

## RESILIENCE FINDINGS

# Equity in Resilience Hub Design and Transportation through Community Discussions

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## Findings

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This research highlights transportation, placement, and features of resilience hubs preferred by underserved populations, using Edmonton, Alberta as a case study. Semi-structured focus groups were conducted with eight different underserved populations (n=52), and thematic analysis was performed to determine common themes and inform equity-centered engineering design. By talking directly with community members, we found that resilience hubs should be placed in locations that are easily accessible by walking or public transit, and additional infrastructure is needed to meet users' needs. Most underserved participants prefer locations that are close to their neighborhood, indicating a proximity-based approach for future implementation.

## 1. QUESTIONS

Resilience hubs are physical spaces created to support residents, coordinate communication and services, and provide resource distribution before, during, or after a disaster (Baja 2018; Sandoval 2019; de Roode and Martinac 2020; Kirwan et al. 2021; Mardis et al. 2021). Resilience hubs are also designed to meet community needs year-round (Baja 2018). Early research on resilience hubs has found that multiple North American jurisdictions have begun implementing resilience hubs (Ciriaco and Wong 2022), with several effective examples in the County of Hawai'i (Vibrant Hawai'i 2020) and Vancouver (City of Vancouver 2023). Despite this development, little research has been conducted on resilience hubs, in particular the transportation implications of these hubs (Ciriaco and Wong 2022). While Baja (2019) discusses the need for walkability and proximity to evacuation routes, research and practice have not analyzed the transportation and accessibility needs of vulnerable populations.

The goal of this research is to provide recommendations to city decision-makers through focus groups to guide more equitable transportation design and planning of resilience hubs. We aim to answer three questions for underserved populations:

- What modes of transportation would be most used to/from resilience hubs?
- Where should resilience hubs be placed?
- What are the preferred transportation features of resilience hubs?

Table 1. Description of focus group participants

Focus Group Population	Key Need Related to Resilience Hubs*	Focus Group Eligibility	# of People	Meeting Date
Carless Residents	Access to multiple modes of transportation for travel	Without a vehicle or reliable access to transportation	7	February 14, 2023
Individuals with Disabilities	Universally-designed transportation services and infrastructure	Have physical or mental disabilities or have a family member with a disability	8	February 2, 2023
Older Adults	Multi-modal access and opportunities, including additional assistance as needed	65 years or older	6	February 7, 2023
Lower-Income Households	Inexpensive access across a variety of modes	Household annual income below \$50,000 in Canadian Dollars	4	February 15, 2023
Racial and Ethnic Minorities	Non-discriminatory services and operations	Not in a dominant ethnic group and may suffer discrimination based on physical and/or cultural traits	7	February 16, 2023
Recent Immigrants	Culturally appropriate transportation with sufficient access to information	Immigrated to Canada in the last 3 years	8	February 21, 2023
Parents/Guardians of Young Children	Children-friendly transportation services and infrastructure	Parent/guardian of at least one child under the age of 18	6	February 22, 2023
Women	Transportation services that are safe, reliable, and effective	Identify as a woman	6	February 23, 2023
		<b>Total</b>	52	

\* Further discussion of the equity needs of underserved populations in emergencies can be found in Fothergill, Maestas, and Darlington (1999); Renne, Sanchez, and Litman (2011); Sanchez and Brenman (2008); Wong (2020)

## 2. METHODS

To directly hear perspectives, we conducted 1.5-hour focus groups with eight different vulnerable and underserved populations in Edmonton, Canada, a mid-sized city with moderate hazard risks. The City of Edmonton is interested in retrofitting existing buildings and designing future buildings to handle climate threats and build social cohesion. A key goal is to assist underserved populations, who are spatially and demographically diverse. Sessions were virtual to reduce travel barriers and were conducted in February 2023 ([Table 1](#)). Participants were asked questions through a semi-structured approach regarding personal modes of transportation, resilience hub placement, and potential services. To uncover key themes, we created a codebook of resilience hub concepts that we used to conduct a thematic analysis through an interview analysis software called MAXQDA. We focus on the coding results, while the supplementary material includes supporting quotes. Future research could expand the number of focus groups, increase the number of participants, and collect information to identify intersectionality.

## 3. FINDINGS

### *Mode of Transportation*

Of the 216 code segments related to resilience hubs and transportation modes across the eight groups, 38% of the codes were focused on public transit, 28% on walking, and 19% on driving a personal vehicle ([Figure 1](#)). Participants

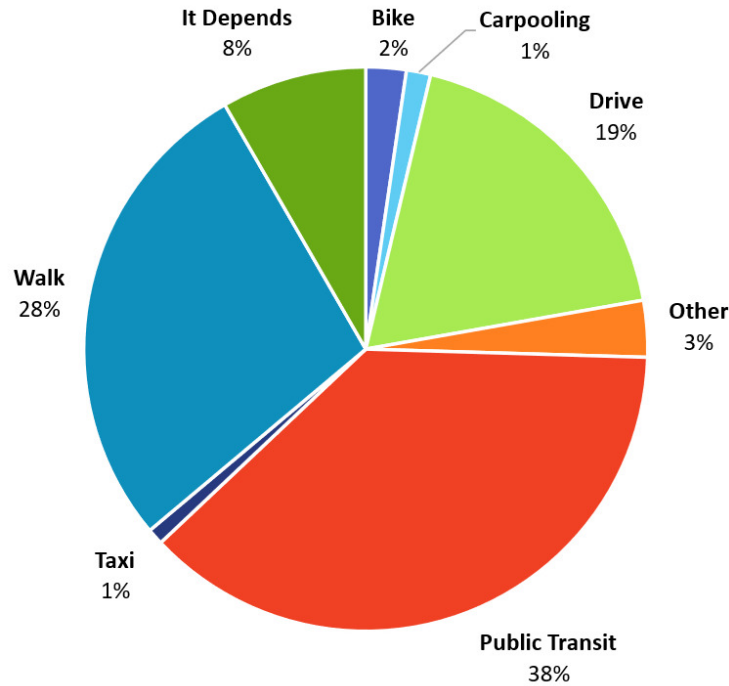


Figure 1. Distribution of codes related to transportation to resilience hubs (n = 216 code segments)

consistently discussed their preference for public transit or walking due to accessibility and affordability during normal conditions, even though 77.6% of all trips in Edmonton in 2015 were taken by private vehicle (City of Edmonton 2018). For disaster situations, most participants said they would not take public transit due to concerns about speed, comfort, personal control, and traveling with children or personal items. A few participants still preferred to take public transit during disaster situations due to fears of driving in dangerous and congested road conditions and feeling safer among people who could help them. Broken down by focus group ([Table 2](#)), some groups heavily preferred public transit (e.g., recent immigrants, older adults), while other groups discussed walking more regularly (e.g., carless, women). Households with children discussed driving the most, some explaining that traveling on public transit with children can be challenging. Participants also tended to contextualize their responses based on the situation ([SM Table 1](#)). For example, some people would only take public transit or walk if a resilience hub was near their residence or if they were traveling alone. Taken together, the results indicate that equitable resilience hubs should be easily accessible by a variety of modes, with an emphasis on public transit or by foot (Baja 2019; Ciriaco and Wong 2022).

### ***Hub Placement and Features***

Underserved populations preferred the placement of resilience hubs in a variety of pre-existing places, particularly community halls/leagues, recreation centers, places of worship, and universities/schools ([Figure 2](#)). Overall, underserved populations prioritized resilience hub placement in buildings where people generally meet, socialize, or receive services (e.g., education, recreation),

Focus Group	Public Transit	Walk	Drive	It Depends	Bike	Other	Car-pooling	Taxi
Older adults	16	2	3	4	0	1	0	0
Children in household	15	8	11	3	0	2	0	1
Recent immigrants	15	1	6	0	4	0	0	0
Carless/poor mobility	10	14	4	0	0	3	0	0
Lower-income households	7	6	4	1	0	0	1	0
Racial and ethnic minorities	7	13	5	4	0	0	2	0
Individuals with disabilities	6	3	5	6	0	0	0	0
Women	5	13	2	0	1	1	0	1

Table 2. Distribution of codes discussing modes

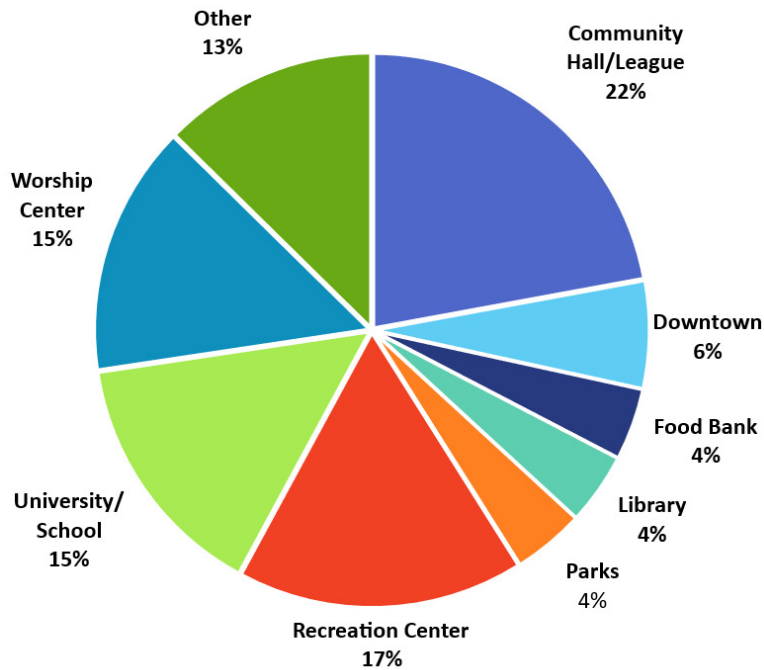


Figure 2. Distribution of codes related to suggested resilience hub placement (n = 95 code segments)

aligning with previous literature (Baja 2019; Sandoval 2019; Kirwan et al. 2021; Mardis et al. 2021). Collectively, the underserved groups did not prefer one type of place over another, indicating that placement may depend on specific neighborhood characteristics ([SM Table 2](#)).

Focusing on resilience hub features ([Table 2](#)), we coded 385 instances across the eight focus groups where features were mentioned or discussed. All groups valued places that were easy to reach and consistently discussed resilience hub locations close to their neighborhood or residence (i.e., 42 of the 385). Another 36 of the 385 segments involved the ease of reaching a hub ([Table 2](#)). Aligning

Table 3. Distribution of codes of suggested features of resilience hubs mentioned more than 10 times (n = 385 code segments)

Suggested hub features by underserved populations (over ten segments total)	Mentions (segments)
Close to Neighborhoods/Residences	42
Basic Needs (Food, Water, Clothing, Shelter)	39
Accessibility and Ease of Reach	36
Accessibility and Special Needs Accommodations	30
Safety	22
Spaces for Children	22
Spacious	20
Parking Spaces	17
Emergency Preparedness Training	16
Staff/Volunteers	15
Familiarity	13
Services for Newcomers	13
Comfort	12
Information/Communication Centers	12
Close to Public Transit	10

with Baja (2019), multiple participants discussed preferring resilience hubs in multiple urban neighborhoods for walkability, low transportation costs, and multiple modal options. Special accommodations related to disability and accessibility (e.g., ramps, elevators, handicap-accessible features) were talked about often ([SM Table 3](#)). Sufficient parking at resilience hubs was also specified (17 segments), which aligns with the higher mode choice for driving during disaster conditions. However, hub features related to public transit and active transportation were only briefly mentioned overall. In addition to transportation, participants also consistently noted other features, focusing on necessities, safety measures, adequate space (especially for childcare), emergency preparedness training, and staff/volunteers. These results align with discussions in existing literature (Kirwan et al. 2021; Mardis et al. 2021), while also showing a need for transportation accessibility and infrastructure.

Overall, the findings provide important evidence for designing resilience hubs that are: 1) highly accessible, 2) neighborhood-specific, and 3) integrated with the existing transportation system, even for auto-dependent urban environments. We recommend that pre-planning public transit responses (Ciriaco and Wong 2022), along with infrastructure changes (e.g., bus shelters, wider sidewalks, improved crosswalks) can begin aligning underserved populations' needs and mode choice with resilience hub design for both daily and disaster situations.

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## **SUPPLEMENTARY MATERIAL**

This section provides additional insights from the eight focus groups using respondents' quotes. The transcription of the focus groups did not include filler words so the quotes have already been edited for clarity. The grammar of the quotes, beyond filler words and small researcher clarifications, has not been changed.



SM Table 1. Quotes about Mode of Transportation to Resilience Hubs

Focus Group Population	Key Quotes
Carless Residents	<p>"It depends on the location for me. I use the train and I use the bus, too. Most times, I prefer the train because, for me, I don't know, it's comfortable maybe because of the subway. It's just cool for me. It depends on the extent of the disaster, and the location of the resilience hub. If there's none, I'll walk. That's why I need it close by."</p> <p>"I'll definitely walk, no matter how far. I think I'll just walk. I think it might be safer that way, so I'll just walk."</p> <p>"Most of the time, I don't have bus fare available, so I'll walk [...]. In a disaster scenario, like I said, I would want to walk. Hopefully, I would walk. I would walk because I'd be interested in helping out my neighbors. I can't do anything to help myself, but I'll walk a mile to help somebody else."</p>
Individuals with Disabilities	<p>"I would drive. Even though I'm close, I would drive around the block to get to it. Especially if I was going there in case of a disaster and having to haul back some water or something, so I would take my car."</p> <p>"For me, it depends if I'm going alone or if you're going with maybe family. If I'm going alone, I'll obviously take a bus, but if I'm going with family, I'll definitely drive."</p> <p>"If the natural disaster was too close to my place, knowing what it is, I would not be walking." <i>Moderator: Why would that be the case?</i> "I am legally blind. Not knowing where it's at or what is happening would prevent me from walking."</p>
Older Adults	<p>"To me, I think it's flexible. I might want it both, depending. I might still drive or take a walk. I think it all depends on the distance to the Resilience Hub. Also, the weather as of the time. I would not want to get stuck in wet weather in the bus. I will be uncomfortable. I would love to walk if everything was okay and the distance was not that far from my house."</p> <p>"I think like I said it is very disaster dependent, for example a situation where it only affected the area I live and then without affecting the roads, in that case I prefer to use a bus where I can easily get to the destination as soon as possible."</p> <p>"For me, my preference over my personal vehicle would be the fact that I will be taken care of in a bus. There will be maybe some trained professional to handle the situation, that way I feel more safer. If there were any crisis both health-wise or otherwise, they will know what to do and the bus has to be extremely comfortable because I wouldn't give up my car for anything less. I would actually want something that I cannot give myself or something I don't already have, which is taking good care of myself. At this age is really, really difficult to do other things for yourself, especially driving can be very hard or can be quite unsafe in situations like this."</p>
Lower-Income Households	<p>"I do drive, so yes, if the car is available, I will, but if it's not, I will take a bus. If close by my house, like five minutes, ten minutes-ish walk, and it's summertime, I will prefer walk."</p> <p>"If it's evacuation, I know it's an emergency, I'll definitely want to move faster, so walking would definitely be not the option. Bus, it takes time because again, you have to stop. Driving will be better."</p> <p>"As for me, I don't have an option other than the public transportation because I even don't have a driver license, I don't have a car. I'll stick with public transportation. This is the only choice I have."</p>
Racial and Ethnic Minorities	<p>"I think that's why I would pick the bus over the train. At least with the bus, you have control over-- the driver has control over how to maneuver the bus, unlike a train that is programmed to go one way or another. That's why I pick the bus over a train or any other means."</p> <p>"If it's closer, of course, I would prefer option of walking, but considering our weather conditions sometimes it is not possible. I would prefer train, ease of access, and being there faster. Otherwise, if it's summer, then would be walking definitely."</p> <p>"For me, I'll go with anything that is available. If it's the fastest to drive, I'll go with the car. If it's not, I'll go with the fastest and best available option for me."</p>
Recent Immigrants	<p>"For me, I think for the mode of transportation, it'll be walking, because I know the public transportation would be meant for the old, the aged, the disabled, and the children. I believe for the adults who are strong and have a lot of strength, the mode of transportation for us should be by walking."</p> <p>"I'd actually like to say, it would still be my car. I would still prefer to drive if I can. Then it would depend on is it an emergency evacuation, am I able to pick a few things to come with? If I have to do that thing, I have more than one bag to carry, but at the most, what could also happen is if it's not exactly within my community where I can walk to, I can also carpool with maybe one or</p>

Focus Group Population	Key Quotes
	<p>two neighbors. That way, we don't have three cars driving to the place, we have one car taking three families if possible."</p> <p>"For me, it depends on the scenario. If the resilience center is very close to me, I think I would walk, but if it's somewhere very far from my community, I would drive, and possibly, just like the other lady said, I will drive and will have a shared drive with the neighbors. That will actually reduce the number of people struggling for the public transport and reduce the number of people having to walk."</p>
Parents/ Guardians of Young Children	<p>"I'll drive, it's easier to drive with kids. Especially when you have multiple kids, thanks to cars, so I'll drive."</p> <p>"Yes, I will drive too. It also depends on the location of this hub. If it's in a neighborhood really close to me, I would choose to ride a bicycle in the summertime, but if not in my neighborhood, I wouldn't feel safe riding a bicycle on the main roads, so I will probably drive."</p> <p>"Everybody shouldn't be driving when there's an issue like that. There should be a shuttle for service or something like that. Driving will create panic or unnecessary traffic, but if a shuttle bus is able to take 10-20 people at once, it cuts down a lot of people wanting to drive. Yes, definitely people shouldn't drive. Buses."</p>
Women	<p>"Walking distance or bicycles in a normal day, but if it's a winter day, drive, I guess, or not even go."</p> <p>"This is just the worst-case scenario kind of thing, the whole getting on the bus thing."</p> <p>"Actually, I am more in support of walking. For driving, because of the parking issues, I don't think it's a good option...I think recently there was a program where they provided free busing."</p>

SM Table 2. Quotes about Resilience Hub Placement

Focus Group Population	Key Quotes
Carless Residents	<p>"I think somewhere that is accessible to everyone, because anything can happen. Any disaster can just happen, so I think somewhere that will be accessible to everyone, maybe like an evacuation shelter. We can have one in Downtown, have one in Southwest, have one in Northwest, just around Edmonton like that, so that for those that are living in Southwest will have access to the one in Southwest."</p> <p>"I would say resilience hub [...] in my area anyway, probably make use of the university grounds just because it is large, well-served by transit. There's also the transit center itself, the LRT, that's close by, four blocks or so."</p> <p>"I said sports, sporting facilities, maybe like a game room, lounge, maybe a community garden, things like that, just to make life comfortable for the people in the hub."</p>
Individuals with Disabilities	<p>"For me, I think, we also have a community center but I think there's a nearby school that I feel a bit large to accommodate more people."</p> <p>"Yes, it would depend on how long to get to the place whether you're taking a bus or if you're driving in a vehicle or even walking. For myself, I can walk to the community center but if it was further away, I have a vehicle so I wouldn't be in a situation where it would be taking a bus and having to change buses and that kind of stuff and it wouldn't make for a long trip."</p> <p>"Well, I also drive so I could go somewhere that was further with my family, but I would prefer something local in the community so I could see what's going on in my neighborhood at the same time."</p>
Older Adults	<p>"I think I will love to recommend [...] trusted and well-utilized sites. For example, you'll need to identify site where community member are already good and trusted. Maybe for example, we have the community centers and the health centers, places of worship, or any recreation facilities."</p> <p>"I think for me accessibility to flexibility for the transport system. Would I be able to get air, bus or a car whenever I want to? Would there be pickup stations? How far would they be from houses or from wherever I'm coming from? How long do I have to walk? I think all of this needs to be considered as well. I think for me accessibility to flexibility for the transport system."</p> <p>"My comments are based on the fact that I'm assuming that the locations that are near me are all within walking distance. There's probably lots of areas of the city where the city would probably have to put on additional buses right away and have them going around and picking people up. You can't just wait for the hourly bus that comes by."</p>
Lower-Income Households	<p>"There are a lot of people going to food bank. It's not only for homeless, but those people who have a breakdown with financial issue, and it's just happen all of a sudden, that is a quick way for you to get food and accommodate yourself for the moment until you adjust yourself financially or you're stable. I feel like that is a quick way to help community around."</p> <p>"Churches, like my church as well. Where my church is situated there are a lot of buildings there, offices, and we have a huge parking lot as well. The offices can be opened up for it to be a safe place when there's a disaster."</p> <p>"Yes, it's like a community center. We go in there, there's a swimming pool, there's a place where you do exercise, like a gym. They have different things where you want to learn, exercising. I believe that place is big enough for people to stay and coordination if there's a disaster or emergency or something."</p>
Racial and Ethnic Minorities	<p>"I'm thinking of community league centers. They are roofed and walled, and people have all sorts of occasions, meetings for residential associations in there as well. This can be converted into an emergency hub for attending to people if there's any need for such."</p> <p>"I just wanted to quickly add the arenas, like Rogers Arena, like stadium where it's a huge space, can accommodate a lot of people. There's already washrooms, I'm assuming kitchens. It's accessible by LRT, bus stations. That's what comes to my mind as well. That kind of spaces."</p> <p>"Something that majority of people will know right away, especially in terms of emergency, you don't have to Google, you don't have to find the address, so then you can directly go there. I like the idea of an awareness like advertisement, from get-go this has to be advertised everywhere that these are the major hubs, these are the resilient hubs that you need to go to."</p>
Recent Immigrants	<p>"I would say maybe somewhere in or close to the firehouses because they are already first responders. I believe they're well-equipped with the training and tools necessary in situations where everybody needs to move to a location. Maybe there's flood in some area or there is power outage or something like that, so I believe in and around firehouses could be a good place to have a resilience hub."</p>

Focus Group Population	Key Quotes
	<p>"Then this is the place where you can stay for one, two nights, like that. I'm not sure if it's same here in Edmonton, because from back home, that's what I understood from this community centers."</p> <p>"I've been racking my head to see if there's a place around Windermere and nothing comes to mind, but I think maybe building an underground bunker in an open space."</p>
Parents/ Guardians of Young Children	<p>"I would say religious places like different churches or mosques because people go there to worship. Temples, people are always there. Everybody knows where they can find a church, where they can find a mosque, where they can find a temple in the community."</p> <p>"Also a rec center, that's recreation centers. Lots of parents go there, children usually have stuff going on there, and it's usually large. It's very large, and I think it would be a good place to have something like that as it's easily accessible. You have a lot around Edmonton."</p> <p>"I just wanted to add that we could use community schools too. I know in older areas, you find many schools. It's just that the newer areas in town have more...most schools they have halls and they have classrooms which are already originally designed to have kids in them."</p>
Women	<p>"We already used the community school for a lot of things like when we do bottle drives or a picnic, or I don't know, the summer, skating this winter, and all that. Whether it's the school playground or the school environment itself. People are drawn there already, and it's diverse. That's why I thought maybe our community school might be a good place for that."</p> <p>"Worship center in the sense that, for instance, in my area, we've got a very big mosque. In times of extreme weathers like this, they usually open the mosque 24/7. They allow people to come in there. They feed and clothe people."</p>

SM Table 3. Quotes about Resilience Hub Features

Focus Group Population	Key Quotes
Carless Residents	<p>"I think I would suggest they have emergency vehicles, like ambulances, that could just come around to pick people in case of accidents, or make some way you can just easily pick up a wheelchair to probably pick a neighbor."</p> <p>"Buses would be assigned districts. They wouldn't maintain their normal schedule. They would revert to basically going up and down the streets, stopping at a school. They would basically slip back in the good old days of DART buses where they'd come down your house and pick you up."</p> <p>"You need to be able to process, perhaps depending on the area, a large amount of people in a very short amount of time. Some people, depending on the nature of the disaster, may be arriving there in vehicles."</p>
Individuals with Disabilities	<p>"To follow up on that muster point, you could have areas where you collect people, put them on ETS bus or school bus and then take them to a resilience hub because you might have too many people at one hub and need to spread them out. You might need to use a bus to do that."</p> <p>"They should also make sure everything is wheelchair accessible as well because you are going to have people who can't walk, who can't drive. They're in wheelchairs and there has to be something for them as well."</p> <p>"Its impact is great because setting up a resilience hub, you have to think of everyone inclusive maybe from the community because of the accessibility for people with disabilities, everybody. Someone may choose not to board a bus, you have to make sure that them using a bike or maybe something of the sort can get there. Somebody may choose to walk there. People may choose to use other means of transport."</p>
Older Adults	<p>"[We should have] safe public transport services to these hubs, parking for private vehicles, and easy access for folks with mobility issues and mental health stress."</p> <p>"I wonder if there needs to be consideration for bus parking at a hub in the event that people are dropped off, but buses need to stand by in case of quick transfer to a safer location?"</p> <p>"Any other consideration I think is ability to transport handicapped or injured people. Someone mentioned childcare as well. I think you need to have some ability to be able to deal with large numbers of children where you're trying to control the rest of the crowd and provide information to adults."</p>
Lower-Income Households	<p>"For me, I think the bus frequency, because sometimes there's some buses, if you lose a bus, you have to wait an hour, so they improve that, the waiting for the next bus. I think this one is for better accessibility."</p> <p>"What I'm thinking of right now that just came to my mind is on days like that maybe when there's a disaster, I really hope that the buses won't be concerned about if you have a bus pass or not, that it will be waived, that just you guys can just come in."</p> <p>"Transportation is an important thing. In a situation like this, we never can tell when things might happen or things might go wrong or something. If we actually come out all in groups and there is no bus available, it's just going to be a double bad situation. Like Fatmata said, it should be readily available 24/7. It should be available on standby."</p>
Racial and Ethnic Minorities	<p>"I like that idea of being together. I had that mind. I don't want to be alone when facing those kind of situation. I would prefer to be somewhere where there are others, or if something happens, I might be able to get help. An idea comes to my mind when in those cases, you said, what would encourage you to take public transportation? Maybe if the buses will be dispatched in neighborhoods to pick people up in those kind of scenarios, then I would definitely run and just go inside a bus, just going to take me to the closest resilience hub."</p> <p>"For me, there's just a bus stop just in front of the park I mentioned earlier. It's really accessible to public transport. Then the religious center. I for one, my church, there's actually a bus stop close to it as well. In one minute, you are inside the church from the bus stop. I guess it is accessible."</p> <p>"I'm thinking if those places are not wheelchair-accessible, they should be made wheelchair-accessible so that people who use those kind of aids can be able to get into those facilities."</p>
Recent Immigrants	<p>"In addition, for the public transportation, I think warm stations during winter needs to be considered because not all the bus station or station for public transportation are very easy or comfortable to be in, especially during winter, because it's hard to be someone who's always taking public transportation."</p> <p>"I think for the accessibility for everyone, just like the ramps, the open space or open doors."</p>

Focus Group Population	Key Quotes
	<p>For example, during the evacuation, to be able to avoid more emergencies or more disaster that's coming, maybe more open space if it's possible."</p> <p>"I think I'd like to add that the resilience hub itself should be a welcoming place where I feel others are safe, I feel safe going there, knowing that I am really going to be safe. A place I'm going to feel comfortable, regardless of who I am, race, age, ethnicity, and all that. It needs to really, really be a warm, welcoming, comforting place for me to stay."</p>
Parents/ Guardians of Young Children	<p>"Yes, somewhere easily accessible because not everybody can afford a car, and not everybody drives. You also want to make it easily accessible for all, even if you drive or areas that have bus routes so that anybody coming from any part of town can easily access it."</p> <p>"Well, if there's a bike lane, I would feel a lot safer to ride a bicycle. Also, for people who like to drive, a parking lot that's big enough to accommodate all the cars would be helpful."</p> <p>"Also providing ramps where people on wheelchair or people with strollers for their kids actually double strollers and the rest."</p>
Women	<p>"Convenience. It's like pick the reasonable location for people at least to- reachable. Not too far. I guess it cannot be close to everyone, but it's a reasonable distance for people to reach."</p> <p>"Transportation should play, of course, a very major role because if the thought of getting out to the place is already discouraging, then purpose is certainly defeated in a way. I don't really know how to answer the question, but I feel like transportation should come to the forefront as well when you're thinking about design."</p> <p>"I was just thinking of that hub provided information on what to do when faced with, "Oh, when you don't have heat, what do you do?" Or something like that."</p>

## SUPPLEMENTARY MATERIALS

### **Supplementary Material - Wan and Wong (2023)**

Download: <https://findingspress.org/article/91270-equity-in-resilience-hub-design-and-transportation-through-community-discussions/attachment/189864.pdf>

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