

TRANSPORTATION RESEARCH BOARD

Creature Comforts—Designing Terminal Restrooms and Ancillary Spaces

November 16, 2021

**@NASEMTRB
#TRBWebinar**

Learning Objectives

- Determine required and recommended restroom and amenity spaces and their impact on traveler satisfaction
- Identify resources for planning, designing, and implementing airport restrooms and ancillary spaces



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Creature Comforts: Planning and Design of Airport Terminal Restrooms and Ancillary Spaces

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ACRP Report 226 Research Team

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ACRP Report 226 Oversight Panel

Casey Martin, Jacobs, Chairperson

Larry Ferrigno, Metropolitan Washington Airports Authority

Alan Howell, Metropolitan Airport Commission

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Ms. Christine Gerencher, TRB Liaison

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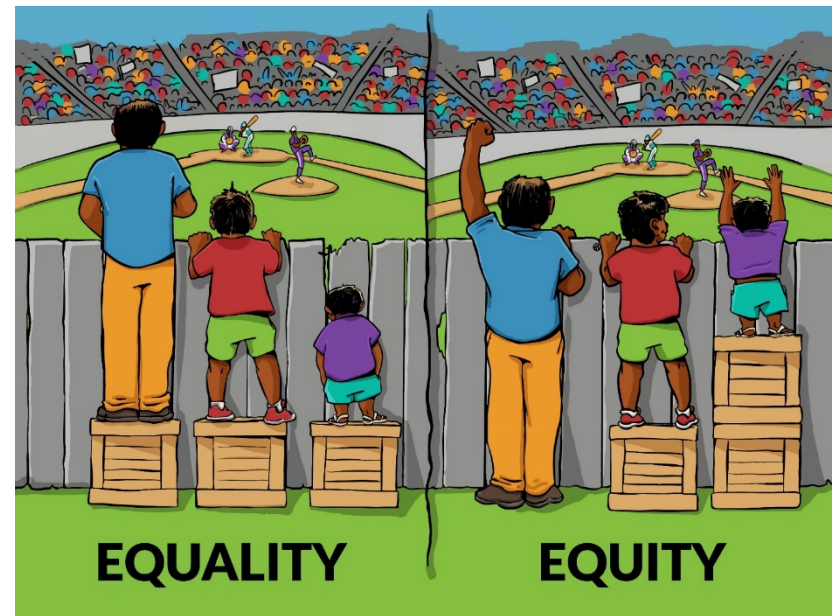
Hana Vagnerova, ACRP Senior Program Assistant

Research Problem

ACRP Report 130 (Original Guidebook)

→ Industry Concerns

- Equity: Travelers with disabilities, children, companions
- Cleanliness and germs.
- Privacy.
- Security of personal belongings.
- Expectations for convenient amenities.

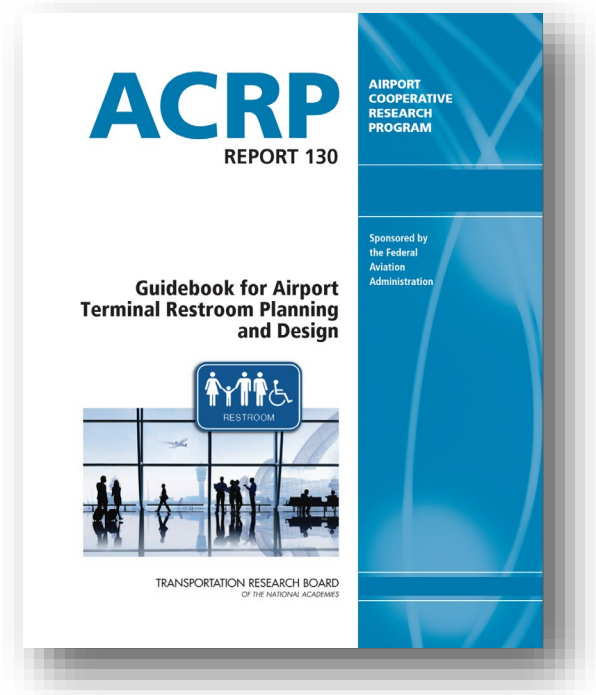


Research Approach - ACRP Report 130

Original Guidebook

- Visited 10 U.S. Airports
- Restroom Master Planning
- Restroom Prototypes
- Restroom Components
- Construction
- Appendices w/checklists, example layouts, materials

- **Missing: Traveler Amenity Spaces**



Research Approach – ACRP 226

Researched Airport Amenity Spaces

Region	Asia-Pacific														Total				
	SARA-	Lactation-	Nursing Mothers-	Companion Care/Family-	Adult Changing-	Multi-Sensory-	Health/	Companion waiting area-	Public Showers-	Ceremonial foot-washing-	Worship Space-	Meditation/	Sleeping-	Yoga-	Fitness Area-	Children's play	Clothes changing-	Other-	Total
Australia	3	5	8	1	1	5	5		4		5	5			4	6	3		55
Melbourne Airport			1		1	1	1		1		1	1			1	1	1		10
Brisbane International Airport	1	1	1			1	1		1		1	1			1	1	1		10
Adelaide Airport	1	1	1			1					1	1			1		1		8
Sydney International Airport		1	1	1			1		1		1	1				1			8
Perth Airport		1	1			1	1								1	1			6
Darwin International Airport	1		1				1		1		1	1				1			6
Townsville Airport		1	1													1			3
Newcastle Airport			1			1													2
Cairns Airport			1																1
Gold Coast Airport						1													1
Cambodia		1	1																
Phnom Penh International Airport		1	1																
China		2	5	3			6		3		1				2	1			23
Changsha Huanghua International Airport		1	1	1			1								1	1			6
Chongqing Jiangbei International Airport		1	1	1			1		1										5
Chenedu Shuangliu International Airport							1				1				1				3

Research Approach – ACRP 226

Identified 18 Airport Amenity Spaces

→ Regulated/Essential Amenities

- Service Animal Relief Area
- Lactation
- Nursing Mothers
- Companion Care
- Change Table Restroom

→ Waiting-related Amenities

- Companion Waiting at Restrooms
- Children's Play Area
- Sensory Room

▪ Meditation / Quiet

- Yoga
- Worship
- Ablution

→ Layover-related Amenities

- Sleeping
- Fitness
- Showers
- Clothes Changing
- Health/ Urgent Care

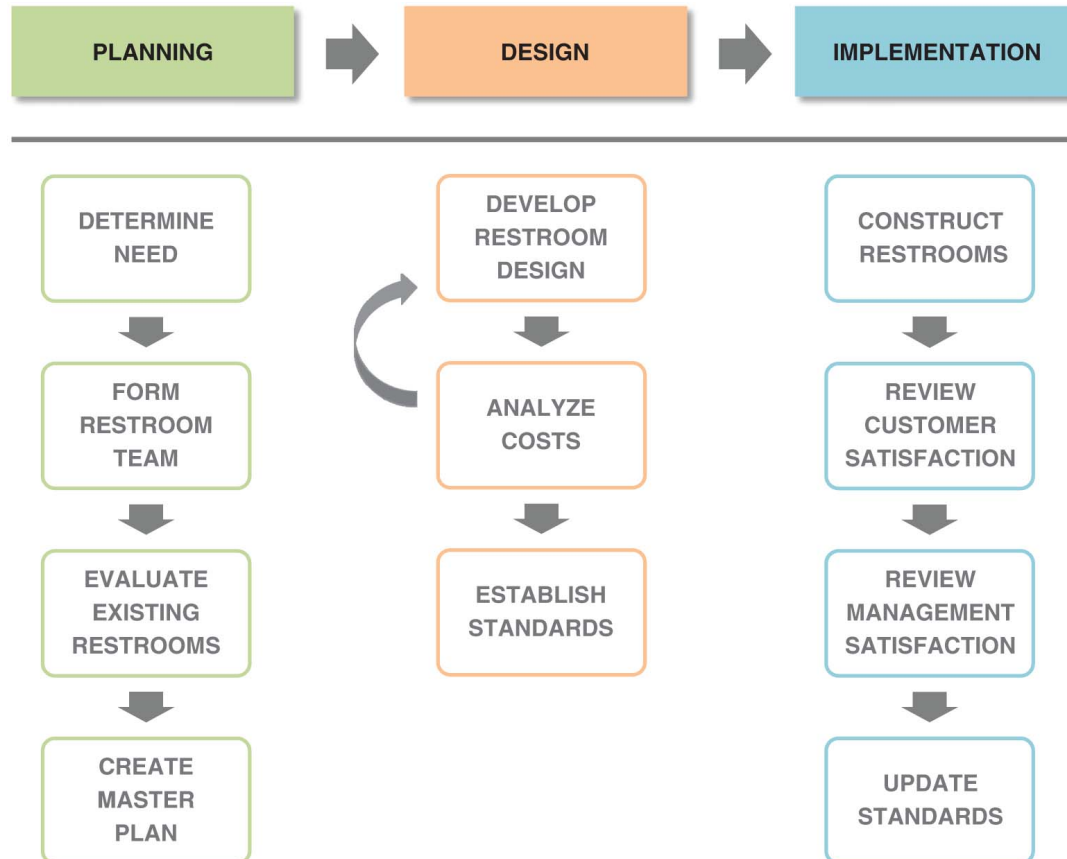
Research Approach – ACRP 226

Stakeholder Outreach

- 10 International Airports
- University of Minnesota and Mall of America
- Three Industry Conferences



How to Use this Guidebook



Planning

Confirm Drivers and Goals

→ Analyze Customer Service Complaints

- Too Far Apart
- Not Accessible
- Long Lines (not enough fixtures)
- Out of Paper
- Restroom Condition
- Smells and noise

“Airport Restrooms often the first and last impression of a destination.”

Planning

The Restroom and Amenities Team

→ Airport managers involved with restrooms and amenities:

- Facilities / Planning
- Customer service
- ADA Coordinator
- Carpentry
- HVAC / Plumbing /
Electric / IT
- Cleaners
- Airport Police
- Design Team



Planning

Existing Restrooms and Amenities Evaluation

- Accessibility
- Signage
- Surfaces
- Hardware
- Accessories
- Amenities
- Plumbing
- HVAC
- Power
- Lighting
- Technology

ROOM NO. _____
ROOM NAME _____

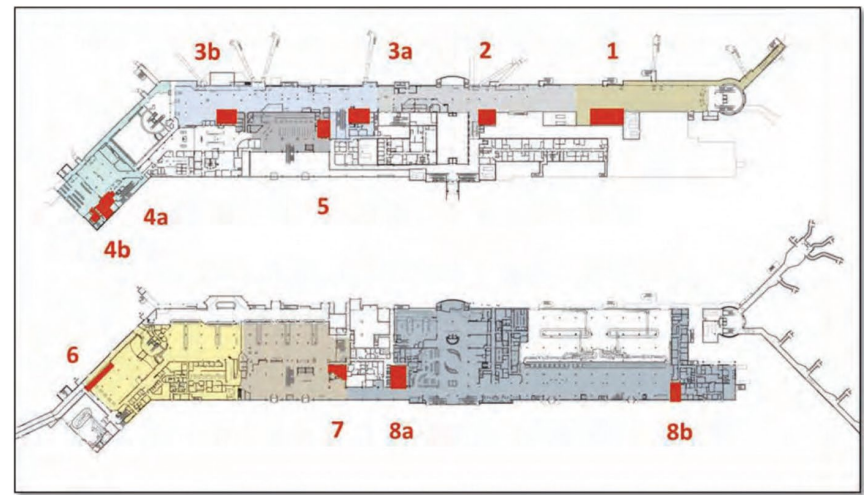
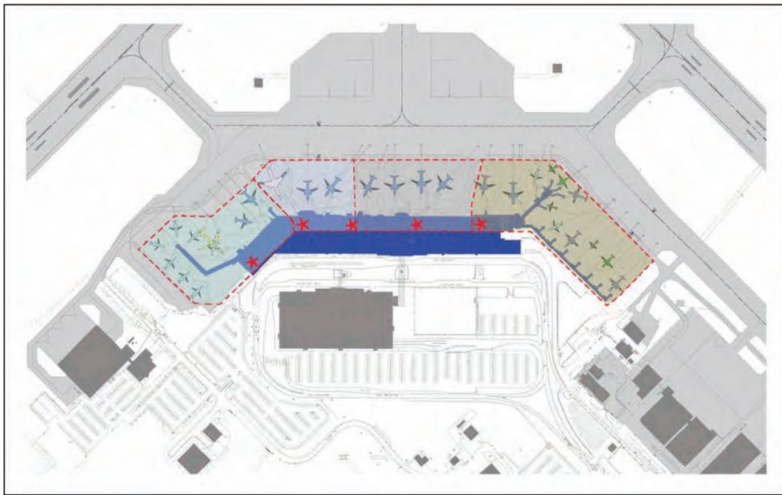
DATE _____
EVALUATOR _____

ACCESSORIES: RESTROOM							
	QTY	TYPE	BRAND	MODEL/ COLOR	FINISH	SIZE	AGE, QUALITY, ISSUES, ETC.
MIRROR							
HAND DRYER							
PAPER TOWEL DISPENSER							
SANITARY PRODUCTS DISPENSER							
WASTE RECEPTACLE							
BIOHAZARD							

Planning

Quantities of Restroom Spaces Needed

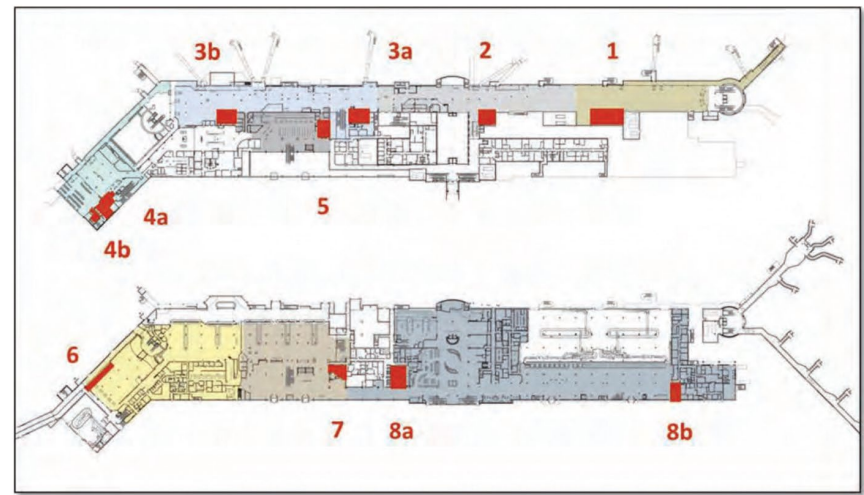
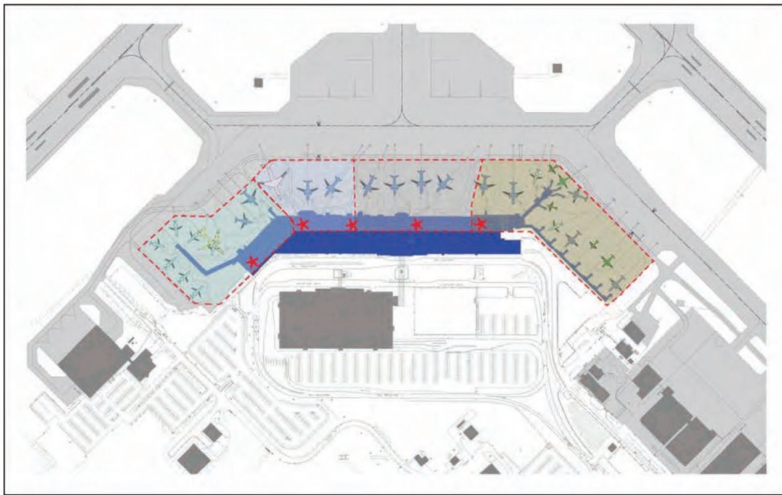
- Quantities of Restroom Fixtures (Level of Service)
- Airside Calculations
- Landside Calculations
- Catchment Zones



Planning

Quantities of Amenity Spaces Needed

- Regulated/Essential Spaces Located Near Restrooms
 - Lactation, Nursing Mothers, SARA, Changing Table.
- Waiting-related within concourses.
- Layover-related within concourses and landside.



Planning

Restroom and Amenity Nodes

- Building blocks of prototypes
- Nodes of activity: elimination, hand-washing and drying, etc.
- Made up of functional components: sink, faucet, etc.

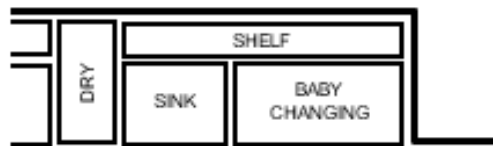


Figure 2-2. Baby diaper changing node.

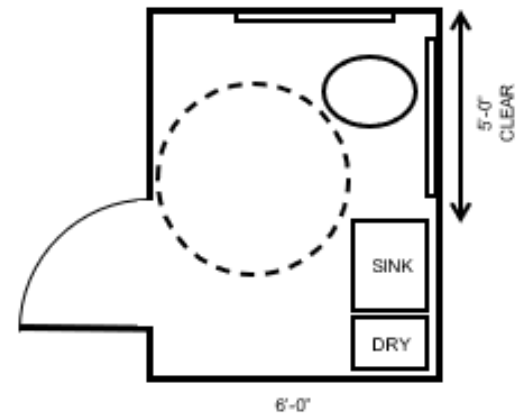
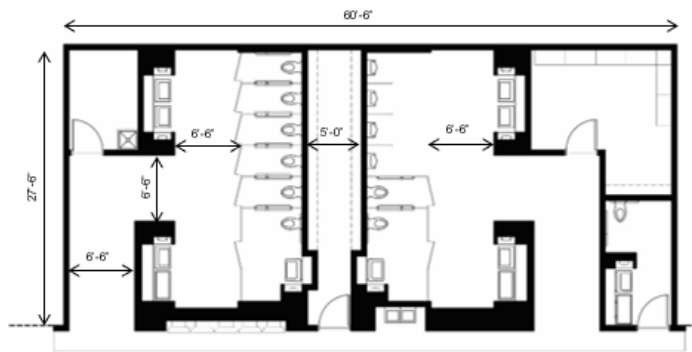


Figure 2-4. Wheelchair-accessible stall layout.

Planning

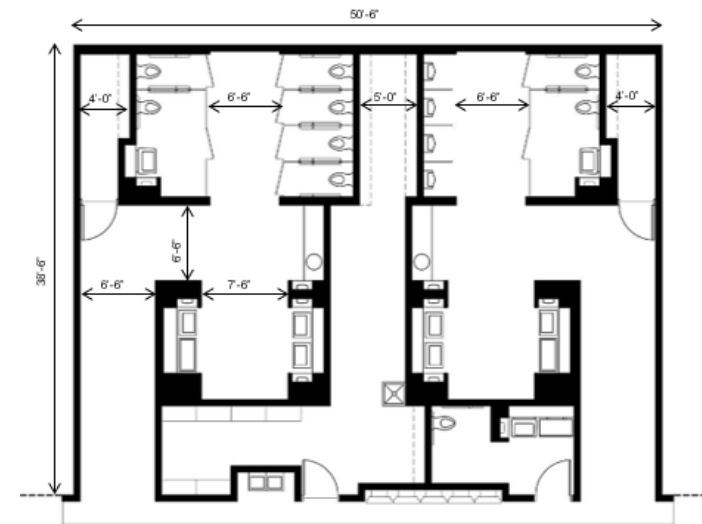
Restroom Prototype Layouts

- ➔ Basic room blocks for test-fitting of node layouts within targeted restroom locations.
- ➔ Galley Prototype:
138 square feet / fixture
- ➔ Room Prototype:
160 square feet / fixture



Room Prototype:

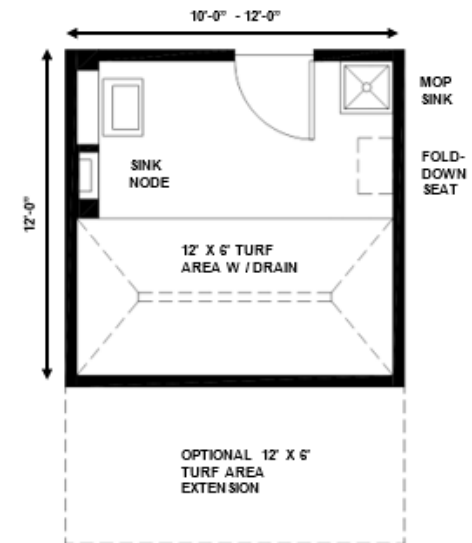
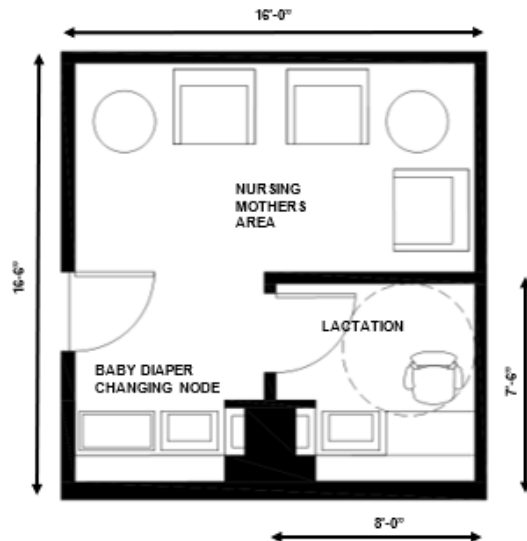
160 square feet / fixture



Planning

Amenity Prototype Layouts

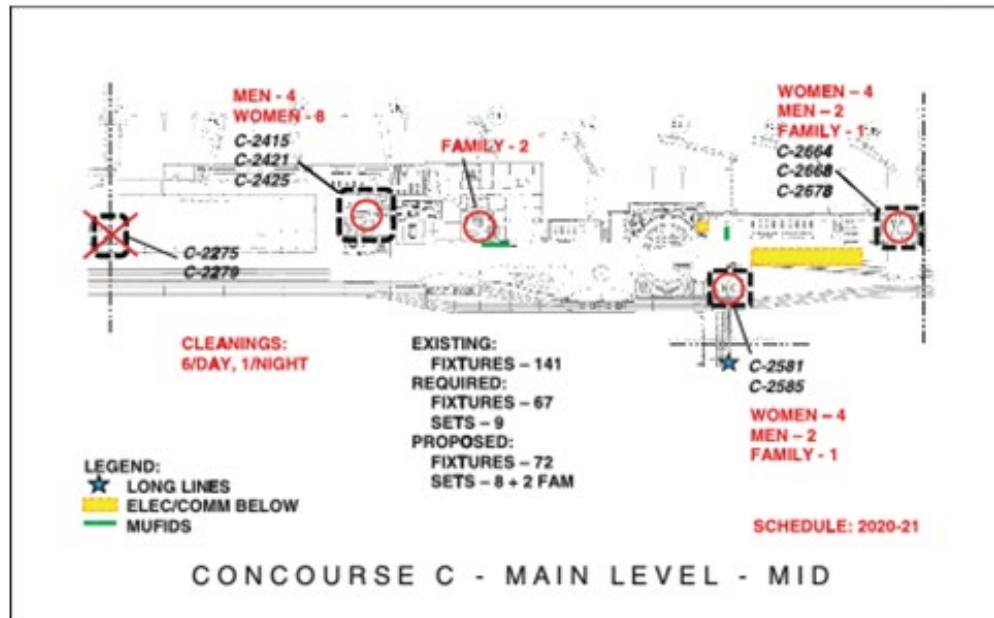
- ➔ Basic room blocks for test-fitting of layout of nodes within targeted amenity locations.
- ➔ Nursing Mothers/Lactation Prototype: SARA Prototype:



Planning

The Master Plan

- Long range airport layout with current and planned future restroom and amenity improvements:

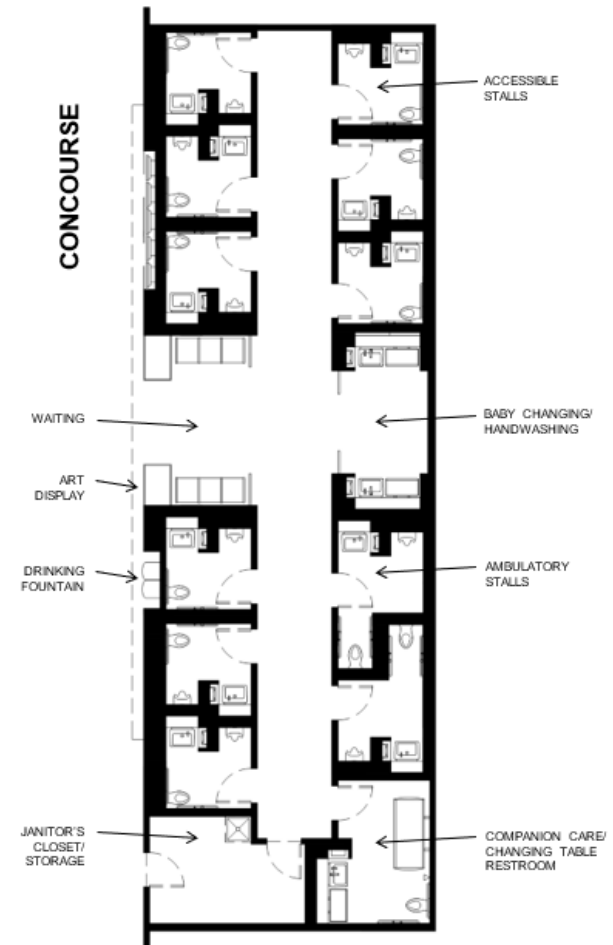


Chapter 3 - Restroom of the Future

The Updated Concept

→ Combination of single user, all gender restrooms (left and right-handed grab bars, ambulatory, and companion care/changing table restroom).

- Pipe chases removed.
- Flexible modules for odd-shaped space configurations.



Chapter 3 - Restroom of the Future

The Updated Concept

- New sign for all-gender restrooms focuses on function rather than attributes of the person.



Chapter 4 - Design

Process: Components

→ Selection of components in the following categories:

- Signage
- Surfaces
- Accessories (e.g., dispensers)
- Plumbing
- HVAC
- Electrical
- Lighting
- Technology



Chapter 4 - Design

Process: Component Attributes

→ Attributes to consider by the Restroom Team when selecting components:

- Initial Cost
- Life-cycle cost
- Warranty
- Maintenance
- Sustainability
- Other Pros and Cons



LGW Sensory Room

Chapter 4 - Design

Process: Prioritization

- ➔ Restroom Team uses form to determine which components are “Must Have,” Wish List,” or “Not Interested”
- ➔ Every Participant gets a vote to create a fair ranking of priorities.
- ➔ Process should be repeated with each new restroom/amenities project to determine if priorities changed after evaluating project.

MUST HAVE	WISH LIST	NOT INTERESTED	RESTROOM COMPONENTS
			ACCESSORIES
			Mirrors
			• Sink Node
			• Grooming Node
			• Full-height
			Paper Towel Dispenser
			• Folded
			• Center Pull
			• Roll Type
			Waste Receptacle
			• Free Standing
			• Surface Mounted
			• Recessed
			• Enclosed
			Hand Dryer
			• Top Access
			• Through Access
			• Recessed
			• Faucet Mount
			Child-step at Sink
			Toilet Paper Dispenser
			• Surface - Standard Roll
			• Surface - Jumbo Roll
			• Recessed - Standard Roll
			• Recessed - Jumbo Roll
			Stall Waste Receptacle
			• Surface
			• Recessed

Chapter 4 - Design

Process: Universal Design

- ➔ Provide equitable access to spaces and components for everyone, regardless of mobility, age, status in life, gender identification...

and Culture!



DOH Ablution

Chapter 4 - Design

Changing Table Restroom

- Emerging space that will likely be a requirement in future building codes, including FAA requirements.
- A Companion Care Restroom with:
 - Adult-sized changing table for diaper changing
 - Ceiling-mounted lift with sling for maneuvering throughout space
 - Shower to clean person being changed

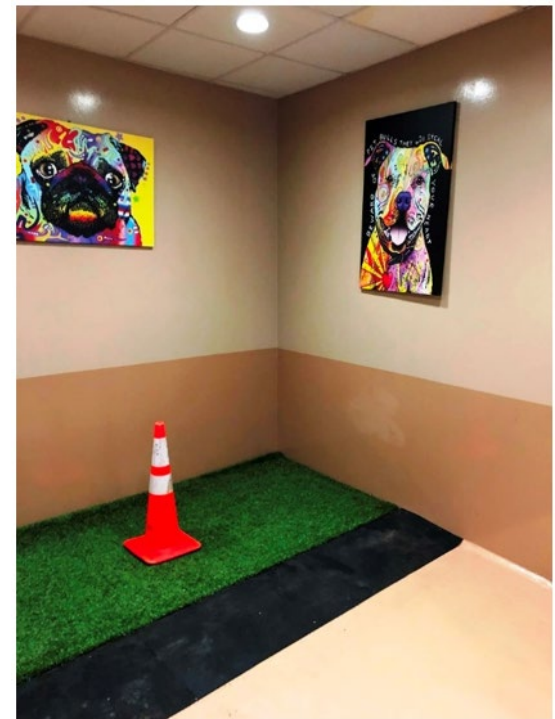


LHR Changing Table Restroom

Chapter 4 - Design

Service Animal Relief Area (SARA)

- FAA required space on airside.
Landside also recommended.
- Enclosed room with:
 - Turf area (ideally with integral drain)
 - Disposal bag dispenser
 - Sink for handwashing
 - Floor sink for cleaning paws
 - Bench
 - Well ventilated!

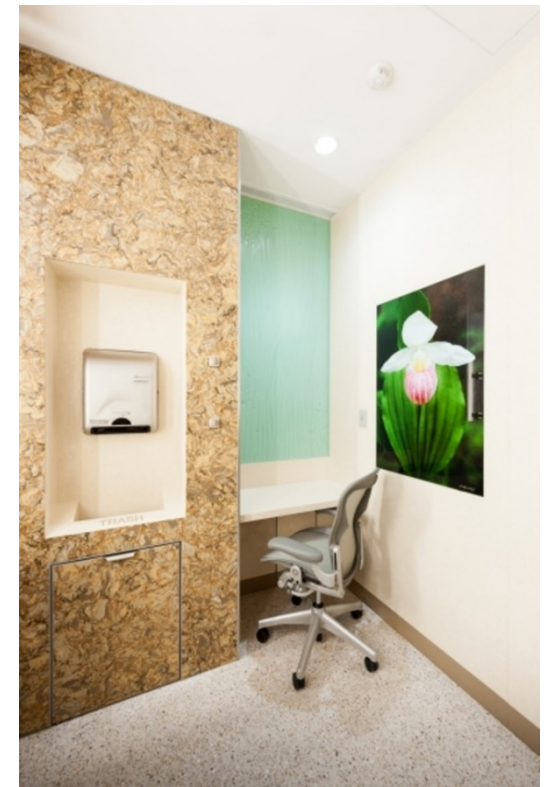


DFW SARA

Chapter 4 - Design

Lactation

- FAA required space.
- Private room with:
 - Counter for expressing with comfortable, movable chair
 - Sink node with baby changing and tall gooseneck faucet for cleaning equipment.
 - Calm lighting.
 - Often paired with Nursing Mother's space.



MSP Lactation

Chapter 5 - Implementation

Construction




- Phasing considerations.
- Delivery methods.
- Maintaining standards.
- Prefabricated restrooms/amenities
(similar to hospital patient rooms).

- **Post-occupancy Evaluation.**
 - **Important step in on-going evaluation
of restroom and amenities program!**

Appendices

App A: Component Comparison Matrix

→ Maintenance, sustainability, pros and cons of materials.

PRODUCT	INITIAL COST	LIFE CYCLE COST	WARRANTY	INITIAL COST: High, Mid, or Low based on full range of costs for similar materials. LIFE CYCLE COST: High, Mid, or Low based on full range of costs for similar materials. WARRANTY: Number of years.			
				MAINTENANCE	SUSTAINABILITY	PROS	CONS
Stall Partition / Urinal Screen							
SOLID SURFACE 	High	Mid	10	Mild soap solution and wiped dry. Consult manufacturer for more stubborn stains recommendations. Good performance in hose-down environment.	LEED supportive low-emitting material and recycled content.	Class A fire rated, won't delaminate, durable, resistant to corrosion, graffiti, impact, mildew, moisture. Scratches can be buffed out. Matte finish is standard, least maintenance. Wide range of colors, upscale visual appearance.	More difficult to install. Scratches and stains may occur but can be buffed.
RECYCLED PAPER - RESIN CORE 	Low	High	10	Soapy warm water applied and removed with a soft cloth or sponge. If necessary for sanitary reasons, a 10% bleach solution can be applied.	LEED supportive paper composite from FCS certified 100% post-consumer recycled paper and/or 100% post-consumer recycled cardboard. Contains no added urea formaldehyde resins.	Class A fire rated, won't delaminate, durable, resistant to corrosion, graffiti, impact, mildew, moisture and bacteria. Good performance in hose-down environment. A49	More difficult to install. Moderate selection of colors. Scratches and stains may occur but can be buffed.
STAINLESS STEEL - #4 FINISH 	Mid	High	15	Non-chlorinated spray cleaner/degreaser and a microfiber cloth. Don't use harsh abrasives, acids or chlorine-based cleaners or cleaning tools. Heavier soiling can be removed using a paste of baking soda on a damp sponge or light duty cleaning pad.	LEED supportive, excellent recycled content.	100% fire proof, vandal resistant, durable material, corrosion resistant, upscale appearance. Good performance in hose-down environment.	#4 brushed finish fingerprints and scratches but can be buffed to minimize scratch. Moderate to higher end visual appearance.

Appendices

App B: Existing Restroom Evaluation Forms

→ Surveys condition of existing components, materials, accessibility, etc.

ROOM NO. _____ DATE _____
ROOM NAME _____ EVALUATOR _____

PLUMBING: CONCOURSE								
	QTY	BRAND	MODEL	MATERIAL/ FINISH	MOUNTING	AUTO/ MANUAL	GPM	AGE, CLEANLINESS, QUALITY, ETC.
DRINKING FOUNTAIN								
BOTTLE FILLER								
CANE GUARD								

Appendices

Other Appendices

- C.1: Case Studies – Restrooms
- C.2: Case Studies – Amenities
- D.1: Stakeholder Outreach – Restrooms
- D.2: Stakeholder Outreach – Amenities
- E: Restroom Survey Summaries
- F: Restroom Design Guidelines Standards Sample
- G: Restroom Standard Operating procedures (SOP) Sample
- H: Bibliography
- I: Glossary

FOR ADDITIONAL INFORMATION



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Today's Panelists



Moderator: Alan Howell,
*Metropolitan Airports
Commission*



Jens Vange,
Alliance

Shane Wirth,
Alliance

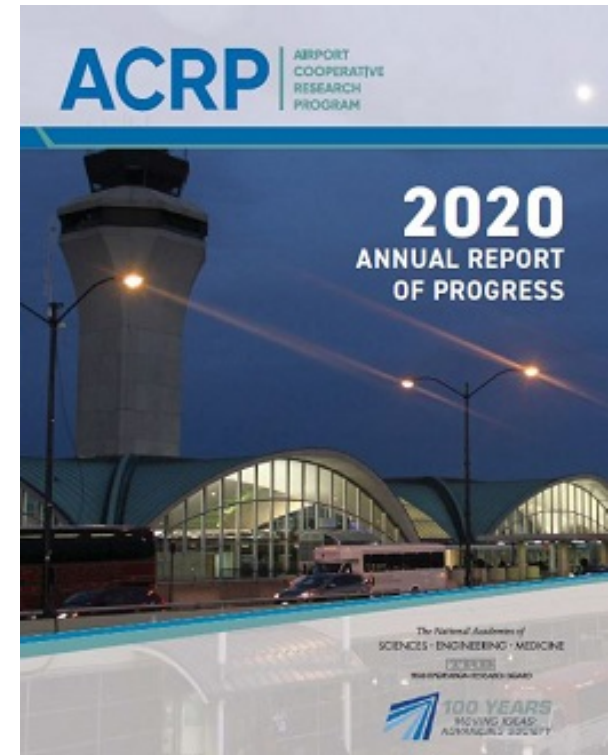


Kerry Bruggemann,
*Michaud Cooley
Erickson*



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- ➔ Seeks out the latest issues facing the airport industry.
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Other ACRP Research on Today's Topic

Research Report 25: [*Airport Passenger Terminal Planning and Design, Volume 1: Guidebook*](#)

Research Report 52: [*Wayfinding and Signing Guidelines for Airport Terminals and Landside*](#)

Research Report 55: [*Passenger Level of Service and Spatial Planning for Airport Terminals*](#)

Research Report 130: [*Guidebook for Airport Terminal Restroom Planning and Design*](#)

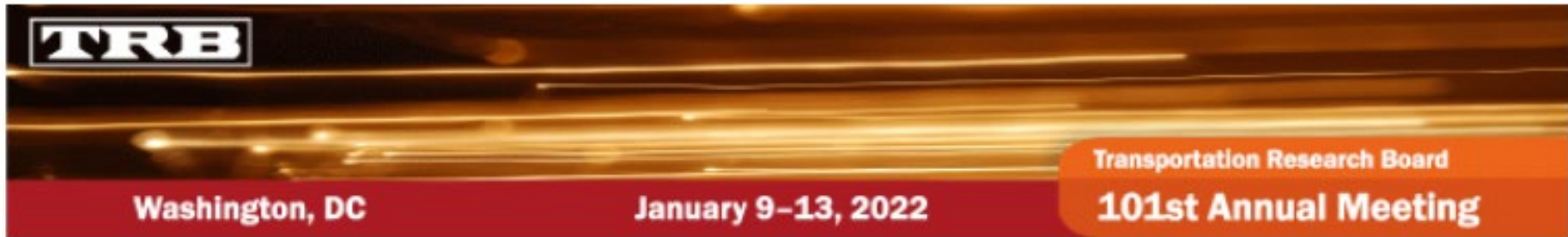
Research Report 157: [*Improving the Airport Customer Experience*](#)

Research Report 177: [*Enhancing Airport Wayfinding for Aging Travelers and Persons with Disabilities*](#)

Research Report 210: [*Innovative Solutions to Facilitate Accessibility for Airport Travelers with Disabilities*](#)

Synthesis Report 56: [*Understanding the Value of Social Media at Airports for Customer Engagement*](#)

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