of the following construction materials used in the Work of the Contract:

- 1.) Asphalt.
- 2.) Concrete.
- 3.) Steel.
- 4.) Aluminum.
- 5.) Wood.

C. The Contractor shall submit EPDs for each of the materials listed in B. above. Non-third-party verified EPDs will be rejected.

- 1.) EPDs shall be specific to the material, product, plant and mix used in the Work. In the absence of providing a specific EPD, the Contractor shall submit evidence that no material, product, plant or mix-specific EPD could be sourced. Evidence may be in the form of a computer screenshot showing a "No EPDs found" outcome from a query within *EC3* identifying the parameters used to search. Figure 1 below is a sample of the search results for a 6000 psi (28-day) ready mix concrete from a manufacturer searched with the name field containing the word "Jersey".

Understanding EPDs

- Standardized ways of quantifying and reporting the life-cycle impacts of products on the environment
 - Similar to nutrition labels on food
- Mainly focused on the Global Warming Potential (GWP)
- GWP shows the amount of CO₂ emitted from the creation of each declared unit of material
 - 1 US or Metric Ton of Asphalt, depending on the EPD

ENVIRONMENTAL IMPACTS

Declared Product:

Mix PAV57T • Newark Plant

5000 PA CAT V A/E

Compressive strength: 5000 PSI at 28 days

Declared Unit: 1 m³ of concrete

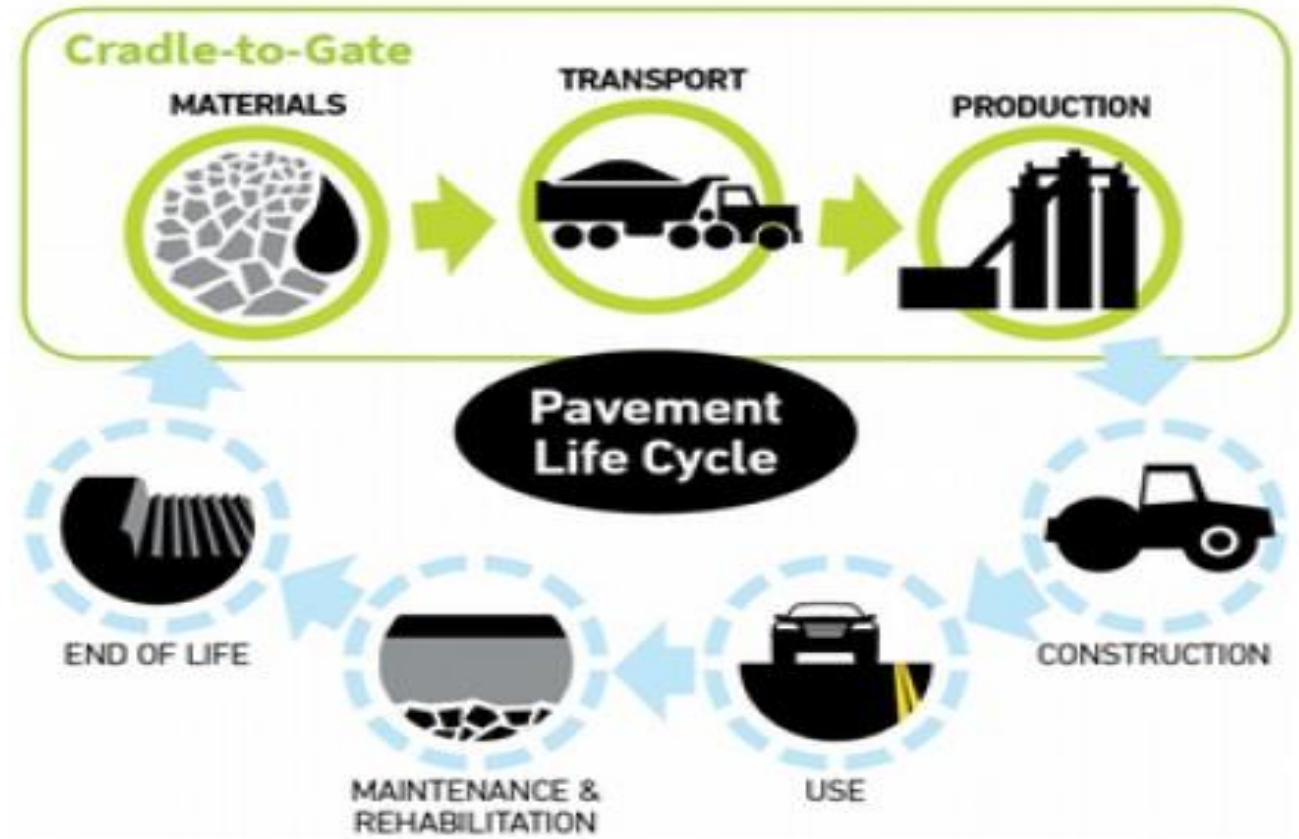
Global Warming Potential (kg CO ₂ -eq)	292
Ozone Depletion Potential (kg CFC-11-eq)	7.4E-6
Acidification Potential (kg SO ₂ -eq)	1.79
Eutrophication Potential (kg N-eq)	0.36
Photochemical Ozone Creation Potential (kg O ₃ -eq)	41.3
Abiotic Depletion, non-fossil (kg Sb-eq)	5.3E-6
Abiotic Depletion, fossil (MJ)	1,159
Total Waste Disposed (kg)	2.35
Consumption of Freshwater (m ³)	2.88

Product Components: crushed aggregate (ASTM C33), natural aggregate (ASTM C33), Portland cement (ASTM C150), fly ash (ASTM C618), slag cement (ASTM C989), admixture (ASTM C494), batch water (ASTM C1602), admixture (ASTM C260)

Additional detail and impacts are reported on page three of this EPD

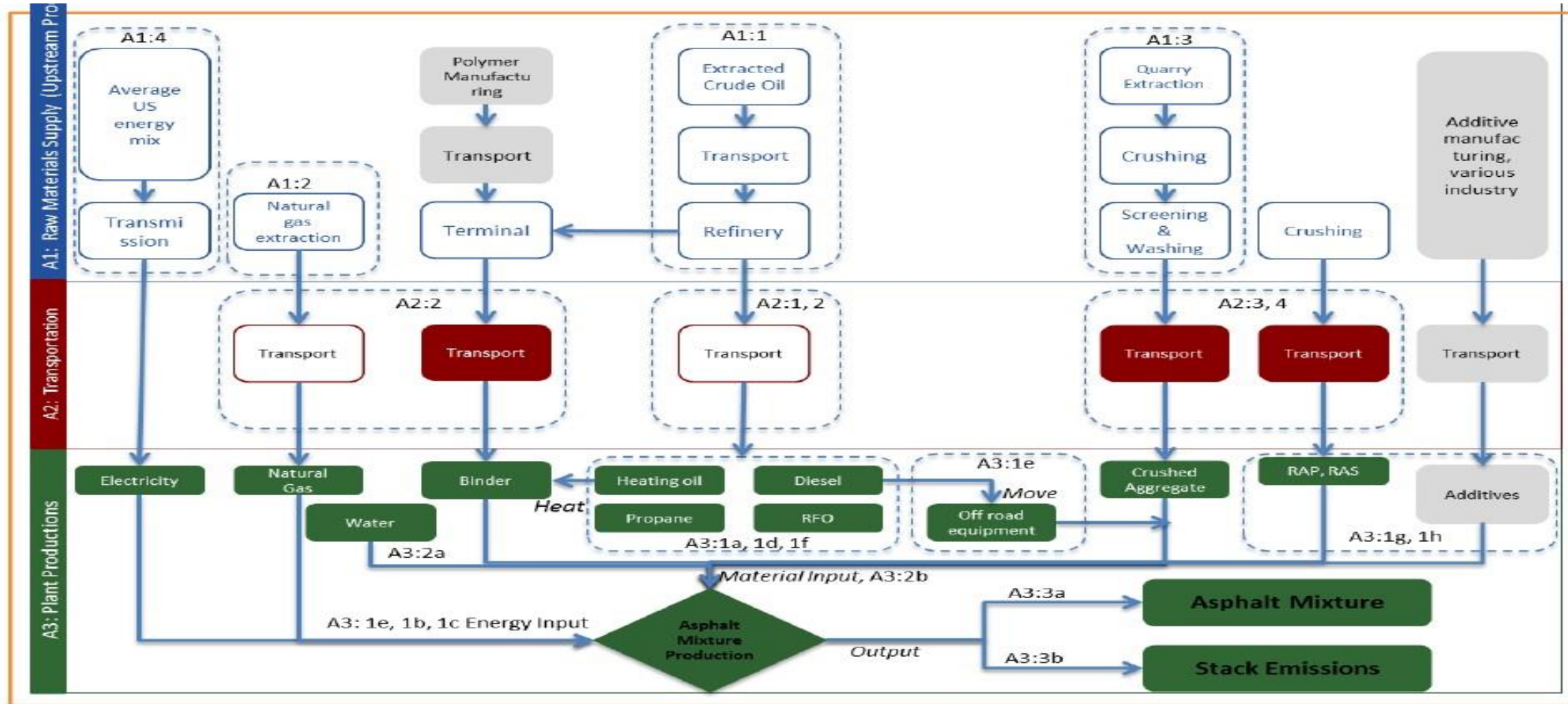
Understanding EPDs

- EPDs only account for the A1-A3 portion of a Life Cycle Assessment (LCA)
 - A1- Materials
 - A2- Transport
 - A3- Production
- Asphalt EPDs are plant specific
 - Mix Design
 - Material Source Locations
 - Manufacturing Processes
 - Efficiencies
 - Fuel Use



Source: Emerald Eco Label-An Environmental Product Declaration for Asphalt Mixtures

Asphalt EPDs



Source: Mukherjee, Amlan, "Life Cycle Assessment of Asphalt Mixtures in Support of an Environmental Product Declaration" June 2016

Asphalt EPDs

- NAPA EPD generator
 - Emerald Eco-Label EPD tool (Version 2 will be available on 4/1/22)
 - Allows producers to generate EPDs for a relatively low price
- PANYNJ will only enforce the Embodied Carbon Clause on Contracts that contain it
 - All new Contracts will include the Embodied Carbon Clause
- EPDs also showcase any plant efficiencies which would reduce the mix's GWP
 - Fuel usage
 - Material selection and transport distances
 - WMA technologies
 - Recycled Materials

Asphalt EPDs

- In-house **A1** GWP calculations derived for all asphalt placed at PANYNJ Facilities
 - If your plant is more energy efficient, this calculation would not capture it!

	National	NEW - 2006	NEW - 2020	NEW - 2021
Mean (kg CO2e/MT)	25.24	23.91	24.39	25.67
Median (kg CO2e/MT)	26.19	23.27	23.88	25.99
Max (kg CO2e/MT)	30.87	30.81	28.53	30.12
Min (kg CO2e/MT)	18.85	17.32	17.13	17.32
QTY Placed (US Ton)	n/a	312,831	115,195	115,166
QTY Placed (MT)	n/a	283,738	104,482	104,455
Total CO2e (MT) (per mix)	n/a	n/a	n/a	n/a
Total MT CO2e/MT (avrg)	n/a	6,785	2,548	2,682

Looking Ahead →

How can the Port Authority Reduce Carbon Emissions?

- Working with NAPA, NJAPA, and our suppliers to identify programs and way to help lower Carbon Emissions from Asphalt production
- We encourage our suppliers to stay informed on new sustainability programs from NAPA as PANYNJ may look to their programs for future policy/spec updates
- The Port Authority has a goal of a 35% GHG reduction by 2025, and a 50% GHG reduction by 2030 – these goals include the reduction of carbon emissions from Asphalt

Points of Contact

- Kevin Monaco – NJAPA – great resource on the work PANYNJ has done over the past year
- Dorian Bailey – Chief of Science and Clean Construction (CCU)
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- Darius Pezeshki – Materials Engineer in the Materials Engineering Unit (MEU)
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- Peter Bacas – Sustainability Analyst in MEU & CCU
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Thank You!

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