Memorandum 1

Meeting Date: February 15, 2019

MEETING 1 SUMMARY

The Futures Working Group is a collaborative, transdisciplinary group that uses exploratory scenario planning to understand how various trends and forces (social, technological, environmental, economic, or political) may impact the region and identify ways to better respond to or benefit from them.

The first working group meeting to update Future Forces 2050 was held on Friday, February 15, 2019, and reviewed:

- Exploratory scenario planning, which starts in the present and projects alternative futures using anticipated trends and driving forces.
- Driving forces are whatever creates the change we see in the world around us. Future forces are driving forces that are anticipated to possibly occur beyond the present day.
- The previous exploratory planning effort, *Greater Philadelphia Future Forces*, completed in 2016 to inform the *Connections 2045* Long Range Plan.

The Global Business Network scenario planning framework will be used to update the Future Forces. This framework is made up of the following steps:

1. Define the research statement.
2. Brainstorm future forces.
3. Presentations on future forces with highest knowledge gaps.
4. Vote: future forces that most probable and relevant to research statement.
5. Vote on impact and uncertainty for the top 20 forces in step 4.
6. Use impact-uncertainty vote to form axes of uncertainty.*
7. Use axes of uncertainty to form scenarios.*
8. Facilitated discussion of scenario implications.
9. Facilitated discussion on scenario recommendations.
10. Model and develop scenario narratives.*
11. Review draft report.
12. Publish final report and communicate key findings.*

    *work completed by DVRPC staff

The first meeting focused on Steps 1 and 2.

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The draft research statement:

Test uncertainty from societal, technological, economic, environmental, and political trends and forces in Greater Philadelphia between the present and the year 2050, which may:

- *Pose new opportunities and risks;*
- *Affect predictability in the region's socio-economics, land use, and travel patterns; and*
- *Impact the region's ability to achieve its vision:*
  - *Preserve the environment,*
  - *Build livable communities,*
  - *Expand the economy,*
  - *Advance equity and foster diversity, and*
  - *Create an integrated, multimodal transportation network.*

Participants brainstormed future forces in eight different breakout group tables, identifying 170 different ones. Each breakout group formed consensus around the five forces they considered to be the most probable and relevant to research statement. Forty-one forces were advanced to group consideration ('nominated forces'). Participants then voted on which of the nominated forces they have the greatest knowledge gaps on and wanted to learn more about at the second meeting.

Each breakout group table identified climate change as a nominated force, and nearly every table had increasing inequality as one. After the meeting, DVRPC staff combined the 41 nominated forces into a working list of 15 forces, trying to minimize the overlap between them. Votes were carried through from the nominated list to their combined working list forces. The top three working list forces by knowledge gaps are: socioeconomic inequality, the Digital Revolution, and international upheaval and (im)migration. Many of the brainstormed forces that didn't advance to the full group have been categorized and incorporated into the current working list forces. This working list of forces is presented in the order of the number knowledge gap votes received.

1. **Socioeconomic Inequality** – Continuing and growing income and wealth disparities within and between regions are propelled by racism, nationalism, and gender.
   - This exacerbates existing social divisions, causes hyper-segregation in physical locations, a disparity in the equitable distribution of fresh, nutritious food, drives political ideology, and harms economic growth.
   - Nationally and globally, the wealthy shape public policy and consumer markets to their benefit, which increases distrust and social unrest.
   - In Greater Philadelphia, there is a shrinking middle class, a shortage of affordable housing, gentrification and displacement, a lack of intergenerational wealth and access to capital for people of color, and unequal levels of job opportunity and training.
   - May lead to a grassroots and community focused push to invest in distressed urban areas; and redistribute income through a universal basic income and a more progressive tax system.
2. **The Digital Revolution** – The universal computer language of ones and zeros brings about a convergence of digital technologies such as the Internet of Things (IoT), big data, artificial intelligence, robotics, 3D printing, and others. Automation replaces many of the functions traditionally done by humans, providing exciting opportunities to change the nature of work, our lifestyles, education, healthcare, and how we get around.
   - Technology may help people live longer, create new modes of transportation, work and shop more from home, enable cloning, require more (cyber) security, and increase complexity.
   - Technology may level opportunities and access to them; or it may lead to more unequal access, changing job markets, and less demand for labor.
   - Digital technologies and real-time communications continue to decrease all costs—including transaction costs—growing the freelance, gig and shared economies while also building momentum for a cashless society. This strengthens the creative class and businesses that cater to it (such as coworking space); but may increase economic polarization, reduce the size of the middle class, increase gentrification, and push low-skill or low-income people out of the city.
   - As data and information become more and more the basis of the economy, universities and colleges may become more important economic development players, or they could be completely disrupted by new forms of learning.

- o Increased access to information can lead to a more informed and connected populace. However, more people may be left behind if technology is used to restrict equitable growth.
- o Digital technologies enable remote actions, and flatten the effects (and costs) of distance.
- o Digital technologies may simultaneously link us together with like-minded people from around the world, while further isolating us from our neighbors. This may increase the effects of the 'filter bubble,' where we increasingly see only information that confirms our viewpoints (and little information that challenges our views). Because each person receives personalized info, everyone has their own version of reality.
- o Alternatively, a major technology failure may increase desire for non-technological solutions and competencies.

3. **International Upheaval and (Im)Migration** – Refugee crises, uprisings, food shortages, rising authoritarianism, and terrorism increase population movement.
- o Immigration makes a large part of regional population growth, but the amount and composition is highly dependent on national policy and global economic trends.
- o It is less clear wither international migration rates will substantially increase or decrease, and how skilled they will be.
- o Climate change will result in significant internal migration, which Greater Philadelphia may be a prime receiving area for.
- o Further risks for supply chain and trade disruption, disease migration, cyberwarfare, and non-state threats.

4. **Mobility as a Service (MaaS)** – Use technology to manage all movements and link trip planning to single personal transportation account, which also pays for tolls, fares, parking, and shared mobility services.
- o Makes it easier to move in a multimodal fashion and integrate all personal and freight delivery data into planning tools that administer investments, manage curb space, and enhance traffic flow.
- o All modes may see an increase in use, but competition could alternatively drive down transit ridership and personal vehicle ownership.
- o Public space becomes more "activated" but more chaotic.
- o With venture capital backing, there may be increasing private market control over the transportation network. Will this lead to disinvestment by the public sector in infrastructure as infrastructure becomes increasingly hard to fund without major reworking of taxes? Will private firms fill the void with control over both transportation services and the infrastructure they use (moving from MaaS to 'Transportation-as-a-Service')?

5. **Workforce Automation** – Robotics, artificial intelligence, and other technologies change the nature of work.
- o Individuals have less work available to perform, but society needs less labor to provide the goods and services that comprise the modern economy. Informal institutions will become more important as a result, and a universal basic income may be inevitable.
- o This may result in loss of jobs, dissolution of social safety net, new labor and skill demands; and change household location decisions, commuting patterns, educational needs, and the types and quality of jobs available.
- o Greater Philadelphia's workforce may fall behind, and lose economic vitality.

6. **Transportation Technology Deployment** – Automated vehicles (AVs), electric vehicles (EVs), connected vehicles (CVs), the Hyperloop, and shared mobility services affect personal travel, goods movement homeownership, and development patterns.
- o Advances in computing and artificial intelligence are being applied to and tested in automobiles. They are likely to initially be used in public vehicles.
- o Development of lightweight, high power, high-storage batteries.
- o Impacts: Reduced air travel, longer commute distances, reduction in freight congestion.

7. **Climate Change** – More severe storms and storm surges, more heavy rainfall in some areas and droughts in others, higher temperatures and more temperature extremes, and increased sea levels cause major disruptions throughout the world.
- o Resiliency will require green infrastructure and fact-based evidence to combat environmental degradation, while both fighting the impacts and adapting to them.
- o Population shifts to more desirable regions and areas within them (higher ground, less need to consume energy). This further bifurcates the haves and have-nots—especially for the communities that lack the

financial resources to rebuild, and leads to very uneven health outcomes. Migration from most affected areas includes the coasts and Central America.

- o Risks include negative impacts to infrastructure (roads, bridges, rail lines, PHL); vulnerable populations become more vulnerable; property damage/loss from extreme weather; adverse human health impacts, including higher mortality from heat waves; resource wars; and there has already been a significant decline in biodiversity, including insect populations—the foundation of ecosystems, which will ripple up through the food chain and be exacerbated by climate change and habitat loss.
- o Opportunities may emerge from increased population and economic growth from climate refugees entering region; and potential for job expansion around a 'green new deal' or similar legislation; radical shift away from fossil fuels with massive investments in wind, solar, battery technology, and conservation.
- o Rapid growth in clean energy technologies risks labor force displacement and creates need for workforce retraining programs.
- o Outcomes could be worse with continuing availability of cheap fossil fuels, cars, and sprawling development patterns; which would increase driving, air pollution, greenhouse gas emissions, and congestion.

8. **Social and Political Dysfunction** – Increasing polarization leads to an inability to advance federal and state agendas.
    - o More funding risks for soft and hard infrastructure, and reduced ability to solve big problems.
    - o Widening gaps among groups based on political ideology leading to distrust of government, with more nationalistic anti-immigration, anti-diversity, and anti-urban views.
    - o Desire for political change—and concern for the environment— may promote more dialogue between disparate groups, and encourage more women and minorities to run for political office, diversifying governments at all levels.
    - o The region must find ways to re-integrate individuals and areas, who have long been long been left behind due to the decline of manufacturing, back into the economy.
    - o Homelessness is increasing in the city and region due to the opioid crises. Individuals who are homeless have a difficult time finding housing, connecting to social services, and making life improvements. Crime is increasingly concentrated, and routinely pops up in new areas.

9. **Shifting Demographics** – Aging population, gentrification and displacement, immigration, decreasing birth rates, and other sociodemographic factors will lead to major changes in the region.
    - o Impacts healthcare costs, employment, social interaction, co- or multi-generational living, population growth and fertility rates (for instance: baby boomers and Japan's negative birthrate), economics of aging population (the 'silver economy'), and unseen health factors (such as birth defects from lead).
    - o Stagnant wages and increasing personal debt are causing more families to live in multigenerational households.
    - o Individuals living in poverty may increasingly be pushed into the suburbs.
    - o More population churn due to fast-changing economic activities. People continue to 'self-sort' their communities by race, class, and political affiliation.
    - o People live longer lives, stretching their retirement savings, and impacting stock market valuations as aging individuals exit long-term equity holdings.

10. **Technocracy** – Massive quantities of information, real time responsive systems, big data analytical models, artificial intelligence, and winner-take-all economics due to network effects concentrate the power in very large organizations (businesses or states).
    - o Laws, rules, and norms are changed in ways that benefit data owners; resulting in more digital divisiveness and inequality; and opportunities to expand communication, accessibility, and public outreach.
    - o Cities become more efficient through deployment of artificial intelligence combined with real-time data collection; these systems sense, change, and guide flows through urban space.
    - o Risks may include a loss of privacy, discriminatory and biased algorithms, and increasing control and power over citizens' lives.

11. **Updating Infrastructure** – From state-of-good repair to incorporating new technologies, public funding for infrastructure has not kept pace with needs. Will the public sector step up and provide new sustainable ways of moving people and goods, delivering drinking water, and managing stormwater?

- o Will we be left with crumbling infrastructure? Addressing infrastructure challenges will be difficult without reworking funding mechanisms in ways that increase revenue.
- o Or will the private market fill the void, even though it could present a whole host of problems, and may not benefit the public.
- o Failure to upgrade infrastructure leads to constant gridlock, and secondarily impacts commuting patterns, and locational and home ownership decisions.
- o Mobility-as-a-service and other transportation technologies may reduce private vehicle ownership and demand for parking, while increasing demand for use of the curb. Need to consider potential reuse for parking facilities.
- o Greater Philadelphia is particularly dependent on uncertain state and federal transportation infrastructure funds, and lacks a local funding source to improve transit and make necessary capital investments.
- o Increasing concern about health impacts from water quality.

12. **Low-Density Divestment** – As the maintenance bill comes due for decades of low-density suburban infrastructure maintenance, economic and demographic forces combine to increase demand for compact, walkable communities.
    - o With no appetite for raising taxes to pay for higher per-capita exurban infrastructure costs, demand for auto-dependent suburbs may decline—causing an additional push factor as tax revenues decline leading to service cuts.
    - o Aging baby-boomers may be stranded in car-dependent places after they can no longer drive.
    - o Fewer nuclear families reduce the demand for low-density, single-family homes.

13. **Greater Philadelphia in the Global Economy** – How competitive will the region be in the global economy?
    - o What are our niche markets? How do we fit into global value chains? How do we serve and engage locals? What are the effects on real estate?
    - o The growing global middle class creates potential economic opportunities for companies located in the region.

14. **Housing Shortage** – New housing models are needed, along with an increased supply of co-generational, infill, and affordable units.
    - o Population growth in the city of Philadelphia is limited by lack of quality housing, zoning that overly restricts density, and the high cost of new construction.

15. **Delivery On Demand / End of Bricks & Mortar Retail** – An intensification of current trends toward shrinking retail square footage and increased package delivery.
    - o This may shift land use demand with a need to repurpose retail space, put more small trucks on the region's roads, and impact the local economy.

The second meeting will be held on Friday, March 8, 2019 and will focus on Steps 3 and 4 in the scenario planning process. The goal is to have no more than 20 Future Forces on this working list, so there is room to add a few. Some of the brainstormed forces proposed in the breakout groups, but did not fit into one of the working list categories, are listed in Table 1. These may be of interest as we consider what is missing from this working list of forces in meeting 2. Any forces added to the working list should be seen as having a medium or higher level of probability and be relevant to the research statement.

Table 1. Brainstormed Forces Identified in Breakout Groups that Didn't Readily Fit into the 'Working List'

Force Name	Description	Potential Outcomes
Education Quality and Cost	[none]	Where people will want to live? What technical training should they be taught?
Healthcare Policy	If it came to pass, how would "Medicare for all" or single-payer healthcare affect our region?	???
Higher Education Shrinking	Cost of education increasing; less access to low and moderate income; income -> elitism.	More bifurcated society of the haves and have nots. Mass thinking, general population taken advantage of by politicians.
Historic Preservation Increase	The state could increase funding and the project cap for historic tax credits to ensure developers are investing more in existing buildings and increase listings on national historic registers.	Less greenfield development; more respect for historic buildings; increased listings on historic register.
Challenges in Public Education	Impact of challenges confronted by the school district students.	Huge issues related to the capacity to obtaining secure employment, and engage in higher ed.
Late Stage Capitalism	Stagnant growth; low wages vs high cost.	[none]
New Work Representation	Re-examine the role of unions and unionization.	[none]
Open Space/Land Preservation	Public will increase demand for open space and land preservation to balance urbanization.	[none]
Return to Nature	Pressure from climate, health, and recreation needs.	Increased competition between regions of the U.S.; increased competition among subregions.
Safety	Increased growth in urban areas especially connection through apps and location services.	Less open space; more concerns for safety, quality of life, and privacy due to IT efforts.
Shrinking [Economic] Cycles	Economic and real estate "cycles" get shorter and shorter with faster communications technology and transactions: 10 years, 5 years, 1 year, etc.	Peaks and valleys eventually disappear.
Smart Development; Open Space Preservation	Infill Development and vacant property reclamation; increased population in cities will require areas of exercise and recreation, contact with nature.	Smart development that includes parks, gardens, trails; health and mental health.
Sprawl and Rapid Overdevelopment from Population Growth	Expansive suburban development that replaces land with neighborhoods removed from employment centers, schools, grocery, and commercial necessities.	Congestion/traffic; decreased property values from loss of open space; loss of agricultural lands create food security concerns; habitat loss; increased flooding and environmental impacts from loss of open space.
Sustainable Cities of the Future	Reduction of environmental impact; incorporate tech in new ways to further sustainability.	Helps sell the city for business investment; increases desirability for travelers and new residents; and has spillover impacts across industries and areas in metro region.