REGIONAL HOUSING NEEDS ALLOCATION

Association of Bay Area Governments

TO: Housing Methodology Committee DATE: March 12, 2020

FR: Deputy Executive Director, Policy

RE: Potential Factors for the RHNA Methodology

Overview

The Housing Methodology Committee's (HMC) objective is to recommend an allocation methodology for dividing up the Bay Area's Regional Housing Need Determination among the region's jurisdictions. This Regional Housing Needs Allocation (RHNA) methodology is a formula that calculates the number of housing units assigned to each city and county, and the formula also distributes each jurisdiction's housing unit allocation among four affordability levels. The HMC will need to select key factors to serve as the main components of the methodology. The factors function as levers that "drive" the allocation from the regional total to the jurisdiction share. While the RHNA process focuses on housing need, staff recognizes that *identifying* need is as much art as science. Ultimately, the allocation assigned to jurisdictions will be based on the factors that HMC members and ABAG's Executive Board consider most important.

The RHNA methodology must achieve two outcomes: determining the total number of housing units for each jurisdiction and determining the distribution of those units into the four income categories. For now, staff is continuing to focus on factors that would be used to identify a jurisdiction's total number of housing units, although some of the factors presented could also be used as part of the income allocation methodology. The HMC will have an opportunity to consider factors for the income allocation at future meetings.

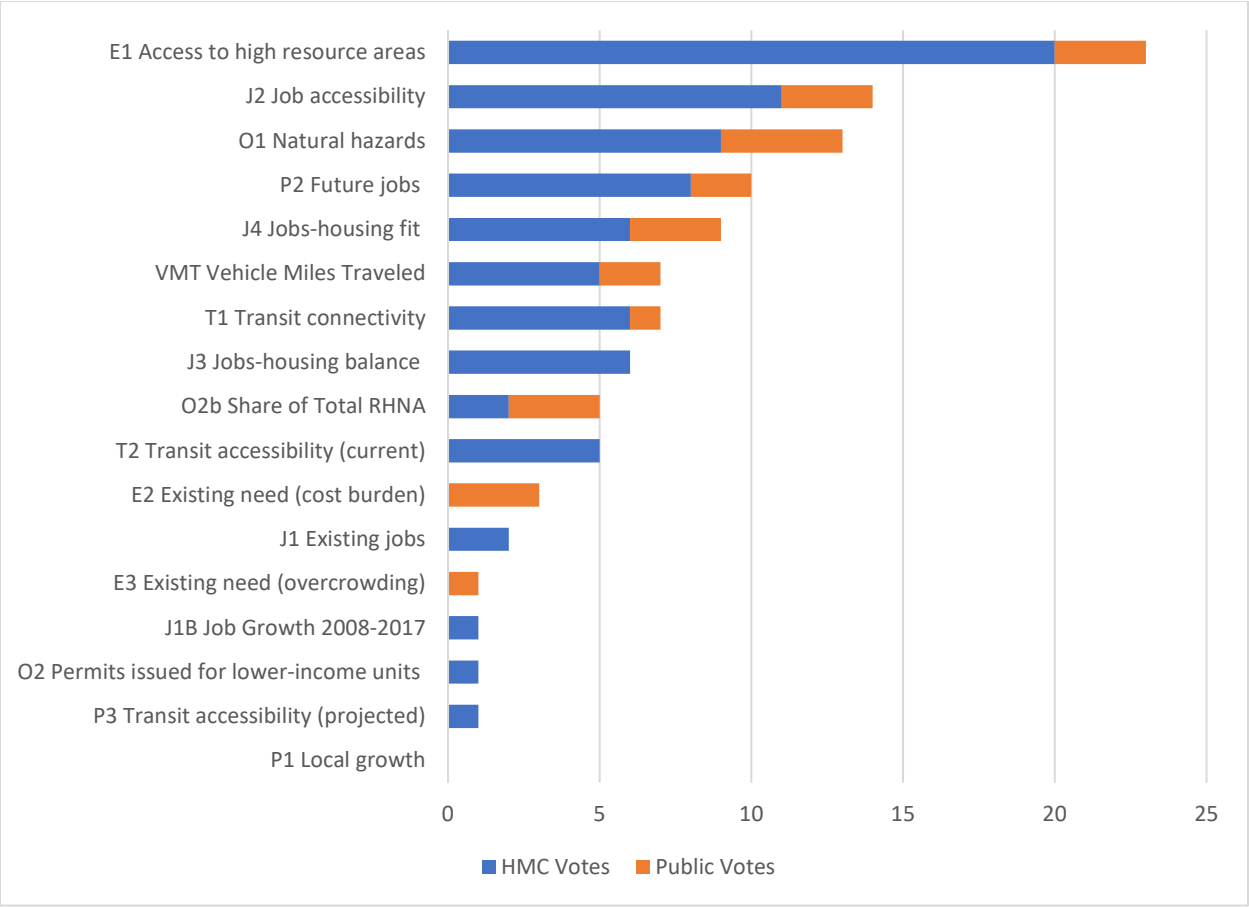
Continuation of Discussion of Potential Factors

At the January 2020 HMC meeting, staff presented a set of potential factor topics for inclusion in the methodology. ABAG staff presented maps showing the regional distribution among jurisdictions for each potential factor topic (e.g., jobs-housing fit, transit proximity, etc.).[1] HMC members discussed the factors in small groups and then had an opportunity (along with members of the public in attendance) to vote for the factors they wanted prioritized for continued exploration. Figure 1 shows the top priorities identified by the voting.

ABAG staff has developed a revised set of nine potential methodology factors based on the feedback from the January meeting. The information staff is presenting for the March meeting takes development of the allocation methodology one step further by translating the raw data for each priority topic shown in the maps from the January meeting into an actual factor that could be incorporated into the methodology and used to assign housing need to each jurisdiction. The revised factors and the methodology for translating the data into a factor are described in more detail below.

[1] The maps from the January HMC meeting can be viewed at https://abag.ca.gov/rhna-maps

Figure 1: Results of Dot Voting for Priority Factors



At the March meeting, staff will present the revised factors and ask HMC members to continue the process of refining and prioritizing the factors to be included in the methodology. Staff has developed a visualization tool that shows a map of the jurisdiction-specific output for different combinations of factors (https://rhna-factors.mtcanalytics.org/). The tool enables users to explore sample RHNA methodologies by allowing them to insert a proxy number for the total housing need determination that ABAG will receive from HCD and to apply a weight to each potential factor. ABAG staff will use the tool to support HMC members as they prioritize factors, consider weights for each factor, and develop an initial recommendation for a RHNA methodology. While the tool will enable the HMC to explore the ten factors described below, staff will be looking for feedback about how to narrow down the number of factors to be included in the methodology, to ensure it meets the HMC's goals for a methodology that is easy to understand and there is a compelling narrative for why the methodology was chosen as the best way to achieve the RHNA objectives.

Translating Data into Factors

For each potential factor, ABAG staff has taken the raw data presented in the maps from the January HMC meeting and translated into a factor for use in the methodology. This translation process involves three steps:

1. ***Baseline allocation:*** As a starting place for the RHNA methodology, ABAG staff is proposing to assign each jurisdiction a share of the total Regional Housing Needs Determination (RHND) from the California Department of Housing and Community Development (HCD) based on the jurisdiction's size (in terms of households) as a share of the region's total households. This *baseline allocation* means that a larger jurisdiction will receive a larger allocation, but each jurisdiction starts out with an equal share of the total housing need relative to jurisdiction size.

   If, in the future, the HMC decides to incorporate the Plan Bay Area 2050 Blueprint into the RHNA methodology, each jurisdiction's share of forecasted household growth could readily be used in place of its share of existing households. That would be similar to the approach used in ABAG's methodology for the 2015-2023 RHNA cycle.

2. ***Factor adjustments:*** Each selected factor for the methodology would be applied to this household distribution and be used to adjust up or down a jurisdiction's baseline allocation. A jurisdiction with above average scores on the factors would get an *upwards* adjustment, whereas a city with below average scores on the factors would get a *downwards* adjustment relative to the baseline allocation. To ensure that each factor is treated consistently in the methodology formula, each factor is standardized by scaling it to the range of 0.5 to 1.5. This facilitates comparison of the impact a factor has on a jurisdiction's allocation.

3. ***Factor weights:*** the methodology includes weights for each factor that correspond to the relative importance of each factor in the overall allocation, reflecting the priorities of the HMC and ABAG's board. When applied, the weight determines the share of the RHND that will be assigned by that particular factor.

Fair Housing and Equity

Staff has proposed two factors that address the statutory objective that the RHNA methodology must affirmatively further fair housing. Housing Element Law defines affirmatively furthering fair housing as:

> "taking meaningful actions, in addition to combating discrimination, that overcome patterns of segregation and foster inclusive communities free from barriers that restrict access to opportunity based on protected characteristics. Specifically, affirmatively furthering fair housing means taking meaningful actions that, taken together, address significant disparities in housing needs and in access to opportunity, replacing segregated living patterns with truly integrated and balanced living patterns, transforming racially and ethnically concentrated areas of poverty into areas of opportunity, and fostering and maintaining compliance with civil rights and fair housing laws."[2]

[2] See California Government Code Section 65584(e).

While other Councils of Governments (COGs) have used the Opportunity Map and other equity-related factors in their RHNA income allocations, ABAG staff has received direction from the HMC to incorporate equity-related factors into the methodology for a jurisdiction's total allocation. Doing so maximizes the impact these factors will have on overcoming patterns of segregation and fostering inclusive communities.

The *Access to High Opportunity Areas* factor received the most votes at the January HMC meeting. This factor would allocate more housing units to jurisdictions with a higher share of households living in areas labelled High Resource or Highest Resource on the Opportunity Map produced by the California Tax Credit Allocation Committee (TCAC) and HCD. Staff revised this factor to incorporate the draft 2020 Opportunity Map, which includes more recent data and some modifications to the methodology, including a revision to how rural areas are assessed. Staff has summarized the TCAC/HCD 2020 methodology in Appendix A.

Several HMC members also expressed interest in exploring a factor that considers racial segregation more explicitly. To address this feedback, staff has proposed a *Divergence Index* factor. The divergence index measures how the racial distribution of a local area (in this context, a jurisdiction) differs compared to the demographics of a larger area (in this context, the region). If the local area has the same racial distribution as the larger area, the divergence index is scored at 0. The more a jurisdiction's demographics diverge from the regional distribution, the higher the divergence index score. A high score does not indicate that the jurisdiction is racially homogenous, only that its demographic profile differs markedly from the region as a whole. Given the multitude of racial and ethnic groups in the Bay Area, the Othering and Belonging Institute at UC Berkeley has identified the Divergence Index as the best measure of segregation in the region in part because it captures segregation for multiple racial groups at the same time.[3] One challenge with the divergence index is that it can be high both in areas of concentrated poverty as well as in areas of concentrated affluence

It is worth noting that explicitly race-based criteria raise constitutional issues and are subject to strict scrutiny, meaning that they must be narrowly tailored to achieve a compelling interest, and it must be demonstrated that race-neutral policies are ineffective. It is not clear that a race-neutral policy such as use of the opportunity maps would be ineffective, so stakeholders may raise constitutional issues with respect to the *Divergence Index* factor based on its focus on race and ethnicity

Both the *Access to High Opportunity Areas* and *Divergence Index* factors would address the RHNA mandate to affirmatively further fair housing by increasing access to opportunity and replacing segregated living patterns. Although the *Access to High Opportunity Areas* factor does not explicitly incorporate racial demographics, it has the potential to expand housing opportunities for low-income households and people of color in more places where these

[3] See "Racial Segregation in the San Francisco Bay Area, Part 1" at https://belonging.berkeley.edu/racial-segregation-san-francisco-bay-area.

communities have historically lacked access. Another practical strength of this factor is that HCD has consistently used the Opportunity Map to assess whether the RHNA methodologies developed by other COGs meet the objective to affirmatively further fair housing and it would increase alignment with how funding for affordable housing is distributed statewide.

1. Access to High Opportunity Areas	
Impact	More housing units allocated to jurisdictions with the most access to opportunity.
Definition	The percentage of a jurisdiction's households living in census tracts labelled High Resource or Highest Resource based on opportunity index scores.[4]
Revisions	Revised to incorporate data from updated draft 2020 Opportunity Maps.
Data source	HCD/TCAC 2020 Opportunity Maps
Dot Vote Rank	1
2. Divergence Index	
Impact	More housing allocated to jurisdictions that are more segregated compared to the rest of the region.
Definition	The divergence index score for a jurisdiction, which is a calculation of how different a jurisdiction's demographics are from the region
Revisions	New factor
Data source	U.S. Census Bureau, American Community Survey 2014-2018, Tables B03002; B19013
Dot Vote Rank	N/A

Jobs and Jobs-Housing Fit

ABAG staff has included five potential job-related factors. The *Job Proximity* and *Vehicle Miles Travelled (VMT)* factors consider the relationships between jobs and transportation. The *Job Proximity* factor encourages more housing in jurisdictions with easy access to the region's job centers. Based on travel model data, staff has revised the *Job Proximity* factor to include jobs that can be accessed from a jurisdiction within a 45-minute transit commute, in addition to jobs that can be accessed from a jurisdiction by a 30-minute auto commute. While the two could be combined, we have left them separate for the March meeting since the transit component is new.[5]

The *Vehicle Miles Travelled (VMT)* factor was included as a reference map at the January HMC meeting, but ranked highly in the dot voting exercise. This factor would direct more housing to

[4] The Opportunity Area Maps include indicators related to poverty, adult education, employment, job proximity, median home value, pollution, math proficiency (4th grade), reading proficiency (4th grade), high school graduation rate, student poverty rate and a filter related to poverty and racial segregation. For more information about the methodology used to create the maps, see https://www.treasurer.ca.gov/ctcac/opportunity/draft-2020-tcac-hcd-methodology-december.pdf.

[5] While the transit factor is a new addition, to be consistent, the auto access factor has been updated to use the same source, the regional travel model. The map presented in January on auto access alone relied on data from Inrix, a provider of traffic volume data.

jurisdictions where a high percentage of workers drive long distances to work, with a goal of increasing access to existing jobs and reducing greenhouse gas emissions.

The *Jobs-Housing Balance* and *Jobs-Housing Fit* factors specifically incorporate the relationships between housing and jobs and would allocate more housing to jurisdictions where there are a high number of jobs relative to housing. The *Jobs-Housing Balance* factor evaluates the total number of jobs and housing in a jurisdiction without considering the relative costs of housing in the jurisdiction compared to the wages of the jobs in the jurisdiction. The *Jobs-Housing Fit* factor has the benefit that it directly addresses this statutory requirement that the RHNA allocation promote "an improved balance between the number of low-wage jobs and the number of housing units affordable to low-wage workers in each jurisdiction."[6]

Most of the jobs factors that staff has presented use jurisdiction boundaries as the geography of analysis. The *Job Proximity* factor uses a commute shed and several HMC members have suggested that the *Jobs-Housing Fit* factor should be revised to use commute sheds. The idea behind using a commute shed is to better capture the lived experience of accessing jobs irrespective of jurisdiction boundaries. Housing and job markets extend beyond jurisdiction boundaries—in most cities, a majority of workers work outside their jurisdiction of residence, and demand for housing in a particular jurisdiction is substantially influenced by its proximity and accessibility to jobs in another community.

Staff analyzed the commute shed variants of the jobs-housing fit and jobs-housing balance measures. While there are compelling reasons to use a transportation accessibility measure that recognizes that job and housing markets are typically substantially larger than particularly the smaller and even medium sized jurisdictions, staff has, for the time being, decided to use the more conventional measurement of jurisdiction boundaries. First, this is consistent with the research that helped cement the planning relevance of the jobs-housing fit measure.[7] Second, there are potential issues with having jobs and housing units outside of a jurisdiction play a role in determining a jurisdiction's allocation of RHNA units. The output of the RHNA methodology is an allocation to a particular jurisdiction so the factors have to assign a score to each jurisdiction. Assigning RHNA units to a jurisdiction based on factor that includes an assessment of housing and/or jobs outside of the jurisdiction's boundaries would mean that a jurisdiction could be held responsible for responding to land use decisions outside of its control.

The *Future Jobs* factor is the only one included in the potential factors that would be based on forecasted data rather than existing conditions. This factor would use data from the forecasted development pattern in the Plan Bay Area 2050 Blueprint. As discussed at the January meeting, the Blueprint is still under development, so this factor is based on information from the Clean and Green Future developed as part of the Horizon Initiative as a placeholder until the Blueprint is released. Clean and Green was selected as the placeholder because it best represents the

[6] See California Government Code Section 65584(e).
[7] Benner, C., & Karner, A. (2016). Low-wage jobs-housing fit: identifying locations of affordable housing shortages. Urban Geography, 37(6), 883-903.

moderate-growth Future explored in the Horizon process. The data used is from the *Horizon Futures Round 2* because the growth framework for this second round of analysis incorporates additional growth in High Resource Areas and Transit-Rich Areas, consistent with the Plan Bay Area 2050 Growth Framework that was recently approved by ABAG and MTC policy makers.

3a. Job Proximity - Auto	
Impact	More housing allocated to jurisdictions with easy access to region's job centers.
Definition	Share of region's total jobs that can be accessed from a jurisdiction by a 30-minute auto commute.
Revisions	Revised to be sourced from travel model travel time data.
Data source	MTC, Travel Model One
Dot Vote Rank	2
3b. Job Proximity - Transit	
Impact	More housing allocated to jurisdictions with easy access to region's job centers.
Definition	Share of region's total jobs that can be accessed from a jurisdiction by a 45-minute transit commute.
Revisions	New factor
Data source	MTC, Travel Model One
Dot Vote Rank	N/A
4. Vehicle Miles Travelled (VMT)	
Impact	More housing allocated to jurisdictions with a high number of vehicle miles travelled per worker.
Definition	Total modeled vehicle miles traveled per worker in 2020 from Plan Bay Area 2040.[8]
Revisions	New factor
Data source	MTC
Dot Vote Rank	6
5. Jobs-Housing Balance	
Impact	More housing allocated to jurisdictions with a high number of jobs relative to the amount of housing.
Definition	Ratio of jobs within a jurisdiction to housing units in the jurisdiction.
Revisions	None
Data source	MTC, U.S. Census Bureau, ACS 2014-2018, Census LEHD LODES for 2015-2017
Dot Vote Rank	8

[8] Data from Plan Bay Area 2050 would be used once it is available.

6. Jobs-Housing Fit	
Impact	More housing allocated to jurisdictions with a high number of low-wage jobs relative to the number of low-cost rental units.
Definition	Ratio of low-wage jobs (less than $3,333/month) within a jurisdiction to the number of low-cost rental units (less than $1,500/month) in the jurisdiction.
Revisions	None
Data source	MTC, U.S. Census Bureau, ACS 2014-2018, Census LEHD LODES for 2015-2017
Dot Vote Rank	5
7. Future Jobs[9]	
Impact	More housing allocated to jurisdictions with a higher share of projected jobs.
Definition	Jurisdiction's share of the region's forecasted jobs based on Plan Bay Area 2050.
Revisions	None
Data source	MTC
Dot Vote Rank	4

Transportation

Staff has included the Transit Connectivity factor that was presented in January without any revisions. This factor would allocate more housing to jurisdictions with a high share of the region's total acres within Transit Priority Areas (TPAs).[10] Using this approach, rather than a percentage of population or households in a TPA or the percentage of a jurisdiction's land area in a TPA, ensures that each jurisdiction's transit resources are counted equally and are not relative to the jurisdiction's size or experience in directing growth to transit-served locations.

8. Transit Connectivity	
Impact	More housing allocated to jurisdictions with existing and planned transit infrastructure.
Definition	Jurisdiction's percentage of the region's total acres within Transit Priority Areas.
Revisions	None
Data source	MTC
Dot Vote Rank	7

[9] Although ABAG would likely use data for year 2030 if the HMC decides to use Plan Bay Area 2050, staff used data for year 2050 from the Clean and Green future due to greater reliability of the data that is currently available.

[10] Defined in the California Public Resources Code, Section 21099 as areas within 1/2 mile of a Major Transit stop, which could be any of the following:

- Existing rail stations
- Planned rail stations in an adopted RTP
- Existing ferry terminals with bus or rail service
- Planned ferry terminals with bus or rail service in an adopted RTP
- Intersection of at least two existing or planned bus routes with headways of 15 minutes or better during both the morning and evening peak periods

Other Factors of Importance

The HMC expressed a lot of interest in a factor related to natural hazards. For the January meeting, staff proposed a factor that used the Multi-Hazard Index developed for the Horizon Initiative as a way to consider the broad range of hazards to which Bay Area jurisdictions are susceptible. For the March meeting, ABAG staff has revised the Multi-Hazard Index for use in RHNA to consider all relevant hazards, ensure all highest risk areas are incorporated, and better align with Plan Bay Area 2050. See Appendix B for a summary of the revised methodology for the Multi-Hazard Index.

With regard to fire hazards, in the original *Natural Hazards* factor, an area only received a score of 1 (highest risk) for fire if it had both high exposure to wildfire and landslide. In the revised version, all areas with "very high" fire risk are assigned a risk score of 1 even if they are not at risk for landslide. This approach to considering fire risk is consistent with proposed legislation, Senate Bill 182 (Jackson), that would add a new RHNA objective to Housing Element Law and add wildfire risk to the list of factors that must be considered for the RHNA methodology. If this bill becomes law, ABAG would be required to consider wildfire risk in the methodology for this RHNA cycle.

In the latest version of SB 182, the sixth RHNA objective would be "Promoting resilient communities. Furthering this objective includes reducing development pressure within very high fire risk areas." In considering wildfire risk in the methodology, ABAG (and other COGs in future RHNA cycles) would be directed to reduce potential development in very high fire risk areas, including through taking into account the percentage of a jurisdiction's land considered suitable for development that is in a "very high fire risk" area. Although the bill includes specifics about addressing fire risks, nothing in the bill prohibits ABAG from considering wildfire risk in addition to other hazards, consistent with the overall RHNA objective of "promoting resilient communities."

Staff also modified the *Natural Hazards* factor to add all "Alquist Priolo Fault Zones" to consider fault rupture, include any "Very High" liquefaction susceptibility zones, and remove sea level rise from the assessment of flooding. Removal of sea level rise zones is consistent with the approach used for Plan Bay Area 2050, which includes investments to mitigate the impacts of sea level rise. However, many of areas susceptible to sea level rise are still captured by liquefaction and/or FEMA 100-year flood zones.

9. Natural Hazards	
Impact	More housing is allocated to areas with low natural hazard risk.
Definition	Percentage of acres within a jurisdiction's urbanized area in locations with low risk from natural hazards according to the Modified MTC/ABAG Multi-Hazard Index.
Revisions	Added all "very high risk" fire severity zones, "very high" liquefaction susceptibility zones, and Alquist-Priolo Fault Zones. Removed sea level rise zones to be consistent with the adaptation-based strategy used in Plan Bay Area 2050.
Data source	MTC; USGS liquefaction susceptibility; CAL FIRE FRAP LRA/SRA data; FEMA (flood zones), Alquist-Priolo Fault Zones (California Geological Survey)
Dot Vote Rank	3

Appendix A: Explanation of TCAC/HCD Opportunity Map Methodology

Purpose of Opportunity Mapping

The Opportunity Map stems from the California Department of Housing and Community Development's (HCD's) policy goals to avoid further segregation and concentration of poverty and to encourage access to opportunity through affordable housing program design and implementation.[11] In February 2017, the California Tax Credit Allocation Committee (TCAC) and HCD established the California Fair Housing Task Force to provide evidence-based policy recommendations related to fair housing goals.[12] TCAC and HCD charged the Task Force with creating an opportunity map using reliable and publicly available data sources to identify areas in the state whose characteristics have been shown by research to support positive economic, educational, and health outcomes for low-income families and their children.

TCAC adopted the first Opportunity Map in December 2017 with the goal of increasing access to high opportunity areas for households living in affordable housing financed by the Low Income Housing Tax Credit (LIHTC) program. TCAC administers the federal and state LIHTC programs, which represent the primary funding source for new affordable rental housing.[13] When scoring applications for LIHTC funding, TCAC provides a tiebreaker bonus for projects located in a census tract designated as Highest or High Resource on the TCAC/HCD Opportunity Map. TCAC/HCD revises the Opportunity Map annually. In February 2020, TCAC/HCD released a draft version of the 2020 Opportunity Map that uses updated data and includes revisions to the methodology.[14]

Opportunity Index Scores and Categorization

The TCAC/HCD Opportunity Map uses 21 indicators to calculate opportunity index scores for census tracts in each region in California. The draft 2020 Opportunity Map measures rural areas using block groups instead of census tracts (as was done in previous versions) because tracts in rural areas of California are approximately 37 times larger in land area than tracts in non-rural areas.[15] Using block groups in rural areas allows for finer-grained analysis (each rural tract contains three block groups). For most of the Bay Area, opportunity is measured at the census tract level, but there are also areas designated as rural that are measured at the block group level.

Tracts and rural block groups with the following characteristics are not included in the opportunity index dataset due to the lack of reliable data:

- Areas where prisoners make up at least 75% of the population.

[11] For more information on the purpose of opportunity mapping and the 2020 Opportunity Map methodology, see https://www.treasurer.ca.gov/ctcac/opportunity/draft-2020-tcac-hcd-methodology-december.pdf.
[12] The Task Force includes The Othering & Belonging Institute at UC Berkeley, the Urban Displacement Project at UC Berkeley, the Terner Center for Housing Innovation at UC Berkeley, and the California Housing Partnership.
[13] For information on TCAC's LIHTC programs, see https://www.treasurer.ca.gov/ctcac/program.pdf.
[14] To view the draft 2020 Opportunity Map, see https://belonging.berkeley.edu/tcac-2020-preview.
[15] The Opportunity Map defines tracts as rural if at least half of the population resides in block groups labelled as rural on the U.S. Department of Agriculture's online multifamily mapping application.

- Areas with population density below 15 people per square mile and total population below 500.
- Areas where multiple opportunity index indicators lack reliable data due to sample size limitations in the American Community Survey conducted by the Census Bureau.

Opportunity Index Scoring

The TCAC/HCD Opportunity Map categorizes tracts and rural block groups into five groups:

- **Highest Resource**
- **High Resource**
- **Moderate Resource/Moderate Resource (Rapidly Changing)**
- **Low Resource**
- **High Segregation & Poverty**

Before an area receives an opportunity index score, census tracts and rural block groups are filtered into the High Segregation & Poverty category. This filter aligns with HCD's policy goals to avoid further segregation and poverty concentration while increasing access to opportunity for low-income families. The Task Force developed a two-stage approach:

- **Concentrated poverty:** First, identify tracts and rural block groups where at least 30% of population is below the federal poverty line. Research shows this share of neighborhood poverty corresponds with negative outcomes for individuals. To prevent students from distorting the concentrated poverty measure, college and graduate students are removed from the poverty calculation in tracts where they are at least 25% of the population.
- **Racial segregation:** Second, the filter measures racial segregation to capture tracts and rural block groups with a disproportionate share of households of color. The filter uses the location quotient of residential racial segregation (LQ), which is a relative measure of segregation rather than an absolute threshold. The LQ is the ratio of a racial group's population share in an area (e.g., a census tract or block group) to that group's share of the population in a larger area (in this case, the county). For the High Segregation & Poverty filter, tracts that have a LQ higher than 1.25 for Blacks, Hispanics, Asians, or all people of color are flagged as being racially segregated in comparison to the county. In other words, if any of these groups is 25% more concentrated in the tract or block group relative to the county, the area is considered racially segregated.

After filtering out High Segregation and Poverty areas, the TCAC/HCD Opportunity Map allocates the 20% of tracts in each region with the highest relative index scores to the Highest Resource designation and the next 20% to the High Resource designation. Each region thus ends up with 40% of its non-filtered tracts with reliable data as Highest or High Resource. The remaining non-filtered tracts are then evenly divided into Low Resource and Moderate Resource categories.

The approach to allocating resource categories for rural block groups is different. Rural block groups are compared to other rural block groups in the same county. 40% of rural block groups in a county are allocated to the Highest Resource and High Resource categories, and the remaining rural block groups in the county are evenly divided into Low Resource and Moderate Resource.

To account for places experiencing rapid changes in opportunity and resources, the draft 2020 Opportunity Map identifies Moderate Resource areas with index scores just below the High Resource threshold that have experienced rapid increases in key indicators since 2000. The 2020 Opportunity Map labels these areas as "Moderate Resource (Rapidly Changing)". However, this new category currently does not impact TCAC or HCD programs, which focus on High and Highest Resource areas.

Indicators that Determine Opportunity Index Scores

The Opportunity Map categorizes 21 different indicators into three domains: **Economic, Education, and Environmental.**

Each census tract or block group receives a score for each indicator. The scores are averaged together by domain (with each indicator's score receiving an equal weighting), and the three domain scores are then averaged together to create an index score for the tract or block group.

Economic Domain Indicators
Poverty: The percent of the population in each tract and rural block group with an income above 200% of federal poverty line. Numerous studies have shown tract-level poverty rates are a strong indicator of an area's level of resources and a predictor of key life outcomes for low-income children. Living in low-poverty areas has been shown to generate significant benefits for both children and adults. The Task Force used 200% of the poverty line to reflect the higher cost of living in California.
Adult education: the percent of adults 25 years and older who have earned at least a bachelor's degree in each tract and rural block group. The tract-level share of adults that have earned a bachelor's degree has been shown to be highly correlated with rates of upward economic mobility for low-income children. Higher rates of post-secondary attainment are also predictive of higher wages and improved work opportunities for adults, meaning that families are less likely to be economically insecure.
Employment: The percent of individuals in each tract and rural block group age 20 to 64 who are employed in either the civilian labor force or the armed forces. The tract-level share of employed adults has been shown to be highly correlated with rates of upward economic mobility for low-income children, while adult unemployment is commonly considered an indicator of neighborhood disadvantage that affects the entire community.
Proximity to jobs: The number of jobs filled by workers with less than a bachelor's degree that fall within the typical commute distance of low-wage workers in the region. Communities can experience poor labor market outcomes because of the lack of nearby jobs with skill-levels and qualifications accessible to community members. This indicator encourages locate affordable housing near jobs likely to be attainable for low-income households.
Median home value: The median value of owner-occupied units according to the census. Home value is a strong proxy for the quality of neighborhood resources. Research suggests that neighborhood characteristics like school quality, public resources, crime rates, and environmental quality are all reflected in home values.

Education Domain Indicators

Math proficiency: The percentage of 4th graders who perform at or above grade level, calculated as the enrollment-weighted average proficiency level of students at the three closest schools (within the same county) to each census tract/block group.[16]

Studies have shown that test scores correlate with students' neighborhood conditions, such as whether they live in a high-poverty or high-crime area. Further, test scores and other measures of school quality are highly correlated with upward mobility for low-income children. While this indicator does not account for non-neighborhood school district assignment policies, the academic literature suggests that low-income students are more likely to attend their neighborhood schools even when they have a choice to go elsewhere.

Reading proficiency: The percentage of 4th graders who perform at or above grade level, calculated as the enrollment-weighted average proficiency level of students at the three closest schools (within the same county) to each census tract/block group.[5]

See explanation above for the math proficiency indicator.

High school graduation rates: The cohort-weighted average of the percent of students who graduate in four years for the three high schools nearest to the tract or rural block group, based on California Department of Education data.[17]

Low graduation rates indicate schools are not preparing students for the workforce. Students who do not graduate from high school face a variety of challenges later in life, including an increased risk of going to prison and lower wages than their classmates who graduate.

Student poverty rates: The percentage of students not receiving free or reduced-price lunch, calculated using the enrollment-weighted average from the three closest schools (within the same county) to the census tract/block group.

Studies have consistently shown that attending low-poverty and economically integrated schools boosts educational achievement for low-income students, when compared to attending higher-poverty schools.

Environmental Domain Indicators

The environmental domain uses data from CalEnviroScreen 3.0, a statewide risk assessment tool that measures cumulative impacts of multiple sources of pollution. The Opportunity Map uses 12 indicators from CalEnviroScreen 3.0, which were selected based on scientific literature related to the impact of the indicator on health and the quality of the data available:[18]

- **Ozone concentrations**
- **PM2.5 concentrations**
- **Diesel PM emissions**
- **Drinking water contaminants**
- **Pesticide use**
- **Toxic releases from facilities**
- **Traffic density**
- **Cleanup sites**
- **Groundwater threats**
- **Hazardous waste generators and facilities**
- **Impaired water bodies**
- **Solid waste sites and facilities**

[16] The Task Force utilized the average value from three schools because the methodology does not account for school assignment boundaries, which are different from census tract/block group boundaries.

[17] Previous versions of the Opportunity Map used district-wide graduation rates for this indicator. The draft 2020 Opportunity Map uses the same approach as the elementary school-based indicators (test scores and student poverty) to increase the accuracy of this indicator.

[18] For more information about the CalEnviroScreen indicators, see https://oehha.ca.gov/calenviroscreen/indicators.

Appendix B: Explanation of Modified ABAG/MTC Multi-Hazard Index

Summary

The Bay Area is a hazard rich region. Earthquakes, wildfires, floods, and landslides are all hazards that have and will continue to impact the region. The proposed Multi-Hazard Index is constructed using five regionally complete hazard layers for wildfire, landslide, flooding, fault rupture, and liquefaction. An early version was developed to support analysis for *Horizon* Perspective Paper 3 which explores areas that are well suited for future growth. The index provides a hazards perspective on which places in the Bay Area have fewer/lesser hazards to contend with. This summary of the methodology for the Multi-Hazard Index has been revised to reflect the modifications made by ABAG staff for using the index in the RHNA methodology. ABAG staff has revised the Multi-Hazard Index to simplify the approach where possible, consider all relevant hazards, ensure all highest risk areas are incorporated, and better align with Plan Bay Area 2050. For RHNA purposes, ABAG staff included only those areas with the greatest exposure to hazard risks.

Index Methodology

The Bay Area is a hazard rich region. Earthquakes, wildfires, floods, and landslides are all hazards that have and will continue to impact the region. Areas of high hazards are spatially correlated into two different groups:

1. In the mountains, fire and landslide hazards are known to occur in the same space. Steep topography is one variable that is a major driver of both landslide and fire hazard.
2. Along rivers and shorelines, flooding, sea level, and liquefaction hazards are spatially correlated. Most liquefaction zones are a result of current or historic river systems carrying liquefiable sediment into a zone. Similarly, areas where the region filled the bay are generally low elevation and at risk of current and future flooding.

The Modified Multi-Hazard Index staff proposes to use for the RHNA methodology includes the following areas of highest risk:

Wildfire and Landslide Hazards

- Any "Very High" Fire Hazard Severity Zone (CAL FIRE)
- A "High" Fire Hazard Severity Zone when it is also a "High" Landslide Area (USGS).

Assessment of fire hazards is based on the draft Fire Hazard Severity Zone (FHSZ) maps from CAL FIRE (2009), which take into account the amount of vegetation, the topography, and weather (temperature, humidity, and wind), and represents the likelihood of an area burning over a 30 to 50 year period.[19] ABAG staff chose the FHSZ map because it is tied to relevant state legislation Senate Bill 1241 (2012) which connects General Plan Housing and Safety Elements

[19] Staff selected the Fire Hazard Severity Zone draft maps because the final versions omit some data, making it a regionally incomplete layer.

and incorporates CAL FIRE's review of Housing Elements. THE FHSZ maps are also the regulatory map that requires more stringent fire codes for new construction as well as defensible space requirements and inspections. The draft FHSZ maps staff used do not assess future fire risks as a result of climate change. CAL FIRE is updating these maps, with expected completion in late 2020/early 2021.

Assessment of landslide hazard areas is based on Landslides_USGS (1998) which shows areas where landslides have occurred in the past, since these are the areas where future landslides are most likely to occur.

Earthquake

- All Alquist-Priolo Fault Zones (California Geological Survey)
- Any "Very High" Liquefaction Susceptibility Zone (USGS)

Liquefaction is a phenomena that can occur when three variables are present: (1) the ground at a location must be "loose" – uncompacted sand and silt without much clay, (2) The sand and silt must be water saturated due to a high water table, (3) the site must be shaken long and hard enough by an earthquake to trigger liquefaction. When liquefaction occurs, it can be very damaging to both buildings and most underground infrastructure (roads, water, wastewater, gas). Assessment of liquefaction is based on a map from the California Integrated Seismic Network (CISN) in 2012.

Flooding

- All 100-year Flood Zones (FEMA)

Assessment of current flooding is based on a simplified version of FEMA's maps which characterize current flooding risk from both bay and riverine sources. The FEMA flood maps exist for eight of the nine counties (San Francisco is unmapped).