JEANNE: Welcome to Move the Era Podcast, I'm you're host, Jeanne Acutanza. Join me when I chat with Dr. Anne Goodchild, a professor of civil and environmental engineering who founded the Supply Chain Transportation and Logistics Center at the University of Washington. She also advises the work of the Urban Freight Lab and oversees cutting edge research in the area of urban freight. We'll talk about the incredible growth in urban freight during the pandemic and how the pandemic may have been the disrupter we needed to change the future of transportation.

JEANNE: My guest today is Dr. Anne Goodchild. She leads the University of Washington Supply Chain Transportation Logistics program and also launched the Urban Freight Lab, which is a very unique program at the University of Washington, working with private industry plus the port and the City of Seattle, or public agencies. She comes from UC Berkeley and she's done a lot of early research, and we know each other because we were both on the City of Seattle Freight Advisory Board. Welcome.

ANNE: Thank you. Thanks for the invitation.

JEANNE: So, supply chain transportation logistics…can you tell us a little bit about that?

ANNE: Yeah. I also think terms like supply chain transportation logistics actually we don't have really standard definitions for them. So, there does tend to be in different communities, transportation means something different to a supply chain manager then a naval officer. So, I think it's important that we establish how we're going to talk about it today anyways. So, really, I would say, supply chain transportation logistics is the planning and implementation of goods movement. So often when we use the word supply chain we're really talking about individual companies, and how they might plan and operate a specific movement of goods, so their Walmart or their Pepsi. And logistics and transportation tend to be a little different in different communities but for us, we're really talking about the actual movement of goods because supply chains involve a lot of other elements like legal elements, trade policy, labor, and management, whereas at The Center, at the University Washington, we're really focused on the movement of goods and so the logistics of that, the planning and the tools around it and then the literal transportation of those goods.

JEANNE: And give us a little history on the program at University of Washington. It's still fairly new and unique.

ANNE: Yeah, well I think the world of supply chain management has been evolving and maybe about 20 years ago became something that you could study at a university. And, , that's sometimes in business schools, that's sometimes in industrial engineering, but when I launched a master's degree, we have a supply chain transportation logistics master's degree at University of Washington, when we started talking about that it was 10 to 13, years ago. And part of our motivation was that most people working in the field have been trained on the job, they weren't trained in some formal training context, and the world of supply chain had increasingly adopted these technologies, which brought data and really was transforming how people were able to understand it and operate it and we saw an opportunity to help people adopt those skills in a more concentrated way in a more formal setting. You can learn them, , at work, but it takes longer because they're also doing your job at the same time. So, , a lot of the people that were interested in our program had been working in the field, but were also interested in getting ahead by understanding exactly what the tools and technology were that were really going to allow them to do something substantially different or better in their professional environment. So that was the motivation for our master's program. We really felt like this was a quickly evolving field that a lot of

people wanted concentrated and formal training in and there really wasn't a lot of availability. A lot has changed in the last decade, there's a number of universities in the state of Washington where you can do an undergraduate degree in supply chain management now. And so, there's just been a lot of growth in in training and it's been a really important field, particularly in the last year. We've really asked supply chains to adapt very quickly to changing circumstances and sometimes very difficult circumstances, and so there's a lot that we wanted to bring as researchers as methodological specialists, this is the field that we want to support we want to bring the tools and the training that we have, and help this field thrive, help people in that field thrive and help, where we can, to find improvements. So, it's also a sector that produces a lot of co2 emissions, and creates traffic creates noise. And so, we want to help that field grow, help that field thrive while trying to mitigate some of the negative impacts that movement and energy use has on communities.

JEANNE: Yeah, and I would say about a year ago, supply chain became under the microscope when people were trying to figure out how to move PPT and COVID tests and also the pressures put on the system from everyone working from home and having their delivery. So, can you tell us a little bit about how it not only affected our lives during the pandemic, but every day?

ANNE: Yeah, I mean I would say that the transportation logistics world is very adaptive, and they are constantly adjusting to changing environments, right? The fuel prices change, there's a shortage of this product, there's population growth in one area, there's a snowstorm…it's a field that relies a lot on day-to- day decision making and adaptation. And they've been investing for decades in the upstream technology that has allowed things like e-commerce, which is not an accident. It reflects decades of investments in information technology, in sensor system, in automated decision making. So, it's an industry that's been investing and been lively and adapting for many years and that's what's gotten us here, that's why we find ourselves able to sit in our house, and order gators in a youth size on a Friday in April and have them delivered the next day. Sometimes I think people forget how we got here, and we got here because there's a long history of this kind of behavior and innovation and an acquisition of new tools, and that also reflects that it's a highly competitive environment because companies have to do to survive. And they've been pushing the envelope all along. I would also say that I'm a civil engineer and the reason we studied this is because provisioning people…I can live in a city because of the supply chain transportation logistics system, because I'm not self-sufficient I don't grow and produce everything that I need. I rely on this system to live, so it's a really important civil system and so is waste removal and recycling and compost. Those are really essential services for cities, and yet we really haven't prioritized them as such from a public policymaking standpoint. So, that world has been very independent, has made it work, we built roads for commuters and they figured out how to use them to do what they needed to do. So, all that to say, I think, actually, I'm not that surprised that the universe was ready. Their nature is to adapt, and to shift, and to change, and to be creative, and I love that about this industry. That's one of the reasons that I enjoy it. I love seeing how quickly decisions can be made, and resources can be reallocated. So, yeah huge shifts. The other way you can thrive and survive as an operator is being able to predict what's going to happen tomorrow and allocating just the right resource, so not too much because that's wasting money and not too long because you'll disappoint your customers, but just the right amount, and knowing your business, knowing how often things happen, has really been necessary to compete. And yet when the pandemic hit tremendous shift, and we see, like, I didn't go to the office, and I stayed home, and that's my first level of thinking but then what that meant is that food didn't need to be delivered to campus, and instead I was actually buying it from the

grocery store. And so, somebody who used to be bringing food to campus doesn't need to do that anymore, and more food needs to be taken to the grocery store. But those are big changes, those are really substantial shifts in demand, and that we also had pretty substantial shifts in supply, if a factory wasn't able to produce products because they were shut down or large numbers of employees were not able to get to work. So, I think it's hard to really understand as a lay person just how significant those changes are and what it takes to manage them. I think it's remarkable how little my own consumption needed to change, and I know people say, we went to the grocery store and all the flour was in a brown bag instead of those branded bags that used to be there, like, there was still flour, which means that somebody thought, "Oh my gosh, more people are buying flour, the factory that makes the bags doesn't know that more people are buying flour and doesn't have the capability because they were operating at 80% because that's what it was efficient for them to do them, now have the capacity to make twice as many bags. So, let's go with your bags from someone else who has extra bags I mean there's a lot of calling and decision making and creative ideas and resources shifting a lot of what I think were remarkably normal conditions for the fact that across the country we shut down businesses.

JEANNE: Except for the couple upfront, lack of toilet paper on the shelves, which I think worked itself out. I think I agree with you. It is amazing that I could get someone to deliver things to my house that I just tended to need like a speaker for my laptop and, and all the accoutrements that you needed to work from home or a new chair and things like that. So yeah, you're right it is stunningly remarkable and only people really understand it. But also, I don't think we wouldn't be anywhere with the discussion right now about the infrastructure bill and broadband infrastructure, internet infrastructure. By far, we wouldn't be doing any of these things without this this wealth of information and data and the internet.

ANNE: It's true. I guess the other thing I would say is that, , I, as an educator and research manager worked from home, and there were many jobs where people worked from home, but half of all workers did not stop going to work and in the transportation field that's a lot of people who were working in warehouses, who were driving vehicles, who were working in retail stores and, , they really put themselves at risk to do that for us.

JEANNE: Yeah, and I don't think that's really, like you are alluding to, I don't think it's understood or appreciated as much as we will. I know that in looking at transit lines for example, the transit lines that served essential workers were the ones that were that were always full.

ANNE: Yeah.

JEANNE: But on the other hand, I know also know that freight increased or the movement of freight and goods. I've seen something at the airport that they had a 23 or 22% increase in cargo, whereas they bottomed out as far as passengers.

ANNE: Yeah, well , people were still eating, right? Some things we bought more of some of the things we bought less of, but we also had to eat. Apparently, someone was eating more. (laughs)
But, the food still got to where it was going, it just some different paths and. So, lot of the stuff we're buying online and we're also having things brought to our homes, and a lot of what happened was a substitution of some kind of delivery service for our own personal travel. And yeah, that's the end of the supply chain that's highly disaggregated and so that did really change travel patterns at in that final model.

JEANNE: Yeah, and I was shocked at how many times a truck would come to our house in a week or even in a day. Where do you find your students? Where do they come to you from? You mentioned a little bit about that.

ANNE: Yeah, so I have a number of student populations. I teach and online master's program who are professionals and largely they all have experience in supply chain transportation and or logistics, so they are working full time, I'd say the majority of them work for shippers. So, people that procure goods as part of either retail or manufacturing. Some of them work for carriers, so they're actually moving goods. Some of them work for railroads or trucking companies, some of them work for technology companies in this space, so they're quite mature supply chain professionals. But then I also they teach in our on-campus programs and we have undergraduate students that learn about transportation engineering. So, originally as a civil engineer that curriculum was more about physically designing a transportation infrastructure, roads, bridges, railroad crossings, but is increasingly really about data and operations management. So, how do we tall facilities, both, what's that technology what's that sensor, how is that data used to set prices, what does drop a condition look like, how much co2 emissions are we producing, how do you set signal turning to minimize delays, so more about data and operations. And those students have engineering backgrounds, typically, but then at the graduate level I do have quite a mix. So, we have some students who come to this from an industrial engineering standpoint, so they have routing and scheduling and optimization skills. We also have students that come from an urban planning perspective that want to learn about how people make decisions about goods movements so that they can apply that to their decision making as city planners or regional planners. I've had some students from the business school who are doing more enterprise level, decision making, so they're going to do transportation or operations management for a business, and I teach some classes about the tools for both enterprise decision making, but also what happens when we aggregate across all those enterprises so what tools do we have to try to anticipate, what regional freight demand is going to be. And there's this feedback because transport is something like my plans have to be informed by traffic now and my plans are actually dependent on what everyone else is choosing to do. So, we kind of focused on that interaction between the individual supply chains and how they make decisions but then this feedback between them and the system and how we can get the system to work even though individuals are all making individual decisions.

JEANNE: I know there's so much hot topic about the curbside, right. So, we'll talk about your 50 feet and all of the information for curbside. I think what you were saying about working amongst the different departments…I know University of Washington also does a lot of business accelerator work like working in labs, is that something that's part of what you do also or is that something in the Urban Fright Lab that they participate in fright lab that they participate in?

ANNE: Kind of, yeah. So, at the University of Washington, we have something called the Mobility Innovation Center, which has worked to really connect local, but they're multinational, companies with their university resources. So, research skills or expertise. And so that's been specific research projects that we've done, we've done some projects with Amazon locally, but also, they have some student competitions and they're in the commercialization side of the university. But then, we do have some startups, some curbside technology firms, that are members of the Urban Freight Lab and have been members of the Urban Freight Lab. And yeah, we really want to help those companies access the domain knowledge that they need to develop effective tools, we want to help catalyze those tech companies and also help build solutions that really work for industry. So, if we are able to connect them

with the users of those systems and understand them better, we feel like that's a valuable contribution. And we run something every year called Tech Day, which helps to connect venture capital city staff, and these technology companies in a competition and an exchange. Cities don't always have the resources of just numbers of people, but also their expertise to screen and filter all of the new technologies and ideas that are out there. So, that's been another place where we felt like we could contribute and help evaluate some of these proposals and give an opportunity for mutual exchange of information. And so, through that process we've I think helped educate and inform and hopefully help product refinement and education on the on the city side.

JEANNE: Tell us about the Final 50 Feet. I know for our audience, they kind of understand that how transportation works… you pull up and you're going end to end, but the Final 50 Feet was a really innovative, interesting research project that you guys did not just to look at how you get to a place but how you get to the door and deliver and the implications of or the benefits of that.

ANNE: Yeah, well, so we coined the term final 50 feet and what happened was I we really started focusing on urban freight and really started collecting data in detailed and robust ways about truck behavior. And we realized, generally, most people want trucks to get their work done and move on. So, one of our goals was figure out why do truck sit at the curve for as long as they do and so we do these very detailed studies of what happens once the driver's outside of the truck. And we discovered that in an urban area, the vast majority of a driver's time is not spent driving, it's spent getting out of the vehicle walking into the building, finding the recipient, there's a signature, and then walking back out, and it varies depending on the kind of building, but it's the majority of their time and the other big inefficiency we saw was that drivers don't have specific places to park. So, every time they arrive somewhere, they're looking for a parking spot. And every time, every day that they do it they don't know what they're going to find. So, imagine trying to plan a route where every day you had this huge uncertainty about that, yet that's your job is to do that efficiently. And it's crazy that you have to take on that risk and that uncertainty. So, what we learned was that really urban delivery is not a routing problem, it's not a scheduling problem, it's a parking problem. And, yeah, there's this obsession. If you look at the last mile delivery literature, that's all about the vehicles and how can I get a more optimal route and can I get a more optimal assignment of customers to vehicles and could I add two more packages into this truck, and you're really not going to make a big impact with any of that because it's it's 20% of your time and 80% of your time is independent of all of that vehicle activity. So, we really shifted the focus, and said, if we want to have a big impact, if we want to improve efficiency reduce downtime, reduce vehicle miles and co2 in the last month and we have to think about what's happening outside of the vehicle. And we were the first people to do that and to make it clear and to have data to show that that was important. So, the other thing I guess the other lens or way you can think about it is that we really tried to focus on the goods and the same way with people. It's not that vehicles want to get places, it's that people want to get places but often we limit ourselves and we just think about getting cars to their destination and when we do that, we come up with some of the wrong solutions. So, in our freight world we wanted to focus on getting the goods to their destination, not just moving trucks around, which, , we generally found was the way people were still thinking about goods movement. And so, adding this last piece, which is the bulk of your time, was missing from those conversations. There are also other reasons…it's hard and slow getting that data. You need to track big metal objects that have Bluetooth signals emanating from them. That's not easy to track people. There's real complexity of who owns those spaces. There's public curb, there's sidewalk, there's private

buildings. So, it's quite cumbersome and slow and we have to put in a lot more effort get one nugget of result. But, , our focus was really studying the things that matter. And when you look at it that way there just was no choice. So that was what led us to the Final 50 Feet and. And then we started by really trying to do a thorough job of collecting data about that because there was not a lot. Well, there's not any kind of systematic data sources to study that problem. And then, once we had that data understanding we really tried to focus on solutions. So, what kinds of technologies would improve this, could we test them ourselves, which we've done and are still doing, and really get evidence that we could come up with some better ways, or ways that we're good for as far as we could tell all participants and also going to reduce traffic, reduce co2 emissions, reduce the impact on other roadway users.

JEANNE: And I'll say that in certain cities, there's that precious load zone versus the alley and I've heard cities say, "Well we don't need those alleys because we have the load zones" and at the same time we hear, "Well, we don't need those loads zones because we have the alleys".

ANNE: So, yeah, so you raise a good point that I should comment on and that was yes, that one of the other things we saw when we first started to study this problem was a lack of really knowledge of the network. So, people thinking about individual pieces because… and it largely reflects the organizational approach we have to managing it. There's people who think about curb space and that's their focus and so they're not thinking about alleyways. And we really wanted to help move our collective conversation to this idea of a network where we have some curb and we have some off-street parking and we have some alleys and if we try to move one, if we modify one, it's going to have these impacts on the other. But we really lacked data, even about the fundamental like what do we have and where is it? Measuring things that move is harder, measuring vehicles is harder, but the first step is just knowing what physical assets we have, like, is there an alleyway on this block, and is that documented in the accurate digital representation and available to people? So, to this day actually a lot of what's going on, is just digitally mapping what physical assets we have. And you can't really take the second step until you do that.

 JEANNE: Yeah, I know. Seattle is lucky that you guys did so much of that work for them because I don't think there's a lot of communities that have that they did.

ANNE: Well, they did pay us money to that. (laughs)

JEANNE: Well, and that was project in the Urban Freight Lab, is that correct?

ANNE: Yeah, yeah. Several of our initial studies, , we did for the city of Seattle and yes we've mapped that infrastructure for them so that they have that they have that but yeah, other cities might hire consultants or might hire their own staff to do that but yeah we did.

JEANNE: It's a body of work, and it's very detailed. Tell us about more Urban Freight Lab projects, what's coming up? I know people are talking about package delivery, like the lockers or monetizing the curb space. Tell us what's coming up.

ANNE: Yeah, we've been really focused on pilots, because people get to this stage of ideas, and then you think, cool, we have ideas, and then the act of actually trying to test them on the ground is quite cumbersome. Also known as a pain in the rear. But I really believe in terms of depth of work…

JEANNE: Sometimes it doesn't work! (laughs)

ANNE: Well, things get in the way things like there's a rule against that or that just looks like a hand for everybody involved.

JEANNE: We're not going to do it, right?

ANNE: Right. Our planning and tools aren't haven't caught up yet. So, I would say for the last two years, one of the things that we've done that's been very visible is pilot testing. So, like I said, we had this period of discovery where we were measuring and making sure we understood the system, so we didn't just propose solutions that we didn't have a foundation for. And one of those solutions was common carrier lockers - common carrier just means that every carrier can deliver to them.

JEANNE: Not just Amazon…

ANNE: Right, so we might be aware that there are individual lockers for individual delivery firms, but they provide less benefit than a shared one. And also, we had this idea that we could make them more publicly available, so if you commuted to downtown on the bus, there might be a locker at the bus stop, where your package could be delivered so that you had some efficiency in your trip-making it wasn't another destination that you had to go to. And then that consolidation is good for the carrier as well, because instead of having to go to five or six different homes and travel all of the way to those things go to one location. It's more secure, there's less failed deliveries, it's touchless, which we didn't know at the time was going to be something we wanted. So, for a number of reasons, we're really excited about that solution and others are too but very few people actually have empirical data that it could work. And you have to think about things like well who's going to give you their space and are they allowed to do that? Are they going to charge you for that? They're using that space for something else now why would they want to turn it over to this locker? Are there security concerns that somebody's going to put something in the locker that's smelly? How's it going to get cleaned out? Are people going to graffiti the locker? So, all these practical considerations that we felt like we weren't done if we just said, "Hey here's an idea.", we needed to also help push through this…it's like making a path in the woods that we would bring our machete and make it a little clearer and then people who came behind us could learn from what we had done. So, we have put lockers in four different locations in downtown Seattle and we have surveyed the users, we can see how many packages there are, and what that estimate is doing to emissions reductions and so we've been doing that for about the last year and so now we can say, "Look, here's how much it will reduce the dwell time of a truck parked outside." And ours are 30 to 50% reductions in dwelling. So, kind of coming back to that Final 50, how do you get a truck to move along, this is definitely one of the solutions that can help you do that and that means you don't need more curb space. That means the same curb space you had can now serve twice as many vehicles. So, other people could say in my simulation, "I estimate this", but we're able to say, we went out and we times the vehicles and we can prove that there is this benefit, so we're excited about that. We also have built what we call digital visibility of commercial parking. So, as I mentioned, right now, the driver arrives at a location and before they get there, they just have their own memory of what parking might be available nearby. And some drivers who go to neighborhoods every day have very good knowledge both of what's available and kind of what typical availability is. But increasingly, a lot of these drivers are new, and they're doing one hour, two-hour deliveries and this isn't a regular gig and that's really a source of inefficiency and it also potentially increases the amount of unauthorized behavior that we see. So, if you don't know and you get there and there's nowhere to park, you think, we'll I'll just park here I'm running in, or I'll double park, it'll just be a few seconds. So, we feel that if we can provide both a priori

knowledge of where there is parking and then we can show them what's available, then it will reduce illegal parking and the time that they essentially waste either looking for parking are waiting for somebody to clear parking spaces. So, there's an app that has a little green and red bars on it that shows the status of the passenger loads and commercial vehicle load zones in Belltown and we're super excited about that. We had to put the infrastructure in the roadway to send those signals that measures if there is a presence in that sport or not. So now we're testing that with drivers and seeing what they do with it, how it changes their behavior and estimating. Ultimately will be able to say how much that improved operations. If it saved them time and if it reduced CO_2 emissions. So, that's another pilot that we've been doing. The other thing that it does is it builds this tremendous database of parking activity that we don't have now and things that we don't know. Like now Google…my students don't know this, but there was a time before Google had real time traffic information. And before they have these they could tell you what the typical Thursday at 4pm looked like. Same thing, we don't have that for parking. And so, we're trying to build that. And so, what these sensors do is allow us to build this historical profile of what parking occupancy looks like so that we can better know, do we have the right amount, do we have it in the right places, and is it predictable? So could we anticipate, gosh, every Friday, there's no parking here…could we give that information to drivers so that they know what it's going to look like when they get down there, which is awesome and we're actually finding is highly predictable which I didn't know because it's at a very small scale, like most things are predictable - Central Limit Theorem - now in a very large scale, but they're not very predictable at a small scale and these commercial vehicle load zones, some of them have one vehicle capacity. So, we really didn't know how predictable they are, but it's been very encouraging because it is quite predictable and so I think our tool eventually will be able to say it's full now, but we are 90% confident, it's going to be empty in 15 minutes. And, we're not planning to implement this, but you mentioned before about paying or reserving, so those kinds of tools, if cities want to go down that path, we might also be able to say, "Oh, reserve it for me in 15 minutes", and you might be able to do that on the app, or you might be to pay, there might be time periods where you pay to use that spot and that would all be implemented in this app as well. So, that's something else that we're doing that is really quite novel, presents just a really nice range of challenges and some of them are very practical on the ground challenges, some of them are technology based, we'd like to learn about what it means for drivers and the experiences of users, but there's also some interesting research challenges and things, is it predictable, how confident can we be about forecasting, what can we learn about utilization of space in the city and maybe reallocate, so some city planning questions. And our third pilot at the moment is we are piloting a micro hub that will be home to some electric assist cargo bikes. One of the areas we'd like to help is reduce the carbon footprint of the urban delivery system and also meet the goals of C 40 cities like Seattle who are committed to a zero emissions zone. So, it's been a really cool, we've got some fantastic partners. Bright Drop, who's GM's electrification and last-mile solution, Coaster Cycle, who's building the cargo bikes, Axle Higher and Reef who has a former parking lot that we now have revamped and it's serving as this micro hub. So, we just actually launched that this week. Super cool, and the cutest bike with the little packages on it.

JEANNE: We'll need a picture! (laughs)

ANNE: I know, I have some. It's beautiful thing and it's really close to the Space Needle and the monorail, so yeah, and we're actually also really developing some sensor technology there because cargo bikes and people are a lot harder to identify. Historically, to identify vehicles, we largely rely on the fact that they're big metal objects and they follow quite distinct paths. Whereas people don't always

do that and they're not metal. And we've put some sensors in that hub that take visual images and we're able to train the AI to identify a person versus a cargo bike. And so, we also think that one of the products of that research will be some better tools to manage and monitor a broader range of activities that are quite costly at this point really to understand bike behavior and pedestrian behavior. And we want to do a better job of that.

JEANNE: I think all of these are fascinating and I can see them not far off in the future. I just remember when we looked at the UPS cargo bikes that you guys were testing a year or so ago. As we come out of the pandemic and seeing that some of the campuses downtown are bringing their people back or calling their people back in as people are getting vaccinated, what do you see happening? I think your data is going to mushroom. What's your expectation for coming out of the pandemic and seeing how these things move forward?

ANNE: Yeah, I think it's a really exciting time actually for us to implement some change. So, this reset allows us to maybe be a little more bold, be a little more ambitious and kind of gives us a little bit of breathing room, and a shock that like makes us reflect on okay we have this moment to pause, or we've been forced to rethink a lot of things and I'm excited about what we might do. I think we felt really constrained before the pandemic because there's so much demand there, and there's so little space. It seems more of this focus on marginal improvement, rather than doing something completely different. And I feel like with the micro hub, with lockers, there's just a new willingness to say, "Really big changes can happen, and we can weather them, and we can try new things, and they can work." And I think in terms of planning, with the city, things like, in a day, we can put up some signs and have a pickup point. It doesn't have to be too cumbersome to make some of these changes that might really change people's lives and modify how people travel. We can build more space for bikes and pedestrians if that's what we want to do, and we can literally, put up some signs, or we can take them down If that's not working. So, obviously the pandemic has been very difficult, for so many people and for all of us, incredibly difficult, and we will be recovering from this emotionally for a very long time and I don't minimize that. But I also think, there has been a lot of innovation forged, but creative thinking, and that's energizing as well. And when we do have some energy back as individuals or as organizations, and we have kind of the space to feel like okay, we've, We've dealt with the most immediate problems but now we might think about if there are new ways we should be operating downtown? I think the transportation electrification blueprint is an example of that it's like well we have this moment where we're going to do something bolder than maybe we have been and I think there are less people downtown, there are less workers downtown, and I think that's going to be the case for a long period of time. And so, it gives us a little bit of space I think to try some new things. And we could see quite a different way of traveling and we could see public spaces used quite differently downtown and I think that's exciting.

JEANNE: I agree I think people have already forgotten what it was like so it, like you said, gives us some breathing room to create and invent new spaces. I think we've all become so resilient and changing our habits, especially in how things come to us like packages…our goods and services. Thank you so much for your time and good luck with all your projects, we will be tracking them, and I'd love to talk to you again.

ANNE: I've really enjoyed it and I appreciate your questions. There's a real value in just sharing what's going on and I really appreciate you taking the time and asking questions and getting it out there for people who are interested in listening.

JEANNE: Thanks so much for listening today. We hope you enjoyed this episode, and if you did, please be sure to subscribe so you'll be notified when our next episode becomes available.