Traffic Circle Policy Task Force
Special Meeting
Wednesday, October 2, 2019

Minutes

1. Roll Call
   Present: Wendy Alfsen, Steven Finacom, Robin Grossinger, Andrew Liu, Linda Franklin Diane Ross-Leech, John Steere, Diana Wood, Sally Hughes
   Absent: Erin Diehm, Yolanda Huang, Fred Krieger,
   Staff Present: Tano Trachtenberg, Farid Javandel, Hamid Mostowfi, Paul Buddenhagen

2. Agenda Approval
   Action: M/S/C (Grossinger/Steere) to approve the agenda
   

3. Approval of Minutes from September 11, 2019
   Action: M/S/C (Steere/Grossinger) to approve the minutes with changes
   

4. Public Comment
   There were 2 speakers during public comment

5. Staff Feedback and Task Force Revisions to Policy-
   Action: M/S/C (Steere/Grossinger) to approve changes to policy as discussed by members (see attached)
   

   Action: M/S/C (Finacom/Alfsen) to request up to 20 minutes to present the report at City Council and to allow multiple members to participate in the presentation
   
6. **Review Revised Vegetation Subcommittee Report**

   **Action:** M/S/C (Steere/Grossinger) to approve changes to report as discussed by members (see attached)

   **Vote:** Ayes: Wendy Alfsen, Steven Finacom, Robin Grossinger, Andrew Liu, Linda Franklin Diane Ross-Leech, John Steere, Diana Wood, Sally Hughes. Noes: None. Abstain: None. Absent: Erin Diehm, Yolanda Huang, Fred Krieger,

7. **Adjourn**

   **Action:** M/S/C (Ross-Leech/Steere) to adjourn the meeting.

   **Vote:** Ayes: Wendy Alfsen, Steven Finacom, Robin Grossinger, Andrew Liu, Linda Franklin Diane Ross-Leech, John Steere, Diana Wood, Sally Hughes. Noes: None. Abstain: None. Absent: Erin Diehm, Yolanda Huang, Fred Krieger

The next meeting will be on Wednesday, October 23 at 7:30pm in the Sports Basement Community Room - 2727 Milvia St, Berkeley, CA 94703
To: Honorable Mayor and Members of the City Council
From: Traffic Circle Policy Task Force
Submitted By: Diane Ross-Leech, Chairperson, Traffic Circle Policy
Subject: Traffic Circle Policy and Program Recommendations

RECOMMENDATIONS
Adopt a resolution to approve the Traffic Circle Policy as outlined below and refer to the traffic engineer for codification.

Integrate the Community Common Space Stewardship Program into the “Adopt a Spot Initiative,” which the City Council approved on April 23, 2019 (Item #33), and request that the City Council refer it to the Traffic Circle Task Force, rather than the Parks and Public Works Commissions, for the purpose of development, outlining criteria and environmental benefits, program costs and staffing.

Refer additional traffic calming measures at Ellsworth for the intersections with Dawn Redwoods to the mid-year budget process and to request mitigation funds from EBMUD due to the impact on these streets from their Wildcat Pipeline Project.

Refer to the City Manager:
1. Create the Community Common Space Stewardship Program as described below
2. Amend BMC section 16.18.040 to exempt traffic circles from permit requirements and address liability
3. Amend section 16.18.280 to encourage installation of green infrastructure
4. Refer the additional staff and material costs of this program to the budget process.

CURRENT SITUATION AND ITS EFFECTS
Berkeley’s traffic circle policy is being revised with the assistance of the Traffic Circle Policy Task Force, which was established by the Mayor of Berkeley on February 26, 2019 (Attachment 2). The Task Force is composed of interested community members from geographically diverse parts of the city, including Berkeley Partners for Parks, who maintain neighborhood traffic circles. The Task Force was charged with evaluating the
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The current traffic circle vegetation policy, recommending appropriate characteristics for allowed plantings, recommending a policy that ensures sight lines for visibility, and working with the community to update the policy to ensure pedestrian, bicycle and vehicle safety, as well as beautification of traffic circles.

Neighborhood traffic circles are islands in the middle of intersections whose primary purpose is to calm and slow traffic. In contrast, larger circles such as the Marin circle, are designed to facilitate traffic flow and efficiency. Neighborhood traffic circles have been shown to reduce the speed of travel as well as reduce the number of collisions and injuries involving vehicles, pedestrians, and bicycles at these intersections. For example, “the Institute of Traffic Engineers (ITE) states that neighborhood traffic circles have been found to reduce intersection collisions by up to 70%.” Seattle WA, which has more than 1,200 circles and adds 5 each year, reports a roughly 90% reduction in collisions. Similarly, Madison WI reports an average decrease of 70%. A major benefit of traffic circles is that they reduce the number of conflict points, or locations where traffic crosses paths, as illustrated in the figures below. For example, vehicles do not need to cut directly in front of oncoming traffic to make a left turn. This tends to eliminate broadside hits, which are often the deadliest intersection crashes.

1 Lupfer, Patrick. “Neighborhood Traffic Circles - Intersection of South Street and Intervale Road in Brookline, MA” (Calm Streets Boston, April 24, 2012)
2 Marek, John. “Neighborhood Mini Traffic Circles: Seattle Washington” a case study of Countermeasures on the webpages BIKESAFE (pedbikesafe.org)
3 Neighborhood Traffic Management Plan (City of Madison WI, November 2004)
Comparing conflict points of a Traditional Intersection (left) with those of a Neighborhood Traffic Calming Circle (right).  

Berkeley has 62 neighborhood traffic circles; they represent a significant component of our streetscapes, shaping the safety and character of many neighborhoods, and improving public health while removing a half acre of asphalt. From a national perspective, low plantings and central trees are usual and customary practice for neighborhood traffic circles in cities throughout the country. These cities’ policies recommend, encourage and support the inclusion of traffic circles with well-maintained trees and vegetation for their benefits to traffic calming, making traffic circles more visible and contributing to beautification, neighborhood character, and other benefits urban greening provides. Berkeley has numerous policies and plans that support traffic circles for traffic calming and other environmental and community benefits. Traffic circle trees and low vegetation are also recommended in national guidance by the Federal Highway Association and the National Association of City Transportation Officials.

Traffic circles provide many important benefits, including traffic calming and street safety. They also make important contributions to the City’s climate, quality of life and social equity goals. Districts 2 and 3 which have the highest number of traffic circles are also the City’s most densely populated neighborhoods and have the lowest ratio of parks and open space. Traffic circles ameliorate some of these inequities in urban greening by 1) reducing stormwater runoff and the Urban Heat Island Effect; 2) ameliorating current and projected increases in Extreme Heat Events; and 3) increasing the tree canopy and vegetation diversity in south-side areas. In light of the City’s Declaration of a Climate Emergency the Task Force wishes to emphasize that

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4 Lupfer, Patrick. “Neighborhood Traffic Circles - Intersection of South Street and Intervale Road in Brookline, MA” (Calm Streets Boston, April 24, 2012)
5 For a map of Berkeley traffic circles, see Appendix B in the Vegetation Subcommittee Report, Attachment 3.
6 Population Density in Berkeley (Zip Atlas)
7 Extreme heat events are a newly-introduced hazard of concern for the 2019 LHMP… By the end of the century, Bay Area residents may average six heat waves annually, which will average a length of ten days… Berkeley’s urban forest helps to mitigate the impacts of extreme heat events by shading buildings and paved and dark-colored surfaces, such as roads and parking lots that absorb and store heat…” From the first complete draft of the 2019 Local Hazard Mitigation Plan (p. ES-10, B-139, B-149; City of Berkeley)
8 See Map 34 illustrating the inequitable distribution of tree canopy in Berkeley. “The areas shaded in darker green, predominately in the hills in east Berkeley, have the greatest percentage of tree canopy, while west and south Berkeley have the least, meaning that these buildings and communities will likely not benefit from reduced temperatures provided by urban tree cover.” From the first complete draft of the 2019 Local Hazard Mitigation Plan (p. B-154, B-155; City of Berkeley). Or page 6 of the attached Vegetation Subcommittee Report, Attachment 3.
9 Endorsing the Declaration of a Climate Emergency, Resolution No. 68-486-N.S. (June 12, 2018; City of Berkeley)
Traffic circles contribute to the planted green space of our densely populated City neighborhoods.

In the last five years there have been at least two serious accidents involving cars and pedestrians in the vicinity of a traffic circle intersection. In a lawsuit against the City of Berkeley in one case, the plaintiff's attorney alleged that the traffic circle vegetation obstructed the view of an approaching driver and contributed to the collision with a pedestrian. These accidents are the major reason the Task Force was established to develop an updated and well-founded set of policies to guide the establishment and maintenance of traffic circle vegetation and addressing safety concerns is the primary purpose.

BACKGROUND AND RATIONALE FOR RECOMMENDATIONS

A. Traffic Circle Task Force Process

The Mayor's office hosted two community meetings on May 15 and May 29, 2019 where all interested community members were invited to participate and learn about the proposed Traffic Circle Policy Task Force, responsibilities, goals, deadlines and how to apply to the Task Force.

The Traffic Circle Policy Task Force held meetings on June 19, July 10, July 31, August 21, September 11 and October 2, 2019 where members of the public, in addition to the Traffic Circle Commissioners, had the opportunity to make public comments and participate in the general discussion. Agendas and minutes from these meetings can be found on the Traffic Circle Policy Task Force page on the city's website.

At its first official meeting, the Traffic Circle Policy Task Force invited the city's Traffic Engineer, Hamid Mostowfi, to address questions from the Task Force Commissioners. The Traffic Engineer's primary concern with traffic circles is maintaining sight lines for

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10 The Task Force notes that it received no data showing that Berkeley intersections that include traffic circles are associated with higher collision rates. In fact, based on data from other cities we would expect the collision rate to be significantly lower than traditional intersections. At writing no data has been provided to the Task Force comparing Berkeley's rate of accidents in traditional intersections (no circle) with those that have a circle (with and without a tree; before and after installation). We recommend the city conduct such an analysis to allow future iterations of the policy to be based on a better understanding of actual accident patterns.

11 The Task Force recommends the city conduct an analysis of it is worth noting that there is no evidence that Berkeley intersections that include traffic circles are associated with higher collision rates. In fact, based on data from other cities we would expect the collision rate to be significantly lower than traditional intersections. At writing no data has been provided to the Task Force comparing Berkeley's rate of accidents in traditional intersections (no circle) with those that have a circle (with and without a tree; before and after installation).
visibility. With this background and the charge set out by the City Council and the Mayor, the Task Force set up three subcommittees to review Berkeley's own policies and plans as they relate to traffic circles and to gather additional information and research about traffic circles in other cities around the country. The Task Force also met twice with Farid Javandel, Traffic Division Manager.

The Vegetation Subcommittee examined the policies and characteristics of traffic circles in cities around the U. S. and Canada, reviewing various standards for traffic circle vegetation in national guidance documents and in published policies of other cities and through interviews with traffic safety experts. In addition, the Vegetation Subcommittee interviewed traffic engineers, landscape architects, and traffic circle administrators from a number of other cities to understand perspectives on traffic circle landscaping. The Subcommittee found that landscaped plantings with trees are standard practice for neighborhood traffic circles in numerous cities across the country and are also recommended in the major national guidelines for traffic safety and urban design. For example, vegetated traffic circles are recommended by the U. S. Department of Transportation/Federal Highway Administration recommends including vegetation and trees to maximize the for traffic calming effect:

“A traffic circle can simply be a painted area, but it is most effective when it is defined by a raised curb and landscaped to further reduce the open feel of a street. A traffic circle can be landscaped with ground cover flowers, and street trees.”

Traffic circles planted with trees are considered to contribute to traffic calming by reducing the open feel of the street and increasing the visibility of the circle, particularly at night, resulting in slower traffic speeds. Specifications for the height and clearance of vegetation are generally recommended for low landscaping and trees that provide clear sight lines. (see Attachment 3 for additional details).

Through the Subcommittee's our research, we found the vegetation subcommittee revealed that specifications for vegetation height ranged from 2 to 5 feet (with our neighbor San Francisco allowing 3 feet) and with tree limbs above 7-8 feet (14 feet if the limbs extend beyond the traffic circle planter curb into the travel lane). Keeping in mind the importance of public safety, the Vegetation Subcommittee of the Task Force used this information to inform the policy described below. (See Attachment 3 for additional details, including photos of traffic circles across 9 cities in the U.S. and Canada)

12 Traffic Calming ePrimer – Module 3 (U.S. Department of Transportation/Federal Highway Administration)
13 SF Better Streets: A guide to making street improvements in San Francisco (City and County of San Francisco 2015)
The Operation and Maintenance Subcommittee focused its research on successful community volunteer programs in other cities that Berkeley could replicate, such as Oakland’s “Adopt a Spot” initiative. The subcommittee relied on previous research prepared by Berkeley Partners for Parks titled “Expanded Berkeley Partners for Parks Proposal to City of Berkeley Regarding Strengthening Volunteer Engagement by Establishing Citywide Adopt a Spot Program,” (see Attachment 6). The Subcommittee further reviewed websites from various cities, including Oakland, to view program documents. All of the community volunteer programs have a more formal structure for their programs and volunteers than Berkeley. Typical elements include: a volunteer job description used for recruiting purposes; volunteer application or agreement with a minimum term; maintenance rules and guidelines; planting guidelines; and safety rules and guidelines all on the city’s websites with easy to use on-line applications and approvals (see Attachment 4 for additional details).

The Policy Alignment Issues Subcommittee reviewed all of the City of Berkeley’s applicable plans, policies and programs found on the city’s website, as well as some state and regional plans and policies, to determine how the proposed traffic circle policy and actions would intersect. These Subcommittee found overwhelming support and alignment among these documents. In particular, the Berkeley Bicycle Plan recommends additional traffic calming improvements along the Bicycle Boulevard network by adding 42 new traffic circles by 2035 (see Attachment 5 for additional details).

The Subcommittee’s comprehensive reports are Attachments 3, 4, and 5.

Other San Francisco Bay Area (e.g., San Francisco, Palo Alto) and North American cities and expert analysts beyond Berkeley have identified trees as a welcome and useful component of traffic circles, particularly because they help slow traffic and identify for drivers the presence of a circle from a distance. For example, From the City of San Francisco recommends that:

"Traffic Calming Circles should be landscaped with trees or plantings. Shrubs and grasses should be planted up to 3 feet tall and trees should be appropriately pruned."

These guidelines also allow for more than one tree, specifying the recommended number of trees in relation to circle size:

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14 SF Better Streets: A guide to making street improvements in San Francisco (City and County of San Francisco 2015)
In traffic calming circles with a diameter of less than 15 feet, one tree should be planted in the center. On a traffic calming circle with a diameter greater than 15 feet, more than 1 tree should be planted and should be equally spaced around the circles.” (emphasis added)\footnote{15} 

The Urban Street Design Guide, a manual developed by the National Association of City Transportation Officials (NACTO, an association of over 71 major North American Cities and 10 transit agencies) notes the value of trees and other vegetation not only for beautification, but also for their contribution to traffic calming. From the NACTO website:

“Mini roundabouts and neighborhood traffic circles lower speeds at minor intersection crossings... Shrubs or trees in the roundabout further the traffic calming effect and beautify the street, but need to be properly maintained so they do not hinder visibility.”\footnote{16} (emphasis added)

Whether community volunteers are experts or novices, everyone needs common sense guidelines for safely maintaining the traffic circles. Most of the cities that support volunteer programs have all of the documents on the city’s website. These guidelines and best practices will be important to help ensure that vegetation in traffic circles continues to contribute to traffic calming even as the seasons pass, climate change becomes a greater global issue, and volunteers come and go. Compliance with overall vegetation traffic calming measures over time, as plants grow and obscure sightlines and as volunteers turn over.

The traffic circle policy emphasizes a strict standard for the height of shrubby and herbaceous vegetation across the traffic circle. Such vegetation has the potential to create a visual barrier to drivers and pedestrians, particularly at the margins of circles where parties are closer to each other. We found that trees in the center area of circles are not considered to be a safety concern in the many other cities examined. Tree trunks create relatively small and momentary visual barriers, and only when parties are on the opposite sides of a circle. However, out of an abundance of caution, we also established guidelines for the width of tree trunks and other narrow vertical vegetation.

With limited time, the Task Force prioritized the development of a vegetation policy and a maintenance program. However, the following categories represent a good starting point for some of the guidelines that will be needed to support the Traffic Circle Policy and Community Common Space Stewardship Program (traffic circles are only one component of the Program).

\footnote{15}{Ibid.}
\footnote{16}{Urban Street Design Guide (National Association of City Transportation Officials 2013)}
Guidelines and Best Practices for Traffic Circles:
- General conduct, safety, tools, watering
- Managing sightlines and vegetation
- General layout/design for traffic circles
- Plant maintenance, pruning, weeding, new planting and tree replacement and/or removal
- Integrated Vegetation Management and Pest Control
- Garbage and Debris Removal
- Decorations, boulders, bird feeders, miscellaneous
- Coordinating with Public Works
- Self-Certification of Compliance with Best Practices
- On-line Arc-GIS/Google Maps traffic circles GIS database

If authorized by Mayor and Council, the Traffic Circle Task Force will continue to work to develop some recommended guidelines for many of these categories, relying on best practices and community knowledge and collaboration, and hopes to be able to do so as part of the integrated Community Common Space Stewardship Program / “Adopt a Spot Initiative”.

B. Review of Existing Plans, Policies and Programs

The City of Berkeley General Plan directly addresses landscaped traffic circles and encourages their construction for traffic calming.

The 2009 City of Berkeley Climate Action Plan identifies traffic circles as essential to slow or reduce automobile traffic and make walking and bicycling safer. Traffic circles are recognized traffic calming measures on a local street with a complementary benefit of sequestering carbon from trees and plantings.

The Berkeley Pedestrian Master Plan strongly supports the traffic calming benefits and safety improvements provided by traffic circles.

The Berkeley Bicycle Plan supports traffic calming through various measures, including additional traffic circles along major Bicycle Boulevards to slow traffic and improve safety. The Design Specifications of the Plan includes a broad canopy tree in the center of the circle. (See Attachment 3 for the associated illustration.)

The “Vision Zero” Policy initiative is intended to create a transportation system with no fatalities or serious injuries involving road traffic. The Task Force strongly recommends that traffic circles are a component of the plan be a part of the pending plan.

There are additional City of Berkeley plans and policies that support traffic circles, and more detail can be found in Attachment 5.
C. Traffic Circle Policy

The traffic circle policy emphasizes a strict standard for the height of shrubby and herbaceous vegetation across the traffic circle. Such vegetation has the potential to create a visual barrier to drivers and pedestrians, particularly at the margins of circles where parties are closer to each other. We found that trees in the center area of circles are not considered to be a safety concern in the many other cities examined. Tree trunks create relatively small and momentary visual barriers, and only when parties are on the opposite sides of a circle. However, out of an abundance of caution, we also established guidelines for the width of tree trunks and other narrow vertical vegetation.

PURPOSE

The purpose of this new policy is to identify the appropriate design, vegetation and operation characteristics of traffic circles that provide both traffic calming, beautification, climate change mitigation and other benefits while maintaining pedestrian safety.

As proposed and documented in numerous City of Berkeley plans, programs and policies, the primary purpose of neighborhood traffic circles is for traffic calming and not facilitating its flow, as excess speed causes one in three traffic deaths, comparable to drunk driving. This purpose is important to highlight so that traffic circle elements, as well as additional, complementary safety measures are designed to support traffic calming and pedestrian safety goals. Both additional safety measures and traffic circle elements support this. We acknowledge that the traffic circle must be maintained to for safety, even if vegetation and trees may periodically need to be pruned significantly or replaced if they grow beyond a safe form. Most cities around the country and in California incorporate vegetation and trees in traffic circles as part of advocate for traffic calming measures. Excess speed causes one in three traffic deaths, comparable to drunk driving. The Task Force's goal of this policy is to develop guidelines ensuring that traffic circle vegetation and trees are maintained to conform with safety standards, thereby enhancing, rather than reducing, neighborhood safety. To include vegetation and trees in traffic circle design.

The traffic circle policy emphasizes a strict standard for the height of shrubby and herbaceous vegetation across the traffic circle. Such vegetation has the potential to create a visual barrier to drivers and pedestrians, particularly at the margins of circles where parties are closer to each other. We found that trees in the center area of circles are not considered to be a safety concern in the many other cities examined. Tree trunks create relatively small and momentary visual barriers, and only when parties are

17 Motor Vehicle Crash Deaths: How is the US doing? (Centers for Disease Control and Prevention)
18 Motor Vehicle Crash Deaths: How is the US doing? (Centers for Disease Control and Prevention)
on the opposite sides of a circle. However, out of an abundance of caution, we also established guidelines for the width of tree trunks and other narrow vertical vegetation.

**GRANDFATHERING IN EXISTING TREES**

Berkeley has a variety of existing trees in its traffic circles, such as Coast Live Oaks, California Buckeyes, Dawn Redwoods, Olives, and other trees. These include California Live Oaks, Dawn Redwoods, California Buckeyes, palms of various species, Strawberry Trees, and Red Bud. These trees should be “grandfathered”, after review of individual specimens to ensure they are healthy, conform to sight line maintenance guidelines, and pass safety inspection from the City’s Arborist, where the inspection only addresses the health of the tree. All existing trees that are structurally safe, healthy and meet the sightline requirements are permitted by this policy. For trees with trunks that exceed 20” in diameter see the section “TREE TRUNKS WIDER THAN 20 INCHES” below, which outlines how additional traffic calming measures will be incorporated into the traffic circle intersection to ensure safety in the case of the few larger trees.

**VEGETATION AND NEW TREES**

Regularly Beautiful, healthy, and well-maintained vegetation and trees in traffic circles supports Berkeley’s neighborhood quality of life and contributes to traffic calming. The City should encourage circle plantings that should be durable, diverse, attractive and planted and maintained by community volunteers. Volunteer participation adds to the unique character of our neighborhood and creates strong resident commitment to our urban communities. Planted circles should improve storm water retention and are strongly encouraged to use native or other plant species that do not require pesticides or herbicides to maintain them. The Task Force does not support a species list of approved plants, which would be costly and difficult to administer. Instead, the City should permit a broad range of plantings that conform to general criteria. Traffic circles should be planted within consideration of their vegetation and tree’s mature shape and size and sightline requirements. The Task Force has drafted several For some—suggested palettes for those who find suggestions helpful (with plant lists provided (... see Attachment 3). The selection of new trees proposed by traffic circle coordinators or volunteers will be approved by the Forestry Supervisor, with the understanding that the city encourages a

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19 Designated historic resources are regulated by the Landmarks Preservation Ordinance, and may have features that do not conform to these policies. In case of conflict, the city shall follow established procedures for alterations to a designated landmark. Landmarks Ordinance prevails.
The Task Force did not reach resolution on whether new tree plantings could result in large trunked trees. We, The Task Force recommends revisiting trunk size considerations issue every five years as the implications of climate change and autonomous vehicles become clearer. In the interim, large trunked trees such as redwoods will not be planted.

**SIGHTLINES**

Visual sight lines – the unobstructed view of the driver\(^\text{20}\) stopped before entering the near crosswalk to the corners of the opposite crosswalk [see drawing on p. 5 of Attachment 3 Illustration Figure X below] – should guide all vegetation selection and maintenance criteria. Based on the City of Berkeley’s Traffic Engineer’s opinion and researched best practice, as well as information from Task Force research, low vegetation should be maintained at a maximum height of 2.5 feet from the top of the traffic circle planter curb and a mature tree canopy should be pruned and trimmed up to and maintained at 7-8 feet height above the top of the traffic circle planter curb. Limbs that extend beyond the curb should be trimmed to 14 feet above the adjacent road surface within the road right-of-way. Single tree trunks that are less than 20” in width, as measured 4 feet above the ground, do not require any additional traffic calming devices. Limited young tree branches Low branches on young trees and/or flower stalks extending above the 2.5 feet maximum height, such as hollyhocks and agapanthus, shall be permitted as long as the total visual obstruction above 2.5 feet is no more than 20° across the circle.\(^\text{21}\) while in bud and bloom if total vegetation and signage creates less than a 3 foot blind spot (approximately the size of a wheelchair), or a 12 inch wide vertical obstruction obstructs less than 25% of the sight triangle.\(^\text{22}\)

\(^\text{20}\) By national standards it is assumed that drivers’ eyes are at three and a half feet and ability to see an object one foot tall on the ground [cite?].

\(^\text{21}\) A tree in the center of a traffic circle can only create a visual impact when objects are on directly opposite sides of the circle. These specifications to trunk size and vegetation height are calculated to create a cross-circle visual impact of no greater than 36 inches (approximately the size of a wheelchair), per guidance from the City Traffic Engineer. Given the geometric relationship between a driver at a crosswalk and the opposite crosswalk, tree trunks or other limited blocks of vegetation up to approximately 23” make visual obstructions no greater than 36 inches in the opposite crosswalk (see illustrations below). Reducing target trunk size to 20” provides a conservative safety margin for visual impacts.

\(^\text{22}\) Sight lines are defined as that horizontal plane (called the sight triangle), from the view of the driver stopped before entering the crosswalk to the corners of the opposite intersection, from 2.5ft above the top of the traffic circle planter curb line to the height of 7-8 feet.
These specifications are calculated to create a cross-circle visual impact of no greater than 36 inches (approximately the size of a wheelchair), per guidance from the City Traffic Manager. Given the geometric relationship between a driver at a crosswalk and the opposite crosswalk, tree trunks or other limited blocks of vegetation up to approximately 23” make visual obstructions no greater than 36 inches in the opposite crosswalk (see illustrations below). Reducing target trunk size to 20” provides a conservative safety margin.
TREE TRUNKS WIDER THAN 20 INCHES

Tree trunks wider than 20 inches will be permitted with additional traffic calming measures, such as speed tables or cushions, diagonal diverters or flashing beacons, rumble strips to ensure slow speeds, additional stop signs or traffic mirrors to increase visibility, established around the intersection. City staff and neighborhood traffic circle coordinators or volunteers will work together to determine what

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\[ A = 25'; B = 43.5'; y = 36''; x = 23'' \]
measures are needed and which ones are best suited for the viability of installation. Where funding restrictions are the significant restriction, traffic circle coordinators or volunteers wish all be given a reasonable amount of time for community fundraising to offset the cost of additional traffic calming measures.

GUIDELINES

SUMMARY OF POLICY RECOMMENDATIONS

Neighborhood communities and traffic circle volunteers care a great deal for their circle plantings and should be provided an opportunity to bring their trees and vegetation into conformance with the sight line maintenance guidelines within 30 days following notice of adoption or, in the future, of non-compliance. The City Arborist or Forester?Forestry Supervisor. Need consistent term, also under VEGETATION AND NEW TREES may provide guidance on how best to prune vegetation and trees to accomplish the sight lines or to suggest alternative plantings whose growth patterns would naturally conform. The Urban Forestry Unit of the Parks Division, will maintain the tree branches above the travelled way to ensure they are at least 14 feet from the road surface.

The City supports community volunteer contributions in a safe and reasonable manner and to find ways of recognizing and acknowledging their efforts. C that community volunteers, who are giving a considerable amount of free time to maintain the City’s open spaces, including traffic circles. Community volunteers are encouraged to contribute in a safe and reasonable manner and to follow guidelines developed by the Community Common Space Stewardship Program.

Summary of Policy Recommendations for Traffic Circle Vegetation:

- The primary purpose of neighborhood traffic circles is for traffic calming.
- Trees should not only be allowed, but encouraged in traffic circles in conformance with sight line maintenance guidelines and pruning maintenance guidelines. Sightlines should be maintained at a maximum height of 2.5 feet from the top of the traffic circle planter curb and a mature tree canopy should be pruned up to a 7-8 feet above the traffic circle planter curb.
- All existing trees will be “grandfathered”, after review of individual specimens to ensure they are healthy, conform to sight line maintenance guidelines, and pass safety inspection from the City’s Arborist, where the inspection only addresses the health of the tree.
- Vegetation will be allowed in traffic circles that conform to sight line maintenance guidelines.
- Traffic circle volunteers will be provided an opportunity to bring trees and vegetation that conform with sightline and pruning maintenance are allowed. Total vegetation and signage extending above the 2.5 foot height maximum should not exceed a 20 inch wide solid sight obstruction should not exceed a 12 inch wide vertical obstruction or generate more than a 3 foot blind spot.
• Existing trees with trunks wider than 20 inches will be permitted with additional traffic calming measures established around the intersection to ensure low speeds and safe intersections. City staff and neighborhood traffic circle coordinators or volunteers will work together to determine what measures are needed and which ones are the most appropriate for installation.

• Traffic circle volunteers will be provided an opportunity to bring trees and vegetation into conformance with the sight-line maintenance guidelines within 30 days following notice of non-compliance, before the City undertakes maintenance to bring the circle vegetation or trees into the 3.5’-8’ sightline compliance.

• The City should develop and implement consistent traffic circle signing and speed limit standards for the Program which will be implemented within no more than 5 years as soon as feasible.

D. Community Common Space Stewardship Program

Berkeley has many engaged community members who volunteer their time and resources. Community volunteers and neighborhoods have been the mainstay of the traffic circles – generously buying plants and giving their time to water and maintain the traffic circles and other common space (i.e. Berkeley Path Wanderers) over the last two decades.

There is no formal mechanism for the City to engage these volunteers or to recruit new ones. There are many existing community-based partnership programs in the San Francisco Bay Area as well as around the country. The City of Oakland’s “Adopt a Spot” is a long-standing and successful model that has also served as a template for similar programs in Livermore and Richmond, and is fortunately being considered as a template for the City of Berkeley’s Program. A Berkeley Stewardship Program will encourage civic engagement and community improvement.

The City can establish and operate a successful partnership program with community volunteers to provide coordination and guidance on safety and technical issues, hosting work days, developing discount programs, and supporting community improvement and agreed upon goals.

Berkeley City leaders have expressed their willingness to work with the community and to develop a real partnership with the community by creating and supporting the establishment of the Traffic Circle Policy Task Force. A formal partnership needs a shared commitment and written guidelines, structure, budget and resources to deliver the benefits to both the City and the community.

26 Notice of non-compliance is a standard vegetation maintenance enforcement procedure. It is recommended that the notice be sent via the Stewardship Program.
The Traffic Circle Policy Task Force recommends that the Public Works Department, in no less than three months, formalize the existing traffic circle community volunteer program and establish it as a component of the Community Common Space Stewardship Program (Stewardship Program) which this Task Force has articulated, to support the management of neighborhood traffic calming through traffic circles. The Stewardship Program will establish a partnership with a clear set of guidelines for community volunteers who adopt and maintain traffic circles, provide guidance for selecting plants and trees, address safety concerns, as well as define responsibilities between City and community volunteers. It is recommended that the Stewardship Program be integrated into the “Adopt a Spot Initiative,” which the City Council approved on April 23, 2019 (Item #33), and that the City Council refer the Adopt a Spot Initiative to the Traffic Circle Task Force for the purpose of developing a coherent and consistent set of guidelines for City/volunteer partnership on volunteer efforts for not just traffic circles but also other City common space, such as the medians, bulb-outs, mid-block curb extensions and pocket parks on Piedmont Avenue. This Stewardship Program will define responsibilities between City and community volunteers and provide guidance for volunteer responsibilities including selection of plants and trees, maintenance best practices and safety guidelines. The Stewardship Program will also investigate and develop an analysis including criteria, environmental benefits, program costs and staffing needs, development, outlining criteria and environmental benefits, program costs and staffing.

Berkeley has many engaged community members who volunteer their time and resources to maintain traffic circles. There is no formal mechanism for the City to engage these volunteers or to recruit new ones. The City of Oakland’s “Adopt a Spot” is a long-standing and successful model that has also served as a template for similar programs in Livermore and Richmond, and is fortunately being considered as a template for the City of Berkeley’s Program.

Community volunteers and neighborhoods have been the mainstays of the traffic circles — generously giving their time and money to pay for plants, water and maintenance over the last two decades that traffic circles have been in existence. The City can establish and operate a successful partnership program with community volunteers to provide coordination and guidance on safety and technical issues, hosting work days, developing discount programs, and supporting overall compliance.

The goals of the Traffic Circle component of the Community Common Space Stewardship Program include:

- To ensure community engagement and partnership in complying with the Traffic Circle Policy
• Maximizing traffic calming benefits of traffic circles
• Maintain sightline visibility to protect pedestrians and bicyclists
• Expand the network of neighborhood traffic circles to underserved areas

and in addition, the Community Common Space Stewardship Program will:
• Help beautify Berkeley - Greenery in and along streets makes Berkeley a more beautiful city and is critical to Berkeley’s livability and success as a place
• Encourage joint activities by neighbors and friends for the betterment of Berkeley
• Maintain sightline visibility to protect pedestrians and bicyclists
• Provide spaces that capture and infiltrate rainfall and storm water
• Reduce noise pollution through the use of vegetation and trees
• Provide habitat for native birds, butterflies, bees, and other native creatures
• Increase carbon sequestration
• Help cool the urban environment
• Expand the network of neighborhood traffic circles to underserved areas

In order to establish and operate a successful partnership program, staff resources are required. Staffing could be provided through the City or through an existing non-profit entity that would be contracted for staff resources (at this point it’s not clear if this would be a full-time position or could be part time after the program is set up).

A Traffic Circle Community Engagement Coordinator would report to Public Works and be responsible for coordinating with all existing traffic circle volunteers, recruiting new volunteers, act as a liaison between community volunteers and City staff, coordinate between Public Works, Parks and Recreation and Planning Departments as well as third-party utilities, and develop and maintain an on-line tool for tracking traffic circle compliance and administration. The Coordinator would also be responsible for developing an annual budget, hosting annual work days, provide assistance with technical issues, and develop a plant discount program, free mulch delivery, tool and safety equipment lending library, seeking additional outside funding and a green infrastructure mini-grants program with matching funds and/or in-kind support.

The Coordinator and City leaders should explore consolidating all resources and responsibilities for traffic calming measures (traffic circles, bulb-outs, mid-block curb extensions, traffic diverter replacement/conversions, and parklets and other speed calming treatments) as well as supporting the Berkeley Bicycle Plan under the
Community Common Space Stewardship Program. The core goal of this position should be nurturing and supporting a Citywide and expanding program of traffic circles that are both beautiful and safe and that make use of community volunteer resources, while also coordinating City staff resources and interests as they apply.

It should be noted that this position could also be defined to coordinate City staff and volunteer stewardship resources (through friends of parks and creeks groups) and efforts associated with maintaining and enhancing city parks, creeks, and open spaces. In this case, additional staff capacity would likely be required.

All of the community volunteer programs that the Traffic Circle Policy Task Force reviewed have a more formal structure for their programs and volunteers. Typical elements include: a volunteer job description used for recruiting purposes, volunteer application or agreement with a minimum term, maintenance rules and guidelines, planting guidelines, and safety rules and guidelines. Public Works should borrow from the best programs, specifically Oakland’s “Adopt a Spot,” to develop the documents needed to support the program. All Program documents should be maintained on the City’s website with easy to use on-line applications and approvals.

This proposed Program and its recommendations are designed in part to reduce City liability and risk from traffic circles. By the same token, the City should be willing to extend protection from liability to neighborhood volunteers who maintain traffic circles and are in compliance with the Program. The advice of the City Attorney and specialized legal experts on municipal volunteer programs should be sought in formalizing this two-way arrangement.

**Communication Plan**

The Traffic Circle Policy Task Force’s report and recommendations and the City’s approval and adoption is only the first step to implementation. Any changes to the status quo will be new and possibly startling to the community. A thoughtful and robust communication plan should be developed and implemented within a set time period in concert with rolling out the new policy and program. Particular attention should be paid to the initial effort to bring existing circles into compliance. Based on a recent photo survey, there are a few many traffic circles that have vegetation that will not easily be brought into compliance. For example, some circles have large cacti that cannot be “pruned” to achieve the sightline requirements. The city should consider organizing a large work day to support the removal of non-compliant existing plants and provide support to community members in planting new, better suited vegetation.

The Task Force Commissioners should be given a prominent role to assist the City with explaining the Program through open houses, newsletters, press, social media and
neighborhood meetings. This process may also be used to ensure current traffic circle volunteers are identified and new ones recruited.

**Incentives for Recruiting Volunteers**

Public Works should strive to be seen as an ally and support for the community volunteers with expertise and resources to support them and the Program. Public Works and the Community Engagement Coordinator should investigate incentives to help recruit additional community volunteers, especially in under-represented neighborhoods of the City. These incentives could include: a plant discount program, free mulch delivery, tool and safety equipment lending library, green infrastructure mini-grants program with matching funds and/or in-kind support.

**On-line GIS Tool**

Public Works and the Community Engagement Coordinator should develop and implement an on-line GIS tool to map all traffic circles and monitor overall compliance with the sight line maintenance guidelines, operation and maintenance guidelines and plant palette guidance.

**Advisory Board**

The Task Force recommends that Public Works establish an advisory board comprised of leaders within Public Works, Parks, Recreation and Waterfront, and Planning Departments and a representative group of relevant Commission representatives and community volunteers to meet periodically to review the Program's progress. Note, we are not suggesting a new commission.

**Annual Compliance Report**

Public Works and the Community Engagement Coordinator should produce an annual report to the Berkeley City Manager, City Council, and the public on overall progress and compliance.

**Additional Traffic Circle Safety Improvements**

The City should inventory all existing traffic circle intersections and develop and implement consistent traffic circle signing and speed limit standards. Effective and safe traffic circles don’t end at the curb line. The City should work towards other holistic street improvements and modifications to continue to improve safety at traffic circle intersections. Pedestrians, bicyclists and motor vehicle drivers should be able to expect consistency in City traffic circles operations. It could often be this uncertainty – the driver, bicyclist or pedestrian who doesn’t realize they’ve come to a two-way, not four-
way stop sign circle intersection – that increases hazards, not the existence or character of the traffic circle itself or its vegetation.

ENVIRONMENTAL SUSTAINABILITY

The Task Force found overwhelming support and alignment for the recommended action and the city’s existing environmental sustainability plans, programs and policies.

Promoting additional tree planting and native drought tolerant vegetation in existing neighborhood traffic circles directly supports the Berkeley Climate Action Plan to restore natural processes, provide habitat for birds and insects, reduce ambient temperatures by shading, intercepting and storing rainwater, improving community quality of life through beautification and by reducing noise pollution and encouraging pedestrian traffic. Increasing the number of neighborhood traffic circles and planting them with trees will help fulfill the stated goals to maximize tree plantings, sequester carbon and protect biodiversity.

Half an acre of forest land can absorb three tons of carbon dioxide annually and produce two tons of oxygen. Berkeley’s 62 existing traffic circles cover about half an acre of land, all of it converted from asphalt. The City’s Hazard Mitigation Plan and Climate Action Plan recommend more tree plantings in Berkeley to help fight climate change and reduce the “heat island effect” in lower elevation neighborhoods. Tree plantings are also an economic and social equity issue. City mapping shows that tree cover is much higher in the Berkeley Hills than it is in the Flatlands.

The recommended action is consistent with Berkeley’s history of neighborhood partnership for creating and caretaking traffic circles, as is common in many other cities, and with the goal of increasing green space and tree canopy in neighborhoods with less access to parks and open space.

The recommended action enables neighborhood traffic circles to contribute to the support of native biodiversity within the City, through the habitat contributed by native plants and trees. The Task Force provides several plant palettes of native plant assemblages designed to maximize biodiversity as well as other valuable services such as pollinator support, water conservation, runoff reduction, and carbon sequestration.

ALTERNATIVE ACTIONS CONSIDERED

No Action Alternative isn’t viable because it doesn’t address traffic safety concerns or provide clarity to the volunteers currently maintaining the existing traffic circles. There’s confusion by the volunteer community about what the rules are for traffic circles, who is responsible for what and if trees in circles are allowed.
**No Trees** Alternative is not recommended because it is contrary to standard practice by many California and national cities, as well as Berkeley plans and policies. There are 37 existing traffic circles that have trees that are maintained by volunteers. The community has already expressed significant concern when the City proposed in the summer of 2018 to remove all trees and other large vegetation in existing traffic circles.

**No Volunteers** Alternative is not recommended because it goes against the spirit of how the City governs. The City has partnered with its citizens on their stewardship of the traffic circles for almost two decades. It is in the City’s interest to formalize and support community involvement to maintain the traffic circles.

**Administrative Department Move** Alternative – to move traffic circle administration from Public Works to Parks, Recreation and Waterfront Department - is not recommended because the Public Works Department is responsible for construction and maintenance of all streets and the right-of-way. The Public Works Department has oversight and approval responsibility for traffic circles including construction, maintenance (in coordination with local community groups), and vegetation.

**FISCAL IMPACTS OF RECOMMENDATION**

The recommended action to develop a formal Stewardship Program with one full time staff in the Public Works Department represents a new cost to the City. The cost will be the salary and overhead for a full time Community Engagement Coordinator position and the costs to administer the program, including setting up an on-line GIS web-based tool, developing the community volunteer program, finalizing operation and maintenance guidelines, finalizing planting palette guidance, developing a self-certification process, and setting up discount and mini-grant programs. It should be recognized that in the long term, the Stewardship Program/Adopt a Spot will, in fact, be a net cost savings for the City for the maintenance and planting “services” rendered by volunteers that would otherwise have to be performed by City staff or contractors. Having this program would also be advantageous for the City whenever it pursues project grants, as a source of in-kind/match funding.

In the long term, through efficiencies and “normalizing” the work of the program, these start-up costs are anticipated to decrease.

The overall total costs to the City should substantially decrease due to the program reducing injuries and lawsuits, minimizing the safety risks and uncertainty associated with the existing traffic circles. The benefits to establishing a formal, staffed program should greatly outweigh these costs.

**CONTACT PERSON**

Tano Trachtenberg, Legislative Aide, Office of Mayor Arreguin, 510-981-7100
RESOLUTION NO. #0,##-N.S.

Traffic Circle Policy

WHEREAS, Berkeley has 62 neighborhood traffic circles, that constitute a half-acre of permeable green space that would otherwise be filled with asphalt; and

WHEREAS, Traffic circles have been shown to reduce the speed of travel as well as reduce the number of collisions involving vehicles, pedestrians, and bicycles at these intersections; and

WHEREAS, Across the country, traffic circles with well-maintained low plantings and central trees are widely encouraged due to their benefits to traffic calming, making circles more visible and their contribution to beautification, neighborhood character, urban greening; and

WHEREAS, The Urban Street Design Guide, a manual developed by the National Association of City Transportation Officials (an association of over 71 major North American Cities and 10 transit agencies) notes the value of trees and other vegetation not only for beautification, but for their contribution to traffic calming and
WHEREAS, Other San Francisco Bay Area and North American cities and expert analysts beyond Berkeley have identified trees as a welcome and useful component of traffic circles, particularly because they help slow traffic and identify for drivers the presence of a circle from a distance; and

WHEREAS, The climate and biodiversity crises, including recent recognition of bird and insect declines, necessitate the support of trees, native plants, and other high value habitat in city spaces.

WHEREAS, Berkeley has numerous policies and plans that support traffic circles for traffic calming and other environmental and community benefits such as the Climate Action Plan, General Plan, Pedestrian Plan and Bicycle Plan; and

WHEREAS, The City Council established the Traffic Circle Task Force on February 26, 2019 with the charge of evaluating the current traffic circle vegetation policy, recommending appropriate characteristics for allowed plantings, and a policy that ensures sight lines for visibility, pedestrian, bicycle and vehicle safety, as well as beautification of the circles.

NOW THEREFORE, BE IT RESOLVED that the Berkeley City Council adopts the Traffic Circle Policy in Exhibit A.

Exhibits:
A: Traffic Circle Policy

Exhibit A

Traffic Circle Policy

**PURPOSE**

The purpose of this new policy is to identify the appropriate design, vegetation and operation characteristics of traffic circles that provide both traffic calming, beautification and other benefits while maintaining pedestrian safety.

As proposed and documented in numerous City of Berkeley plans, programs and policies, the primary purpose of neighborhood traffic circles is for traffic calming. This purpose is important to highlight so that traffic circle elements, as well as additional, complementary safety measures are designed to support traffic calming and pedestrian safety goals. Many cities around the country and in California incorporate vegetation and trees in traffic circles as part of traffic calming measures. Excess speed causes one
in three traffic deaths\textsuperscript{27}, comparable to drunk driving. The goal of this policy is to
develop guidelines ensuring that traffic circle vegetation and trees are maintained to
conform to safety standards, thereby enhancing, rather than reducing, neighborhood
safety.

GRANDFATHERING EXISTING TREES

Berkeley has a variety of existing trees in its traffic circles, such as Coast Live Oaks,
California Buckeyes, Dawn Redwoods, Olives, and other trees. All existing trees that
are structurally safe are permitted by this policy\textsuperscript{28}. For trees with trunks that exceed 20" in
diameter see the section “TREE TRUNKS WIDER THAN 20 INCHES” below, which
outlines how additional traffic calming measures will be incorporated into the traffic
circle intersection to ensure safety.

VEGETATION AND NEW TREES

Beautiful, healthy, and well-maintained vegetation and trees in traffic circles supports
Berkeley’s neighborhood quality of life and contributes to traffic calming. Circle plantings
should be durable, diverse, attractive and planted and maintained by community
volunteers. Volunteer participation adds to the unique character of our neighborhood
and creates strong resident commitment to our urban communities. Planted circles
should improve storm water retention and are strongly encouraged to use native or
other plant species that do not require pesticides or herbicides to maintain them. Traffic
circles should be planted with consideration of vegetation and tree’s mature shape and
size and sightline requirements. There are several suggested palettes for those who
find suggestions helpful (see Attachment 3).

New trees proposed by traffic circle coordinators or volunteers will be approved by the
City Forester, with a preference for natives and a focus on maximizing ecosystem
services\textsuperscript{29}creative diversity of species.

The Task Force did not reach resolution on whether new tree plantings could result in
large trunked trees. We The Task Force recommends revisiting trunk size
considerations\textsuperscript{this issue} every five years as the implications of climate change and
autonomous vehicles become clearer. In the interim, large trunked trees such as
redwoods will not be planted.

SIGHTLINES

\textsuperscript{27} Motor Vehicle Crash Deaths: How is the US doing? (Centers for Disease Control and Prevention)

\textsuperscript{28} Designated historic resources are regulated by the Landmarks Preservation Ordinance, and may have
features that do not conform to these policies. In case of conflict, the city shall follow established
procedures for alterations to a designated landmark. Landmarks Ordinance prevails.
Visual sight lines – the unobstructed view of the driver\(^{29}\) stopped before entering the near crosswalk to the corners of the opposite crosswalk (see illustration below) – should guide all vegetation selection and maintenance criteria. Based on the City of Berkeley’s Traffic Engineer’s opinion and researched best practice, low vegetation should be maintained at a maximum height of 2.5 feet from the top of the traffic circle planter curb and a mature tree canopy should be pruned and trimmed up to and maintained at 7-8 feet height above the top of the traffic circle planter curb. Limbs that extend beyond the curb should be trimmed to 14 feet above the adjacent road surface within the road right-of-way. Single tree trunks that are less than 20” in width, as measured 4 feet above the ground, do not require any additional traffic calming devices. Low branches on young trees and/or flower stalks extending above the 2.5 feet maximum height shall be permitted as long as the total visual obstruction above 2.5 feet is no more than 20” across the circle.\(^{30}\)

Figure X. Traffic Circle Sightlines and Geometry

\(^{29}\) By national standards it is assumed that drivers’ eyes are at three and a half feet and ability to see an object one foot tall on the ground.

\(^{30}\) A tree in the center of a traffic circle can only create a visual impact when objects are on directly opposite sides of the circle. These specifications to trunk size and vegetation height provide a conservative safety margin for visual impacts. These specifications are calculated to create a cross-circle visual impact of no greater than 36 inches (approximately the size of a wheelchair), per guidance from the City Traffic Engineer. Given the geometric relationship between a driver at a crosswalk and the opposite crosswalk, tree trunks or other limited blocks of vegetation up to approximately 23” make visual obstructions on greater than 36 inches in the opposite crosswalk (see illustrations below). Reducing target trunk size to 20” provides a conservative safety margin.

\(^{31}\) Sight lines are defined as that horizontal plane (called the sight triangle), from the view of the driver stopped before entering the crosswalk to the corners of the opposite intersection, from 2.5ft above the top of the traffic circle planter curb line to the height of 7-8 feet.
A=25'; B=43.5'; y=36''; x=23''

TREE TRUNKS WIDER THAN 20 INCHES
Tree trunks wider than 20 inches will be permitted with additional traffic calming measures, such as speed tables or cushions\(^{32}\), diagonal diverters or flashing beacons to ensure slow speeds, additional stop signs or traffic mirrors to increase visibility,\(^{33,34}\) established around the intersection. City staff and neighborhood traffic circle coordinators or volunteers\(^{2}\) will work together to determine what measures are needed and which ones are best suited for the viability of installation. Where funding restrictions are a significant restriction, traffic circle coordinators or volunteers will be given a reasonable amount of time for community fundraising to offset the cost of additional traffic calming measures.

SUMMARY OF POLICY RECOMMENDATIONS

Neighborhood communities and traffic circle volunteers care a great deal for their circle plantings and should be provided an opportunity to bring their trees and vegetation into conformance with the sight line maintenance guidelines within 30 days following notice of adoption or, in the future, of non-compliance. The Forestry Supervisor may provide guidance on how best to prune vegetation and trees to accomplish the sight lines or to suggest alternative plantings whose growth patterns would naturally conform. The Urban Forestry Unit of the Parks Division, will maintain the tree branches above the travelled way to ensure they are at least 14 feet from the road surface.

The City supports community volunteer contributions and recognizes and acknowledges that community volunteers give a considerable amount of free time to maintain the City's open spaces, including traffic circles. Community volunteers are encouraged to contribute in a safe and reasonable manner and to follow guidelines developed by the Community Common Space Stewardship Program.

Summary of Policy Recommendations for Traffic Circle Vegetation:
- The primary purpose of neighborhood traffic circles is for traffic calming.
- Sightlines should be maintained at a maximum height of 2.5 feet from the top of the traffic circle planter curb and a mature tree canopy should be pruned up to 7-8 feet above the traffic circle planter curb.

\(^{32}\) The Federal Highway Administration website provides data summarizing studies on engineering countermeasures used to manage speeds and lists the speed reductions for different kinds of traffic calming measures. Per the extensive table, Speed Cushions and Tables reduce the 85th Percentile Speed by 5 to 9 mph. (US Department of Transportation/Federal Highway Administration. Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed, July 2014)

\(^{33}\) https://www.nationalsafetymirror.com/driveway-mirror-traffic-mirrors/

\(^{34}\) The trees in the traffic island at Woolsey & Wheeler should be exempted from these rules due to the unique shape of the traffic island, its location outside of the actual intersection, and the presence of traffic diverters.
• Trees and other vegetation that conform with sightline and pruning maintenance are allowed. Total vegetation and signage extending above the 2.5 foot height maximum should not exceed a 20 inch wide solid sight obstruction.

• Existing trees with trunks wider than 20 inches will be permitted with additional traffic calming measures established around the intersection to ensure low speeds and safe intersections. City staff and neighborhood traffic circle coordinators or volunteers will work together to determine what measures are needed and which ones are the most appropriate for the viability of installation.

• Traffic circle volunteers will be provided an opportunity to bring trees and vegetation into conformance with the sightline maintenance guidelines within 30 days following notice of non-compliance, before the City undertakes maintenance to bring the circle vegetation or trees into sightline compliance.

• The City should develop and implement consistent traffic circle signing and speed limit standards for the Program which will be implemented as soon as feasible.

The purpose of this new policy is to identify the appropriate design, vegetation and operation characteristics of traffic circles that provide both traffic calming and other benefits while maintaining pedestrian safety.

As proposed and documented in numerous City of Berkeley plans, programs and policies, the primary purpose of neighborhood traffic circles is for traffic calming. This purpose is important to highlight so that both additional safety measures and traffic circle elements support this. Most cities around the country and in California advocate for traffic calming measures to include vegetation and trees in traffic circle design.

EXISTING TREES

Berkeley has a variety of existing trees in its traffic circles. Most have attained a size where they do not have any substantial small branching or leaf canopy below 8 feet, preserving the needed sight line window, and others are growing rapidly towards that expectation. These include California Live Oaks, Dawn Redwoods, California Buckeyes, palms of various species, Strawberry Trees, and Red Bud. These trees should be “grandfathered”, after review of individual specimens to ensure they are healthy, conform with sight line maintenance guidelines, and pass safety inspection from the City’s Arborist, where the inspection only addresses the health of the tree.

35 Notice of non-compliance is a standard vegetation maintenance enforcement procedure. It is recommended that the notice be sent via the Stewardship Program.

36 Designated historic resources are regulated by the Landmarks Preservation Ordinance, and may have features that do not conform to these policies. In case of conflict, the Landmarks Ordinance prevails.
VEGETATION

Regularly maintained vegetation in traffic circles supports Berkeley’s neighborhood quality of life and contributes to traffic calming. The City should encourage circle plantings that are durable, diverse, attractive and planted and maintained by community volunteers. Planted circles should improve storm water retention and are strongly encouraged to use native or other plant species that do not require pesticides or herbicides to maintain them. The Task Force does not support a species list of approved plants, which would be costly and difficult to administer. Instead, the City should permit a broad range of plantings that conform to general criteria—suggested palettes with plant lists provided, (see Attachment 2).

SIGHTLINES

Visual sight lines—the unobstructed view of the driver stopped before entering the near crosswalk to the corners of the opposite crosswalk—should guide all vegetation selection and maintenance criteria. Based on the City of Berkeley’s Traffic Engineer’s opinion, as well as information from Task Force research, low vegetation should be maintained at a maximum height of 2.5 feet from the top of the traffic circle curb and a mature tree canopy should be pruned and trimmed up to and maintained at 7-8 feet height above the curb. Young trees and/or flowers extending above the maximum height, such as hollyhocks and agapanthus, shall be permitted while in bud and bloom if total vegetation and signage obstructs less than 25% of the sight triangle.

GUIDELINES

Neighborhood communities and traffic circle volunteers care a great deal for their circle plantings and should be provided an opportunity to bring their trees and vegetation into conformance with the sight line maintenance guidelines within 30 days following notice of adoption or, in the future, of non-compliance. The City Arborist may provide guidance on how best to prune vegetation and trees to accomplish the sight lines or to suggest alternative plantings whose growth patterns would naturally conform.

The City supports community volunteer contributions in a safe and reasonable manner and to find ways of recognizing and acknowledging their efforts. Community volunteers, who are giving a considerable amount of free time to maintain the City’s open spaces, including traffic circles are encouraged to follow guidelines developed by the Community Common Space Stewardship Program.

37 By national standards it is assumed that drivers’ eyes are at three and a half feet.
38 Sight lines are defined as that horizontal plane (called the sight triangle), form the view of the driver stopped before entering the crosswalk to the corners of the opposite intersection, from 2.5 ft above the top of the traffic circle curb line to the height of 8 feet.
Summary of Policy Recommendations:
The primary purpose of neighborhood traffic circles is for traffic calming.
Trees should not only be allowed, but encouraged in traffic circles in conformance with
sight line maintenance guidelines and pruning maintenance guidelines.
All existing trees will be "grandfathered", after review of individual specimens to ensure
they are healthy, conform with sight line maintenance guidelines, and pass safety
inspection from the City's Arborist, where the inspection only addresses the health of
the tree.
Vegetation will be allowed in traffic circles that conform to sight line maintenance
guidelines.
Traffic circle volunteers will be provided an opportunity to bring trees and vegetation into
conformance with the sight line maintenance guidelines within 30 days following
notice of non-compliance, before the City undertakes maintenance to bring the circle
into the 3.5'-8' sightline compliance.
The City should develop and implement consistent traffic circle signing and speed limit
standards for the Program which will be implemented within no more than 5 years.

39 Notice of non-compliance is a standard vegetation maintenance enforcement procedure. It is
recommended that the notice via the Stewardship Program.
Traffic Circle Task Force Vegetation Subcommittee Report
July 22, 2019 —Last updated Sept 30, 2019

Members: Robin Grossinger (chair) Yolanda Huang, Erin Diehm, Sally Hughes, Andy Liu, and Diana Wood

Summary

Low plantings and central trees are usual and customary practice for neighborhood traffic circles in cities throughout the US. Cities recommend, encourage, and support the inclusion in circles of well-maintained trees and vegetation for their benefits to traffic calming, making circles more visible at night, and contribution to beautification, neighborhood character, and all the other benefits urban greening provides, from carbon sequestration and urban cooling to access to nature and biodiversity. Traffic circle trees and low vegetation are also recommended in national guidance documents by the Federal Highway Association and the National Association of City Transportation Officials.

Establishing a practical, well-founded policy for trees and low vegetation in Berkeley’s traffic circles, as proposed here, is consistent with other City policies and helps support some of their stated goals. For example, from the:

- **2019 Local Hazard Mitigation Plan (First Draft).** Trees in traffic circles contribute to a dense tree canopy that helps mitigate projected extreme heat events, reduce the heat island effect, and address inequity.1 [See Map of Tree Coverage, below]Add image of Tree Canopy Map]

- **2009 City of Berkeley Climate Action Plan.** Increasing the number of traffic calming circles and planting them with trees will help fulfill the stated goals to maximize tree plantings, sequester carbon, and protect biodiversity.2

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1 Extreme heat events are a “newly-introduced hazard of concern for the 2019 LHMP.” (ES-10) The report notes that by “2100, most of the Bay Area will average six heat waves per year, each an average of ten days.” (ES-7) Projections indicate that “the number of extreme heat days... will increase exponentially: by 2099 the City of Berkeley is expected to average 18 days per year with temperatures over 88.3 degrees F.” (ES-8). In the face of these threats the Plan recognizes the positive impact of trees, stating “a dense tree canopy can result in fewer heat related emergencies” (B-154) It also acknowledges a stark inequity in our tree cover: the densest tree canopy is in the hills of east Berkeley while “west and south Berkeley have the least [tree canopy]”. (see Map below) Interestingly, west and south Berkeley contain the most traffic circles, and many of them include trees. Retaining and expanding tree cover in traffic circles can provide a valuable way to address both this inequity and future extreme heat events. 

**Source:** City of Berkeley 2019 Local Hazard Mitigation Plan (First Draft)

2 “A single mature tree can absorb as much as 48 lbs of carbon dioxide per year. Estimates are that between 660 and 990 million tons of carbon is stored in urban forests nationally.” (p. 31) Trees also improve quality of life through beautification.
2017 Berkeley Bicycle Plan (Appendix F). The design guide for a typical Traffic Calming Circle includes a tree in the center, which can help contribute to the stated goals of calming and safety. [See Design Specifications illustration, belowAdd image of Design Guide]³

Given the limited size of available curb cut-outs along most streets, the larger unpaved spaces available in neighborhood traffic circles represent valuable locations for the healthy, larger trees that provide greater climate adaptation and mitigation functions.

The proposed traffic circle vegetation policy is also consistent with Berkeley’s history of neighborhood partnership for creating and caretaking circles, as is common in many other cities, and with the goal of increasing green space and tree canopy in neighborhoods with less access to parks and open space.

The proposed policy enables neighborhood traffic circles to contribute to the support of native biodiversity within the city, through the habitat contributed by native plants and trees. This policy provides several plant palettes of native plant assemblages designed to maximize biodiversity (Re-Oaking Palette, Native Wildflower Palette), as well as other valuable services such as pollinator support, water conservation, runoff reduction, and carbon sequestration.

Existing policies for maintenance of traffic circle vegetation, ascertained by this subcommittee, are generally consistent across municipalities throughout the United States and are the basis for recommended policy below.

This report comprises several sections. In addition to the proposed policy (Chapter 1), we review the history of traffic circles, traffic calming, and tree policy in Berkeley (Chapter 2), and we summarize policy precedents and provide examples from other cities (3). We also provide Suggested Planting Palettes for traffic circles, which offer a set of appropriate plants and trees on the themes of native oak communities, bees/pollinators, and native wildflowers, to enable residents to develop drought-tolerant circle landscaping that supports local biodiversity and resilience.

³ As long as they are maintained to preserve sightlines, circles are a valuable tool in traffic calming on Bicycle Boulevards. They are especially effective when placed on concurrent intersection locations, helping to lessen the open feel of the road which reduces vehicle speeds. The Design Specifications drawing of a sample traffic circles includes a “Broad canopy tree”, the placement of which depends on location of underground utilities. [Source: 2017 City of Berkeley Bicycle Facility Design Toolbox (Appendix F)]
Map illustrating the distribution of tree coverage in Berkeley. The densest tree coverage is located in the hills in east Berkeley while the fewest trees are in the west and south, where a majority of the traffic circles are located. The LHMP recommends expanding tree coverage in Berkeley to help mitigate the UHIE (Urban Heat Island Effect) and the anticipated increase in extreme heat days, as well as to safeguard public health. Expanding tree coverage can also address historical inequities.

Source: City of Berkeley 2019 Local Hazard Mitigation Plan (First Draft, p. B-155)
Berkeley’s Design Specifications for Traffic Circles include a broad canopy tree in the center of the circle. The recommendation to include a tree is illustrated in 2 places: at the top, via the elevation drawing and in the middle, via the aerial view.

*Source: 2017 City of Berkeley Bicycle Facility Design Toolbox (Appendix F)*
Policy

NOTE: The policy outlined below represents the perspective and thinking of the Vegetation Subcommittee. However, it is not fully aligned with the final policy in the Summary Report because it predates that document. Please see the final Summary Report for the policy approved by the full task force and recommended to City Council.

Definition
Traffic Calming Circles are those circles in residential neighborhoods, where the objective for installing the circle was to reduce, discourage and slow traffic. In Berkeley, these circles are generally 20 feet in diameter or smaller.

Proposed Policy

Traffic circle plantings and trees shall be designed and maintained to provide clear sight lines for drivers, as described below.

Sight Triangle Definition

1. Sight lines are defined as that horizontal plane (called the “sight triangle”), from the view of the driver stopped before entering the crosswalk to the corners of the opposite intersection, from 2.5 ft above the top of the traffic circle curb to the height of 7-8 feet.
Traffic Calming Circle Vegetation Policy

a. All trees on existing circles at the time this policy is adopted shall be maintained even if the triangle contains multiple trees. However, the overall vegetation of the triangle shall not obstruct more than 25% of the sight triangle.

1. For traffic circles 20 feet in diameter or less, one tree is allowed, located in the central area of the circle, the trunk 6 feet or further from the outside perimeter of the circle.

2. Vegetation must be no taller than 2.5 ft (30 inches) above the traffic circle planter curb. Exceptions

   a. Flowers extending above the plant, such as hollyhocks and agapanthus, shall be permitted while in bud and bloom if less than 25% of the sight triangle is obstructed, considering total vegetation and signage within the sight triangle.

   b. All trees on existing circles at the time this policy is adopted shall be maintained even if the triangle contains multiple trees. However, the overall vegetation of the triangle shall not obstruct more than 25% of the sight triangle.

2-3. Trees more than 5 inches in diameter and 16 feet in height shall be maintained so that no foliage obstructs the sight triangle.

3.4. Trees smaller than 5 inches in diameter and less than 16 feet in height shall be permitted to maintain foliage within the sight triangle if less than 25% of the sight triangle is obstructed, considering total vegetation and signage within the sight triangle.

4.5. Tree limbs that extend beyond the curb line of the traffic circle, and are less than 14 feet above the curb line may be removed or pruned so that branches and canopies are 14 feet above the curb line in the area beyond the traffic circle where vehicles travel.


6-7. Traffic circle plantings and maintenance, as outlined in the best practices guidelines as periodically updated by the Parks and Waterfront Commission, are recommended.

7.8. Sight triangles shall be maintained so that no more than 25% of the sight triangle is obstructed from the vantage point of a driver stopped before a crosswalk bordering the traffic circle.
History of Traffic Circles

Overview

Islands or elevated protrusions in intersections have long been used for different purposes. They are popular in Europe, the United States and Canada. Nomenclature is inconsistent. They are called roundabouts, traffic circles, rotaries, and mini-roundabouts and differ in purpose. The primary difference is circle size, intersection size, traffic volume, and speed.

Some circles are used to facilitate traffic, particularly large circles in arterial intersections with high-volume traffic, so traffic can enter into an intersection at speeds between 25-45 mph, often without traffic signs or signals. These circles range from 100 to 300 feet in diameter and have daily traffic ranging from 10,000 to 14,000 vehicles. Berkeley has two of this type, Marin Circle and Channing Circle, both situated in heavily trafficked intersections.

Traffic Circles in Berkeley

The majority of Berkeley’s traffic circles are small, generally 20 feet in diameter, in comparison to what traffic engineers term roundabouts. Berkeley’s circles are traffic calming devices designed to discourage, limit and slow traffic on residential streets with light auto traffic. The majority of Berkeley’s traffic circles originated to mitigate the impact on residential neighborhoods of commuter and development traffic diverting traffic from major arteries onto residential neighborhood streets.

History - Evolution of Traffic Calming and Traffic Circles in Berkeley

In Berkeley, the tradition of viewing streets as more than just traffic arteries goes back to the 19th Century. Berkeley’s very first street design was done by famed landscape architect Frederick Law Olmsted for the private College of California in the 1860s. Olmsted wrote that streets in the neighborhood he was commissioned to design—the

4 Roundabouts Spreading Like Kudzu Across South Carolina
https://www.postandcourier.com/news/roundabouts-spreading-like-kudzu-across-south-carolina-despite-some-opposition/article_06dc6030-3a4b-11e7-9dc8-93f0f4f6b236.html
6 Exploring Roundabouts, Sheri Park, PhD., PTP, Kimberly Musey, James Press and John McFadden, PhD., P.E. PTP, June 2015, www.ite.org
7 Exploring Roundabouts, supra at p. 2
Berkeley Property Tract, along what is now Piedmont Avenue north of Dwight Way and east of College Avenue—should provide “good outgoings” embowered and calmed with overhanging trees. He divided the main street with landscaping and followed the natural topography, and included a large landscaped circle at the central intersection.

Thus, more than a century and a half ago, in the 1860s, Berkeley installed its first traffic circle Channing Circle.

Later, in the 1890s, as development began to proliferate along uniform grids of streets, a group of North Berkeley women formed the Hillside Club to advocate for urban planning. In the words of Berkeley historian Charles Wollenberg, “The club was dedicated to a new kind of urban development that would respect rather than destroy the natural environment. (They) fought any attempt to cut down the region’s trees. A club pamphlet said, ‘The few native trees that have survived centuries should be jealously preserved...Bend the road, divide the lots, place the houses to accommodate them!” (page 78/79, Berkeley: A City in History, Wallenberg).

Many of the pleasant winding streets and most picturesque neighborhoods of Berkeley are the result. Annie Maybeck, one of the founders of the Hillside Club, put the Club’s words into vigorous practice, successfully leading a protest that saved an old California Live Oak tree growing in the middle of Le Roy Avenue. The City agreed not to cut down the tree, leaving it on an informal island in the middle of the street. Decades later it was designated a City Landmark (when it eventually died, in 1985, the City planted a replacement oak in the same spot).

Early in the 20th century, East Bay civic leaders hired noted urban planner Werner Hegemann to advise on the development of Berkeley and Oakland, including streets. His 1915 report advocated for narrowing residential streets to 24 feet of pavement and landscaping them with “shapely and uniform avenue trees and planting the parkways between to shrubs or grass and flowers”. He also noted that residential property values were improved by “creation of small parks at street intersections and the use of shrubs or great masses of brilliant geraniums.” (page 104, Hegemann report)

Berkeley did not end up narrowing the pavement of its streets, but during the Great Depression chose to use much Federal money to plant a reported 16,000 ornamental street trees along residential blocks from 1935 to 1937. By 1944—seventy five years ago—Berkeley civic leader, businessman, and poet Lester Hink could rhapsodize about his town as a “city of hillside, homes and gardens gay. Sentineled by myriad traceryed trees...”
After World War II as automobile use began to overcrowd the streets of Berkeley and communities all across the country, city traffic engineers began to concentrate on plans to speed vehicles, often at the expense of neighborhood livability.

This led to the 1950s/60s creation of one-way streets and dedicated turning lanes through some of Berkeley’s residential and commercial neighborhoods. Some streets were widened and others converted into two- or three-lane, one-way, thoroughfares. The State of California similarly planned a grid of freeways. One was to connect Highway 13 as a freeway following--and replacing--Tunnel Road and Ashby Avenue all the way across south Berkeley to US I-80.

Transportation engineers then largely believed that the primary role of streets, was to move large amounts of traffic quickly and efficiently and they planned and advised cities accordingly.

In contrast, Berkeley, whose original design contemplated walkable neighborhoods, each with its own shopping district and elementary school, disputed the primacy of vehicles and responded with successful grassroots efforts.

In the 1960s, due to community protest, the Ashby freeway plans were shelved, and Berkeley also voted to become the only city that paid to entirely underground BART, helping to preserve surviving adjoining neighborhoods.

Traffic Barriers

In the 1970s widespread neighborhood activism led to a successful plan of traffic diverters and barriers that channeled through traffic off Southside residential blocks onto a defined network of arterial streets.

To reduce traffic and speed in residential neighborhoods, Berkeley deployed traffic barriers, then speed bumps, and now traffic circles. Each tool promoted controversy.

Diverters

Diverters were temporary structures installed by the end of 1975, concentrated south of UC Berkeley. They were subjected to two rounds of voter initiatives to have them removed. Both initiatives failed and most are still in place, but the system was not expanded citywide.9

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9 Traffic Calming In Berkeley, 1998 supra.
Speed Bumps

By 1996, the City has installed 156 speed bumps on 99 streets. By 1998, a moratorium had been placed on installing speed bumps due to criticism from the fire department for endangering back injury emergency transport patients, slowing response times and damaging fire truck transmissions.10 As a result, Berkeley opted for the traffic circle as a calming device. The U.S. Department of Transportation’s Federal Highway Administration has successfully promoted traffic calming circles for several decades, with their adoption in many US cities.11

Traffic Circles

By the turn of the century, the City documented excessive injury, vehicle speeds and volumes in Central Berkeley due to commute and commercial traffic cutting through Allston, Addison and Grant as alternatives to University Avenue and Martin Luther King. Neighbors proposed removing commercial and institutional traffic from the local residential streets when the City looked to expand the Public Safety Building into a residential area. When the City proposals for a half barrier plan failed to materialize, the City offered traffic circles as a first step for mitigation of existing excessive and speeding traffic dangers.

More than 20 traffic circles were first installed along California’s bicycle boulevard, in central Berkeley and in Le Conte. Six traffic circles were installed on Addison and Allston between MLK and California to mitigate the documented danger and increased traffic from construction of the Public Safety Building on MLK and Addison. (community oral history) The City then had a list of trees and plants approved for plantings, paid for the initial plantings as part of its mitigation and neighbors contracted to plant and maintain the circles.

The City formally adopted a Traffic Calming Policy and Program in 2003, updated in 2009 for annual installations for traffic circles citywide with a $50,000 annual City installation construction budget12,13 The City allocated no funds for traffic circles planting or maintenance.

10 Traffic Calming In Berkeley, 1998 supra.
11 https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm
12 See records of City Transportation Commission and Transportation Division files.
13 These circles and others in Berkeley were typically planted and landscaped by neighbors with the City's blessing. Karl Rhee, who led the Le Conte effort, recalls: “In 1998 the LeConte Neighborhood Assn. received complaints that traffic on Ellsworth Street was frequently speeding[...].” Realized that it was wider than our other residential streets and had no parking
By 2008, Berkeley had removed most of the speed bumps and installed 50 traffic circles, all in residential areas, mainly bordered by major arterial streets. The City’s goal was that traffic circles were to “slow down” traffic and encourage drivers to stay on major arterial roads by making the residential streets less efficient to traverse. The City built and installed the traffic circles, but their planting and maintenance was left to circle neighbors due to City budget restraints. (community oral history)

Today there are 60 traffic calming circles, 37 of which contain trees. District 5 and 6 have only 1 traffic circle each. District 8 has 3 traffic circles. District 1 has 5 traffic circles. District 4 has 6. The largest numbers are in districts with major arteries, San Pablo, Sacramento, Shattuck, Telegraph, University, and Martin Luther King. District 2 has 13 and 6 more along the border with District 3. District 3 has 15, not including the 6 along the border with District 2, and 5 along its border with district 7. So District 3 is impacted by enough traffic to warrant 26 traffic calming circles, almost half the total number in the entire city. District 7 has the 5 traffic circles along its border with District 3. The two districts most impacted by traffic and who have the largest number of traffic circles are District 2 and District 3, south and west Berkeley. In the City, South Berkeley has the lowest ratio of open space to population, and Districts 4, 2 and 3, in 94703 and 94702, are two of the densest zip codes.

Traffic circles, the latest effort to maintain livability with ever-increasing traffic volumes, have been partly successful. Many areas remain unsafely burdened by excessive injury, vehicle volumes and speeds. The City has for many decades recognized the value of trees - as nature and as environmental screens. Now with many densely walked areas, it is critical that they not be increasingly polluted and dangerous.

History - Berkeley Community Relations to Trees

The City of Berkeley in the last half century has experienced numerous community issues due to threats and damage to trees. Some examples: after a church removed a large, heritage oak on Virginia Street, the City passed the Oak Moratorium Ordinance (BMC 6.52.010), requiring permits for removing any live oak more than 18" in

\[\text{strips nor street trees.} \quad \ldots \quad \text{The City Forestry Dept. donated and planted the two Dawn Redwood trees at Stuart & Parker.}\]

Three circles were installed on Ellsworth, then several years later 5 additional circles were installed on Fulton. By this time plans were already in place to put traffic circles throughout Berkeley and the City began offering grants to pay for plantings (including trees). (Karl Rhee, email to Mayor Arreguin, Dec. 6, 2918).

\[\text{14 Map is in the appendix} \quad \text{15} \quad \text{http://www.zipatlas.com/us/ca/berkeley/zip-code-comparison/population-density.htm} \]
circumference at 4” from the ground. When the Central Library Plaza was redesigned and the lone tree was cut down, a protester chained herself to the stump overnight in protest. (community oral history) Dozens of trees were added to Shattuck Ave islands to settle the dispute.

In 2000, a “redesign” by landscape architects who had designed Palo Alto’s downtown, proposed that all existing trees from Dwight to University be removed and replanted for uniformity. Public outrage resulted in the redesign being rescinded. (community oral history)

The most famous tree sit-in protest and the longest on record—December 2006 through September 2008—protested the University of California’s felling of a grove of 75-year-old oaks in rebuilding its football stadium. Despite the neighborhood-negotiated use permit condition that Redwood trees were to be preserved in the “TuneUp Masters” University Avenue housing redevelopment, trees were not preserved, damaged in construction, forcing removal - yet the project continues. In central Berkeley, some 17 fully mature trees (the majority redwood) have been removed despite use permit conditions which the City often fails to enforce or create. Recently, the community raised concern over damage to redwoods during construction of the West Branch Public Library and housing construction on University Avenue.17

Tree Preservation

Tree preservation ordinances exist across the United States, acknowledging the value and contribution of trees, particularly in urban environments, and the need to encourage and protect them.18 Here are a few Bay Area examples: The City of Pleasanton has thirty-year-old heritage tree ordinance, certified arborists on staff, and a mandate that all tree pruning comply with International Society of Arboriculture standards. The stated goal of El Cerrito’s tree committee is to ensure a “healthy growing forest” (Resolution 2007-96). The City of Oakland requires city review and permits for removing all private and public trees, and encourages citizens to nominate trees for Oakland “Big Tree Registry”. UC Berkeley even maintains a slide show of heritage trees on campus, stating “there’s no place on campus that is not soothed and improved by trees.”19 The university also offers periodic campus tours, often over-subscribed, of its prize trees.

We live in a manmade epoch of already devastating climate change as evidenced by unprecedented heatwaves, powerful storms, and destructive fires. Scientific research unequivocally shows that human activity is altering natural earth systems, to the detriment of all living organisms. In November, 2018, the United Nation Intergovernmental Panel on Climate Change (IPCC) recommended planting 1 billion hectares of forests as one important way to combat global warming. In the July 2019 edition of *Science*, Swiss scientists determined that such extensive tree planting is feasible and could remove 200 gigatonne of carbon from the air.\(^{20}\)

**Driver Patterns**

In interviews with community members, testimony during public comment at subcommittee meetings, and from direct observation at traffic circles, the subcommittee observed that drivers generally negotiate traffic circles following a pattern. Drivers usually approach and enter the traffic circle cautiously. However, once the driver enters the traffic circle and negotiates half of the right turn, the driver speeds up to exit the circle, usually just before reaching the crosswalk 180 degrees across from where the driver entered the circle.

**Speed & Sight Triangles**

The National Association of City Traffic Officials (nacto.org) recommends that instead of removing a tree in a sight triangle, traffic speeds be reduced and other traffic calming devices considered.\(^{21}\) For this reason, the vegetation subcommittee recommends that speeds in traffic circles be reduced to 15 miles per hour.

**Precedents**

The Vegetation Subcommittee examined the policies and characteristics of traffic circles in cities around the US and Canada. We reviewed the various standards for traffic circle vegetation in national guidance documents in the published policies of other cities, and through interviews with traffic safety experts.

In addition, to capture an “on-the-ground” perspective we used the street-view feature in Google Maps to view neighborhood traffic circles in several cities, to gain an

\(^{20}\) [https://science.sciencemag.org/content/365/6448/76](https://science.sciencemag.org/content/365/6448/76)

\(^{21}\) “Fixed objects, such as trees, buildings, signs, and street furniture, deemed to inhibit the visibility of a given intersection and create safety concerns, should not be removed without the prior consideration of alternative safety- mitigation measures, including a reduction in traffic speeds, an increase in visibility through curb extensions or geometric design, or the addition of supplementary warning signs.” *Source: Urban Street Design Guide*, Visibility/Sight Distance (NACTO 2013)
understanding of plantings and general layout. See the Section: “Photo Album of Traffic Circles…” (below) for a subset of photos captured. We found that landscaped plantings with trees are usual and customary practice for neighborhood traffic circles in numerous cities across the United States and are also recommended in the major national guidelines for traffic safety and urban design.

Trees are in fact recommended for their benefits to traffic calming, by making circles more visible at night, cueing drivers to slow at a greater distance. Well-maintained trees and low plantings are also valued by many cities for their diverse community benefits, including beautification, neighborhood character, ecosystem services such as carbon storage and cooling, and local biodiversity. These city and national documents routinely feature pictures of neighborhood traffic circles with landscaping and a central tree.

Specifications for the height and clearance of vegetation are fairly standard, generally recommending low landscaping maintained at 2 to 3 feet height (in one case 5 feet), and trees with mature branches maintained at a minimum of 8-14 feet above the ground. Responsibility for maintenance varies between the neighboring communities and city departments. Several examples follow.

Policy Statements from Specific Cities Supporting Trees in Circles

- **Palo Alto**

  The City of Palo Alto’s Comprehensive Plan recognizes the value of traffic circles for reducing collisions and “offer[ing] opportunities for added landscaping and tree planting.” The 2012 Transportation Plan “calls for greater use of traffic circles, particularly along bicycle boulevards.”

  **Source:** *Palo Alto Comprehensive Plan Transportation Element* (Palo Alto City Council 2017)

- **San Francisco**

  The City of San Francisco recommends that “[T]raffic calming circles should be landscaped with trees or plantings. Shrubs and grasses should be planted up to 3 feet tall and trees should be appropriately pruned.” In fact, the City specifies a

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22 *Roundabouts: An Informational Guide* (NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM/Transportation Research Board 2010. Research sponsored by the American Association of State Highway and Transportation Officials in cooperation with the Federal Highway Administration)
recommended number of trees in relation to circle size: “In traffic calming circles with a
diameter of less than 15 feet, one tree should be planted in the center. On a traffic
calming circle with a diameter greater than 15 feet, more than 1 tree should be planted
and should be equally spaced around the circle.”

San Francisco’s Green Connections Design Guide recognizes the value of landscaped
traffic circles, noting that “Traffic circles visually reduce the scale of wide intersections
and break up the monotony of the street grid. When they include landscaping, they
can beautify and enliven the streetscape.” In fact, the City’s SF Better Streets
website features a picture of a neighborhood circle landscaped with native pollinator
plants and a central tree, similar to some of Berkeley’s circles.

Sources: SFBetterStreets: A guide to making street improvements in San Francisco (City and County of
San Francisco 2015); SF Green Connections Plan (City and County of San Francisco 2014)

- Seattle

The City of Seattle is a recognized leader in making streets safer for bicycles and
pedestrians. As part of this effort the city supports and celebrates their community-
planted traffic circles. In fact, Seattle’s DOT maintains a Traffic Circle Flickr page
featuring attractive or charismatic circles with trees. Contacted for information, Seattle
shared a photo of a circle with a mature tree, as shown below.

Seattle policy allows trees in traffic circles with an inner diameter of at least 8 feet, with
city approval: “All Traffic Circle trees must be approved by SDOT Urban Forestry
prior to planting.” The city relies on maintenance by the community but reserves the
right to maintain if this is not successful.
Missoula

The City of Missoula incorporates trees and substantial landscaping into their traffic circles. Referring to traffic circles, medians, and chicanes, the Missoula Parks and Recreation Design Manual (2018) states that “Landscaping in these areas consist of trees, woody and herbaceous shrubs, grasses, woody and herbaceous perennial-type ground covers, drought tolerant grass.” (19)

Missoula also encourages growing traffic circle plants to 5 feet in height to assist with traffic calming: “...Where median and traffic circle plants are used for specifically for traffic calming, the selected plants may grow to a height of 60” above the top of the curb.” (23)

The City also prioritizes the benefits of landscaping to neighborhood health and local biodiversity. It is the first certified “Community Wildlife Habitat™” City in Montana, based on its endeavor to provide habitat for animals, especially birds and insects. The Design Manual states: “When designing public landscape, greenway and park facilities, the landscape architect must consider costs of construction and maintenance in relation to the benefit derived by the community. Proper design and effective use of the built environment can lead to a happy and healthy community, as well as plant and animal diversity within the community.” (14)

Tucson

The City of Tucson has developed a guidance document to assist neighborhoods in obtaining traffic circles because they "have been shown to be very effective in reducing the speed of vehicles traveling on residential streets . . . and for beautification" of residential streets. This document was produced by the Department of Transportation Traffic Engineering Division. The City encourages trees and provides specific, practical guidance for visibility:

Note newly planted tree in photo of Missoula Traffic Circle, in National Wildlife Foundation’s announcement that Missoula became the first city in Montana to become a Certified Habitat City, with the caption: “Many Traffic Circles in Missoula provided excellent habitat!” Photo by Claire Grisham.”

“Sight visibility around the traffic circle must not be blocked with large dense shrubs. Shrubs should be set back accordingly so that mature growth will not extend past the curb edge. Tree selection and setback should be such that the mature tree branches do not extend into the travel lane below the 14’ level around the traffic circle.”

Source: Traffic Circles: Facts About Controlling Traffic in our Neighborhoods (City of Tucson Traffic Engineering Division nd)

National Guidance Documents:

- Urban Street Design Guide (NACTO 2013)

This widely-cited manual was developed by the National Association of City Transportation Officials (NACTO), an association of 71 major North American cities and 10 transit agencies, whose mission is “to build cities as places for people, with safe, sustainable, accessible and equitable transportation choices that support a strong economy and vibrant quality of life.” The Guide notes the value of trees and other vegetation not only for beautification but for their contribution to traffic calming: “Mini roundabouts and neighborhood traffic circles lower speeds at minor intersection crossings…Shrubs or trees in the roundabout further the traffic calming effect and beautify the street, but need to be properly maintained so they do not hinder visibility.”

The guidance diagram for the “mini roundabouts” section highlights a traffic circle with landscaping and a central tree (see below).
Note tree in center of mini-roundabout
Source: Urban Street Design Guide (NACTO 2013)

● Traffic Calming ePrimer (USDOT Federal Highway Association 2017)

The U.S. Department of Transportation/Federal Highway Administration's Office of Safety Programs provides an extensive Toolbox of Individual Traffic Calming Measures, including neighborhood traffic circles. In the section on traffic circles, they emphasize that these features are more effective as traffic calming devices when landscaped, including the use of trees:

“A traffic circle can simply be a painted area, but it is most effective when it is defined by a raised curb and landscaped to further reduce the open feel of a street. A traffic circle can be landscaped with ground cover, flowers, and street trees.”

The illustrative photo of a landscaped traffic circle provided in this FHA Traffic Calming guide includes a central tree (see below).

Source: Traffic Calming ePrimer - Module 3 (U.S. Department of Transportation/Federal Highway Administration)

Phone Interviews with Cities with Traffic Circles:

We also interviewed traffic engineers, landscape architects, and traffic circle administrators from a number of cities to understand their perspectives on landscaping of traffic circles. These cities include Augusta (Maine), Austin (Texas), Boulder (Colorado), Chapel Hill (North Carolina), Columbus (Ohio), Minneapolis (Minnesota), Missoula (Montana), Pasadena (California), Portland (Oregon), San Francisco (California), Savannah (Georgia), Seattle (Washington), Tucson (Arizona), Vancouver
(British Columbia), Williamsport (Pennsylvania), Washington D.C., and Winooski (Vermont).

We found that the vast majority of the cities contacted not only allow but encourage trees and vegetation to be planted in traffic circles, provided the plantings conform to city policy regarding stipulated sightlines and planting policy. Policies vary, but the great majority require:

- vegetation to be no taller than 2-3 feet,
- tree limbs to be no lower than 8 feet,
- boughs and canopy extending over the street to be no lower than 14 feet above pavement

**Table of Findings on Traffic Circles in Other Cities**

The table below summarizes key pieces of information related to traffic circle vegetation policy from our research. This information was found online (e.g. city websites) or captured during phone interviews, including any material shared afterwards. For each city, it tracks the maximum allowed height of vegetation and pruning specifications for trees (“limbing up”). If trees are allowed but pruning specifications weren’t captured, the cell is noted with "Allowed". If no details were captured the cell is marked with a hyphen, "–".

<table>
<thead>
<tr>
<th>#</th>
<th>City</th>
<th>Plant Ht</th>
<th>Trees*</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Missoula MT</td>
<td>60inW</td>
<td>AllowedW</td>
<td>Robust Adopt-a-Circle program that promotes adoption and maintenance of circles, including a clickable Google Map. <a href="https://example.com">In July 2018</a> Missoula was the 1st city in MT to become a National Wildlife Federation certified &quot;Community Wildlife Habitat™.&quot;</td>
</tr>
<tr>
<td>2</td>
<td>Tucson AZ</td>
<td>36inO</td>
<td>14ftO</td>
<td>200+ circles. Neighbors decide signage (STOP or YIELD). Biggest issue is watering, not sightlines.</td>
</tr>
<tr>
<td>3</td>
<td>San Francisco CA</td>
<td>36inO</td>
<td>AllowedO</td>
<td>Robust SF Better Streets Program. Multiple trees allowed: &lt;15’ dia. 1 tree, &gt;15’ dia. 2+ trees</td>
</tr>
<tr>
<td>4</td>
<td>Boulder CO</td>
<td>30inO</td>
<td>8ftO</td>
<td>Sightline specs from Municipal Code 9-9-7 for Sight Triangles</td>
</tr>
<tr>
<td>5</td>
<td>Pasadena CA</td>
<td>30inF</td>
<td>7ftF</td>
<td>No yield control, Stop signs at each corner.</td>
</tr>
<tr>
<td>6</td>
<td>Seattle</td>
<td>24inW</td>
<td>AllowedW</td>
<td>First circles in 1970s, now 1,200+. Approx 5 new per year.</td>
</tr>
</tbody>
</table>
Possible funding from “Your Voice, Your Choice” budgeting initiative.

Focus on native vegetation

Robust Green Streets Program that promotes adoption and maintenance of circles, includes a list of recommended plants.

1998 Planting Guidelines - more than half of all recommended are trees

“Trees placed in Traffic Circles break uninterrupted views of long straight street sections and help to focus driver attention on their local surroundings.” Only deciduous trees allowed (for limbing up), no evergreens.

For Neighborhood Traffic Circles the desirable maximum entry design speed is 15mph. Traffic circles may be planted with appropriate landscape and central islands greater than 12ft in diameter may be planted with a tree.

Key of superscripts:

–– = No information collected
* = Sightline clearances (or “limbing up”) not captured for all locations. If no specs captured, noted as “Allowed”. If sightline clearance was captured, the allowance is by default for inside curbline, exceptions noted as “if extend beyond edge of circle”
P = Information from phone interview
O = Information found online, usually city’s webpage
E = Information from an email
W = Information from written document

Sources:
(Missoula) Adopt-a-Circle webpage, Parks & Rec Design Manual, Google Map of Circles; (Tucson) TDOT Traffic Circles Webpage, Traffic Circles Fact Sheet Brochure; (SF) San Francisco Better Streets Program; (Boulder) Boulder Municipal Code 9-9-7; (Seattle) SDOT Traffic Circles; (Vancouver) Green Streets Program, Recommended plant list; (Arlington) Roundabouts/Traffic Circles Guidelines

Photo Album of Traffic Circles in Selected U.S. Cities

The Subcommittee on Plantings and Vegetation opted to gain a contemporary on-the-ground perspective of traffic circles by sampling cities throughout the United States and Canada. We knew from our initial research that many cities promote circles as effective traffic calming devices and that trees are not only allowed but encouraged. The next logical step was to get a street-level view, to compare and contrast the circles in other cities with those in Berkeley.

The images below represent a sampling of images. Some were captured in the winter months when deciduous trees are without foliage. In others, the trees are small and still becoming established, apparently planted recently as part of traffic calming efforts.
Better than words can convey, they offer a clear, visual understanding of how other cities approach this valuable traffic calming device.
Seattle WA
Map of Missoula’s Adopt-a-Circle program. Illustrating adopted circles and those which are available to be adopted.

Source: Missoula’s Traffic Circle Locations
Arlington VA
Austin TX
Appendix

NOTE: Final order of Appendices to be determined

A. NACTO Recommendations on Sight Triangles and Speed

The following illustrations are taken from the NACTO (National Association of City Transportation Officials) guide for design streets and emphasize the importance of lowering speeds to promote safety. The task force concurs, especially in residential areas with heavy bicycle and pedestrian traffic. **Speed kills.** Reducing speed saves lives. For example, lowering the speed of a vehicle just 5-10 mph can reduce the crash risk by up to 10%, while simultaneously decreasing the risk of fatality by 3%. From the table below, reducing speed from 25 mph to 15 mph reduces the Crash Risk from 15% to 5% and Fatality Risk from 5% to 2%.

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>STOPPING DISTANCE (FT)*</th>
<th>CRASH RISK (%)¹</th>
<th>FATALITY RISK (%)¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>10–15</td>
<td>25</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>20–25</td>
<td>40</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>30–35</td>
<td>75</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>40+</td>
<td>118</td>
<td>90</td>
<td>85</td>
</tr>
</tbody>
</table>

* Stopping Distance includes perception, reaction, and braking times.
¹ Source: Traditional Neighborhood Development: Street Design Guidelines (1999), ITE Transportation Planning Council Committee SP-8

**Driving Speed Fatality Risk Chart.**


Slower speeds also enhance a driver’s field of vision, which is paramount for promoting safety. See illustration, below, comparing the peripheral view corridor of a vehicle traveling at 10-15 mph (top image) vs. 20-25 mph (2nd image from the top). At slower speeds the field of vision is broader.
<table>
<thead>
<tr>
<th>Speed (MPH)</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-15</td>
<td>Driver's peripheral vision, Stopping distance, Crash risk</td>
</tr>
<tr>
<td>20-25</td>
<td>Driver's peripheral vision, Stopping distance, Crash risk</td>
</tr>
<tr>
<td>30-35</td>
<td>Driver's peripheral vision, Stopping distance, Crash risk</td>
</tr>
<tr>
<td>40+</td>
<td>Driver's peripheral vision, Stopping distance, Crash risk</td>
</tr>
</tbody>
</table>

*Driver’s peripheral vision at different speeds.*

*Source: Urban Street Design Guide, Design Speed. (NACTO 2013)*
B. Map of Traffic Circles in Berkeley
C. General Vegetation Guidelines

Planted traffic circles accord with Berkeley's environmental and sustainability values and, when regularly maintained, add to urban beauty and neighborhood quality of life. Circles should have a minimum of hardscape and a maximum of low growing plantings.

The following principles are suggested for guiding the planting of traffic circles.

1. The City should encourage circle plantings that are durable, diverse, and attractive. Planted circles also reduce hardscape and runoff and improve ground water retention. Plantings are strongly encouraged that provide habitat for native bees and other pollinators, butterflies and other insects, and birds, and that do not require pesticides or herbicides to maintain. Use of native plant species is encouraged.

2. Circle plantings can and should reflect the individuality and diversity of Berkeley in the same way that our buildings, people, cultures, public spaces, neighborhoods and activities are diverse. There is no need for all circles to look, or be planted, the same, although within specific neighborhoods or along individual streets circle designs might be coordinated.

3. We do not recommend a species list of approved plants. Developing and maintaining a species list will be costly, controversial, and difficult and expensive to administer. Instead, the City should permit a broad range of plantings that conform to general criteria. To aid residents who seek additional guidance, several planting lists (or "palettes") are provided.

4. One criteria is height. Non-tree plantings should not be allowed to grow taller than 2 1/2 feet (30") in height above the circle curb, in accord with national and regional standards. An exception should be made for seasonal flower stalks that may extend above this height.

5. The City may maintain a limited list of plants that are not recommended for circles because of very specific detrimental impacts, for example, poison ivy.

6. Trees in circles are welcome as a way to reduce the heat island effect, provide habitat and shade, and sequester carbon. Species selection should be coordinated with the City Forester.

7. Mature trees should have no substantial foliage below about eight feet above the pavement. Sapling trees will clearly have some foliage between two and eight feet, but species should not be used that grow extremely wide when low and young. When Circle
tree plantings are young they may also be selectively pruned to encourage growth to a
taller height.

C-1. Tree Guidelines

Tree plantings in Berkeley’s parks, along Berkeley’s streets, and in traffic circles have
clear and substantial benefits and value. Trees sequester carbon which helps fight
climate change, remove carbon dioxide and other greenhouse gases from the air,
reduce urban heat, help create and retain soil, reduce stormwater runoff and promote
groundwater recharge, and create habitat for birds, animals, and insects. They also
provide beauty, shade, a stately presence in the public landscape and a marker of the
changing seasons, particularly in highly urbanized areas where mature trees are rare in
private gardens and/or on public streets.

Other Bay Area and North American cities and expert analysis beyond Berkeley have
identified trees as a welcome and useful component of traffic circles, particularly
because they help slow traffic and identify for drivers the presence of a circle from a
distance.

Half an acre of forest land can absorb three tons of carbon dioxide annually and
produce two tons of oxygen. Berkeley’s numerous existing current traffic circles cover
about half an acre of land, all of it converted from asphalt. The City’s Hazard Mitigation
Plan and Climate Action Plan recommend more tree plantings in Berkeley to help fight
climate change and reduce the “heat island effect” in lower elevation neighborhoods.
Tree plantings are also an economic and social equity issue. City mapping has
determined that tree cover is much higher in the Berkeley Hills than it is in the Flatlands.

Berkeley has a variety of existing trees in its traffic circles. Most have attained a size
where they do not have any substantial small branching or leaf canopy below eight feet,
and others are growing rapidly towards that expectation. These include California Live
Oaks, Dawn Redwoods, California Buckeyes, palms of various species, strawberry
trees, and even large woody shrubs that have been pruned up into a tree like canopy.
These trees should be “grandfathered” into the City’s policies after review of individual
specimens to ensure they currently conform, or will conform as they continue to grow.

Pruning of circle trees should be done in consultation with circle coordinators and the
City Forester. The pruning emphasis should not be on radical “limbing” or entirely
removing everything below eight feet, especially for tree saplings, because this may
retard rapid growth to appropriate height or permanently deform or weaken the tree.
Instead, smaller trees can be thoughtfully pruned to improve sight lines and maintain
healthy condition and growth. Pruning should be done at times of year best suited to
individual species. Trees should generally be planted at, or slightly offset from, the center of the circle so the perimeter areas do not have trunks or low tree branches.

The City Forester should be consulted and review the selection of tree species for individual circle planting, but we do not recommend a specific prescriptive list of tree species for circles or a requirement that circle trees be the same as nearby, or citywide, street tree plantings. Diversity should be encouraged. In some areas circle trees can be species that match existing nearby street trees, but special tree species in circles also have their own value. For example, palms in circles along Ninth Street and Dawn Redwoods in circles along Ellsworth are a distinctive presence.

Individual neighborhoods and circle coordinators should be trusted, with appropriate review by the City Forester, to suggest species that will work in specific circles. A goal of circle trees that are among the most attractive, unusual, and distinctive in a neighborhood is consistent with these policies.

Specific guidelines for species selection:

1. Trees that require frequent or major irrigation once established are not encouraged for circles.
2. It should be expected that circle trees will receive, and should be able to thrive and remain attractive in, conditions of full or close-to-full sun and reflected heat from surrounding pavement.
3. The existence of utility access shafts and underground utilities should be a factor in the selection of tree species for individual circles.
4. Trees that have long lifespans may be preferable since they will remain mature for a longer time without deterioration or low elevation growth. Short lived species will increase the frequency of replacement plantings and also increase the time that younger, and thus lower, trees are in a circle.
5. Multi-trunked species should not necessarily be discouraged. Visibility can be maintained between trunks as the tree grows older and trunks overall will have a narrower diameter.

If any single variety or species is preferred, it should be native oaks. Oaks meet many of the goals described in this section and, as described elsewhere, a “re-oaking” effort in Berkeley could be partially based in newly planted traffic circles. Oaks could be a preferred species for “orphan” circles and newly installed circles where the City is undertaking all the installation and maintenance work.

New tree plantings in circles may be from 15 gallon 24 inch box or larger specimens so the new planting already has substantial height and a clear lower trunk when it is placed
in a circle. However, smaller specimens may be selectively used / planted where the tree is expected to grow rapidly to greater height and clear sight lines. Research has shown that many tree species grow more rapidly when planted young. For example, the California Live Oak at Fulton and Russell was planted as a seedling less than three feet high and quickly attained adult maturity and size.

Circle tees may be planted as memorials to, or honoring, individual citizens, organizations, or causes, after appropriate city review. Special trees of this sort can reinforce neighbor and community ties and identity and increase neighbor maintenance attention to the circles. The City should develop guidelines and a process for approval of such memorial trees, and should have a process for reviewing and accepting community donations of tree specimens for circle plantings.

Small memorial plaques may be placed in circles in conjunction with memorial or other special plantings, but should be low and unobtrusive. An alternative, where space permits, would be a freestanding plaque on nearby sidewalks that can be read by passersby viewing the circle across the intersection.

D. Introduction to Suggested Planting Palettes

Whether or not you plant a circle to a specific palette, all appreciate the benefits of any type of planted circle.

About one quarter of Berkeley's land area is covered with asphalt or concrete pavement in the form of streets and parking lots. The typical Berkeley traffic circle provides 200-300 square feet of welcome growing ground, recovered from otherwise sterile asphalt pavement. When a new circle is created, it is quickly colonized by insects, plants, and soil organisms even without human help. Within a season or two birds can forage in circles for seeds and edible insects and find them a welcome place to take temporary refuge.

Traffic circles also absorb and filter rainwater, decreasing stormwater runoff and urban pollution. Circles with a mature central tree provide additional bird habitat and shade, sequester large amounts of carbon, remove greenhouse gases from the atmosphere, and combat the "heat island effect" prevalent in densely developed urban areas. Fruits and flowers produced by plants in circles provide food for birds and insects, including beneficial bees.

For generations Berkeley has prided itself on being a garden city, with plants and nature integrated into every area; planted circles reinforce that history. Traffic circles also function as miniature public open spaces in neighborhoods without large parks or other
plantings. Although they should be viewed, not actively used for recreation, their very existence helps reduce human stress and brightens and softens the streetscape.

Appropriate seasonal, secular, decorations in circles that are planned and positioned to not obstruct sight lines can cheer the passersby, especially during the winter.

The palette lists below are drought-tolerant plant assemblages that support native biodiversity and the benefits to human health and well-being that local access to nature provides. The palettes are based on local ecosystems, to bring the experience of nature into our neighborhoods and re-establish some of the lost habitats of Berkeley. They are also designed to be low-maintenance, climate-resilient and to conform with visibility and safety considerations.

D-1. Re-Oaking Guidelines

The re-oaking template is based on the native oak savannas and woodlands that were common throughout much of the Bay Area before modern development. California’s oaks are keystone species that support tremendous local biodiversity through their leaves, branches, and acorns. In addition to their ecological benefits, coast live oaks and valley oaks also provide valuable ecosystem services to address climate change, providing large shade canopies while being drought-resilient and sequestering carbon at higher rates than most other trees. Matching oak canopy with complementary drought-tolerant understory vegetation creates an experience of local nature in the city that enhances the biodiversity benefits for local wildlife.

Biodiversity Benefits: Native oaks such as coast live oak and valley oak support a diverse range of native birds and insects. Planting neighborhood oaks within 500’ of each other increases the likelihood of pollination and acorn production. The understory supports an extremely diverse range of native pollinators and other insects such as butterflies, beetles, bees, crickets and moths. For example, Great Spangled Fritillary Butterflies and wooly bear caterpillars use oak leaf litter for protection from cold weather and predators. The setting provides an opportunity for low-growing plants that were common to the area but now rarely find space given the priority for lawns and taller vegetation. A combination of different types of native oaks within neighborhoods (coast live, valley, blue, black) will support greater biodiversity and resilience to climatic variation.

Carbon Sequestration: Coast live oak and valley oak store more carbon per year than commonly used street trees.
Maintenance: As the oaks mature, their canopy provides shade and natural mulch, reducing the need for watering and weeding. The leaf drop—particularly from live oaks—can greatly reduce weeding needs.

Center tree

Coast live oak (*Quercus agrifolia*). Live oaks are hardy distinctive California trees with a striking dark green color and year-round canopy.

Valley oak (*Quercus lobata*). Valley oaks are a beautiful, graceful deciduous shade tree. Valley oaks are sensitive to salt in the air and tend to be found further away from the Bay. In Berkeley, healthy valley oaks appear to be more common east of Martin Luther King Way.


*Oaks of California* (Pavlik et al. 1993)
<table>
<thead>
<tr>
<th>Plant</th>
<th>Scientific Name</th>
<th>Height</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apricot Monkeyflower Bush</td>
<td>Mimulus bifidus</td>
<td>2-3-ft h x 2-3-ft wide, might need some pruning to keep lower</td>
<td>Spectacular 2” azalea like flowers. No irrigation once established. Attracts hummingbirds. Host plant for Checkerspot butterflies.</td>
</tr>
<tr>
<td>California Aster</td>
<td>Corethrogyne flageliform</td>
<td>1-3-ft h x 3-ft wide, variable, prune to keep low.</td>
<td>Deciduous perennial. Bright lavender yellow centered 1” daisy like flowers summer into fall. A wildflower, pollinator and butterfly plant.</td>
</tr>
<tr>
<td>California Fuchsia</td>
<td>Zauschneria or Epilobium canum (low growing selections, such as ‘Everett’s Choice’ or ‘Select Mattole’), Ceanothus</td>
<td>1-2-ft x 2-3-ft wide</td>
<td>Fine textured gray green to silver leaves, moundng habit and bright red orange 1.5” tubular flowers in clusters later summer into fall. Deciduous during winter. Best hummingbird attracting plant. Drought tolerant. Best to cut to ground after bloom. Spreads by root runners.</td>
</tr>
<tr>
<td>California Lilac</td>
<td>ex. Ceanothus hearstiorum - San Simeon Ceanothus (low growing selections)</td>
<td>3”-6” h x 6 ft wide</td>
<td>Many species and varieties, choose low growing selections. Ceanothus hearstiorum is Flat growing, with dark green crinkled leaves and 1”deep blue flower clusters in the spring.</td>
</tr>
<tr>
<td>Douglas Iris</td>
<td>Iris douglasiana and hybrids and selections (ex. ‘Canyon Snow’ Iris Pacific Coast Hybrid)</td>
<td>18 h x eventually 3-ft wide (Canyon Snow)</td>
<td>Ex. ‘Canyon Snow’ recognized as an outstanding white flowered selection. Disease resistant, little water, evergreen. Blooming in the spring.</td>
</tr>
<tr>
<td>Island Alum Root</td>
<td>Heuchera maxima, varieties</td>
<td>2-ft h x 2-ft wide</td>
<td>Part Shade to full shade clump forming perennial with delicate airy pale pink to white flower spikes. A preferred groundcover for Coast Live Oaks.</td>
</tr>
<tr>
<td>Hummingbird Sage</td>
<td>Salvia spathacea</td>
<td>1-3-ft h x 4-ft wide, may need pruning to encourage lower growth</td>
<td>Showy native groundcover for dry shade. Blooming late spring into summer, 1” bright magenta pink flowers emerge from spikes of burgundy calyces. Attractive evergreen to</td>
</tr>
</tbody>
</table>
Manzanitas | Low growing selections (e.g., Arctostaphylos urn 'Emerald Carpet', Arctostaphylos edmundsii 'Carmel Sur', Arctostaphylos uva ursi 'Point Reyes', Point Reyes Bearberry) | 6-12' ht x 6 ft wide | Low to average water. Low tidy evergreen groundcovers that are drought tolerant with pink to white small urn shaped flowers winter into spring provide bees with nectar earl in season. Edible red berries good for bears and birds.

Red Buckwheat | Eriogonum grande var. rubescens | 12' ht x 2-3ft wide | Late blooming, short growing, Drought tolerant, attractive to butterflies and bees.

Seaside Buckwheat | Eriogonum latifolium | 1ft ht x 2ft wide | Compact mound of softly felted blue grey spoon shaped leaves topped by pale pink 1" clusters of flowers blooming summer into fall. Used for erosion control, drought tolerant. Loved by bees, butterflies and many pollinators.

Sulphur Buckwheat | Eriogonum umbellatum | 1ft tall x 2 ft wide | Compact evergreen mound. Blooms late spring to end of summer. Needs little or no water once established. Attractive to Bee and Butterfly.

Western Sword Fern | Polystichum munitum | 2-3ft ht x 4ft wide | Drought tolerant fern recommended for growing under oaks. Adds bold visual structure. Cut old fronds back as they die. Part shade to full shade. Average to Low water.

Western Yarrow | Achillea millefolium | 1-4ft ht x 2-3ft wide | Usually a low spreading ferny leaved perennial with 3-4" clusters of white to pink flowers. Usually full sun, edge of shade under oaks. Attractive to pollinators.

Yerba Buena | Clinopodium douglasii | 2' ht and spreading | Flat evergreen groundcover for shade. Easy, tough and long lived, used medicinally by native people. Makes a mint-like tea. Drought tolerant by best with a little summer water.

### D-2. Bee/Pollinator Guidelines

Bees are essential pollinators in the plant world. About 75% of plants rely on an animal pollinator—most often a bee—to create seeds and fruit that produce the next generation of plants. In recent years bee populations have seen significant declines; habitat loss and pesticides are thought to be primarily responsible.

By providing food for bees—and, simultaneously, many other pollinators—we help sustain local bee populations, especially natives which can actually be more efficient and productive at pollination than honey bees.
Aside from the common European honeybee, there are some 1,600 species of native bees in California which can look quite different and do not construct and live in large, organized hives. Many native bee species form small colonies of just a few dozen adults. Some are solitary. Many live in the soil and do not make above-ground colonies.

This suggested planting palette serves bees in the following ways: it provides specific types of flowers especially rich in nectar and/or pollen that bees find most useful; the flowers bloom over a long period of time, giving bees a steady source of food during the seasons when they’re most active; it concentrates many flowers in a small space, allowing the bees to forage efficiently without having to fly long distances; it emphasizes a diversity of native plants to which native bees are best adapted, thereby sustaining those bee species most adapted to California’s climate.

Bee friendly traffic circle planting should avoid all insecticides and herbicides and heavy mulching (which can bury the homes of ground-dwelling native bees). A traffic circle which gets little human foot traffic can be an excellent oasis for bee colonies, especially native bees which live in small numbers and/or in the ground.

Planting a traffic circle with bee friendly plants and habitat will reward your neighborhood many times over with increased yields of vegetables, fruits, and nuts from nearby gardens.

**References:**
- UC Berkeley Urban Bee Lab
- UC Davis Arboretum and Public Garden: California Native Bees
- World Bee Day: Best plants to help save bees
- Theodore Payne Foundation: Bee Friendly Native Plants
# Suggested Plants for Bees/Pollinators

<table>
<thead>
<tr>
<th>Plant</th>
<th>Scientific Name</th>
<th>Height</th>
<th>CaNa</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanket Flower</td>
<td>Gaillardia x grandiflora</td>
<td>10-14&quot; ht x 12&quot; wide</td>
<td>Ca</td>
<td>Pollen and Nectar source for many native bees. Daisy like flowers summer to fall in shades of orange red and yellow many banded. Perennial, but short lived 2-3 years. Drought tolerant.</td>
</tr>
<tr>
<td>Blue Thimble Flower</td>
<td>Gilia capitata</td>
<td>12-18&quot; ht x 12&quot; wide</td>
<td>Ca</td>
<td>Annual native wildflower loved by pollinators as pollen and nectar source. Ferny foliage and lavender blue flower clusters spring into summer. May self sow.</td>
</tr>
<tr>
<td>Borage</td>
<td>Borago officinalis</td>
<td>2-3ft ht x 1-2ft wide</td>
<td>Ca</td>
<td>Annual Herb, reseeds. Spring to summer bloom of start shaped Clear Blue flowers. Poor soil, drought tolerant Mediterranean. Edible.</td>
</tr>
<tr>
<td>Calamint</td>
<td>Calamintha ssp. Ex. C. repeta</td>
<td>1-2ft ht x 1ft wide</td>
<td>Ca</td>
<td>Deciduous perennial. Bright lavender yellow centered 1&quot; daisy like flowers summer into fall. A wildflower, pollinator and butterfly plant.</td>
</tr>
<tr>
<td>California Aster</td>
<td>Corethrogyne filaginifolia</td>
<td>1-3ft ht x 3ft wide, variable, prune to keep low.</td>
<td>Ca</td>
<td>Small evergreen shrublet with clusters of cream colored flowers April to October, aging pink to rust. Attractive to many pollinators. Seeds prized by birds. Drought tolerant once established.</td>
</tr>
<tr>
<td>California Buckwheat</td>
<td>Eriogonum fasciculatum</td>
<td>2-3ft ht x 2-3ft wide</td>
<td>Ca</td>
<td>Flat growing, dark green wrinkled leaves and 1&quot;deep blue flower clusters in the spring. C. hearstiorum likes clay, not sand. Better with some summer water (Native to foggy coast).</td>
</tr>
<tr>
<td>California Lilac</td>
<td>ex. Ceanothus hearstiorum - San Simeon Ceanothus (low growing selections)</td>
<td>4&quot; ht x 5 ft wide</td>
<td>Ca</td>
<td>Evergreen prostrate shrub that can be 6’ ht but also mounds - pruning required to keep low. Round dark green leaves, clusters of light blue flowers in spring. Drought tolerant, but likes to washed off occasionally. Attractive to bees as well as a butterfly host plant.</td>
</tr>
<tr>
<td>California Lilac Low Blue Blossom</td>
<td>Ceanothus thyrsiflorus repens</td>
<td>2ft ht x 6 ft wide, prune to keep low</td>
<td>Ca</td>
<td>Perennial grown as Annual. Reseeds. Start from seeds or plants. Drought tolerant state flower. Mainstay Pollen source for many native bees.</td>
</tr>
<tr>
<td>California Poppy</td>
<td>Eschscholzia californica</td>
<td>1-1.5ft ht x 1ft wide</td>
<td>Ca</td>
<td>Mint scented. Trailing groundcover for sun or part sun. 1” lavender puff balls July thru August.</td>
</tr>
<tr>
<td>Common Name</td>
<td>Scientific Name</td>
<td>Height &amp; Width</td>
<td>Additional Information</td>
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<tr>
<td><strong>Attractive nectar source for bees and butterflies. Drought tolerant.</strong></td>
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</tr>
<tr>
<td>Farnleaf Carpet Tickseed</td>
<td>Bidens ferulifolia</td>
<td>12” ht x 1.5 ft wide</td>
<td>Short lived perennial (3-5yrs) Native to US/Mexico. Drought, deer and heat tolerant. Bright yellow daisies summer to fail or more. Moderate to low water.</td>
<td></td>
</tr>
<tr>
<td>Frikart’s Aster</td>
<td>Aster x frikartii ‘Monch’</td>
<td>2ft ht x 2ft wide</td>
<td>Moderate water, sun part shade, pruning late spring will lower overall ht. Cut to ground after bloom. Late summer fall bloom provides nectar and pollen in late season. Lavender Blue 2” daisy flowers in profusion. Attractive to butterflies too.</td>
<td></td>
</tr>
<tr>
<td>Hairy Gumplant</td>
<td>Grindelia hirsutula</td>
<td>1-2ft ht x 1-2ft wide</td>
<td>Low herbaceous perennial, 2” sunny yellow daisies, summer to fall. Drought tolerant, but best with some summer water. Pollen and nectar source. G. stricta. Similar, lower growing.</td>
<td></td>
</tr>
<tr>
<td>Hummingbird Mint</td>
<td>Agastache spp.</td>
<td>2-3ft ht x 2ft wide</td>
<td>Long blooming perennial, humming magnet, spikes of orange flowers, minty fragrant leaves. Low water once established</td>
<td></td>
</tr>
<tr>
<td>Lavender</td>
<td>Lavandula spp.</td>
<td>1-2ft ht x 1-3ft wide</td>
<td>Choose dwarf varieties that mature at or below guideline mature ht. Example: Hidcote - darkest purple, Munstead - blue w/grey foliage. Summer bloom of lavender flower clusters. Fragrant.</td>
<td></td>
</tr>
<tr>
<td>Manzanitas</td>
<td>Low growing selections (ex. Arctostaphylos ‘Emerald Carpet’, Arctostaphylos edmundsii ‘Camel Sun’, Arctostaphylos uva ursi ‘Point Reyes’: Point Reyes Bearberry)</td>
<td>6-12' ht x 6ft wide</td>
<td>Low neat evergreen groundcover shrubs that are drought tolerant with pink to white small urn shaped flowers winter into spring provide bees with nectar early in season. Bumblebees. Edible red berries good for birds.</td>
<td></td>
</tr>
<tr>
<td>Pot Marigold</td>
<td>Calendula officinalis</td>
<td>12-18” ht x 12”wide</td>
<td>Short lived perennial grown as annual. Winter to spring bloom, Yellow and Orange Daisy like flower is edible. Easy to start from seed.</td>
<td></td>
</tr>
<tr>
<td>San Miguel Island Buckwheat</td>
<td>Eriogonum grande var. rubescens</td>
<td>12” ht x 2-3ft wide</td>
<td>Low growing. Drought tolerant, attractive to butterflies and bees. Red pink pom pom clusters Summer bloom.</td>
<td></td>
</tr>
<tr>
<td>Sea Holly</td>
<td>Eryngium spp.</td>
<td>1-2ft ht x 1-2ft wide</td>
<td>Thistle like perennial produces striking purple blue flowers with silver bract collars, often deeply lobed leaves. Drought tolerant. Very attractive to bees. Blooms summer to fall.</td>
<td></td>
</tr>
<tr>
<td>Seaside Buckwheat</td>
<td>Eriogonum latifolium</td>
<td>1ft ht x 2ft wide</td>
<td>Compact mound of softly felted blue grey spoon shaped leaves topped by pale pink 1” clusters of flowers blooming summer into fall. Used for erosion control, drought tolerant. Loved by bees, butterflies and many pollinators.</td>
<td></td>
</tr>
<tr>
<td><strong>Squash</strong></td>
<td>Squash, Pumpkin and Zucchini</td>
<td>2ft ht x 6 ft wide</td>
<td>Vegetable. Summer annual. Needs moderate water. Bushy to rambling vine. Large yellow trumpet shaped flowers attractive to bees. Food for humans after bees get Nectar and Pollen.</td>
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<tr>
<td><strong>Sulphur Buckwheat</strong></td>
<td>Eriogonum umbellatum</td>
<td>1-3ft ht x 2 ft wide, can mound high, may need pruning to keep lower</td>
<td>Ca Native  Compact evergreen mound. Cream to yellow flower clusters late spring to end of summer. Needs little or no water once established. Attractive to Bee and Butterfly.</td>
<td></td>
</tr>
<tr>
<td><strong>Tickseed</strong></td>
<td>Coreopsis spp.</td>
<td>1-2ft ht x 1-2ft wide</td>
<td>US Short lived perennial (3-5yrs) Drought tolerant, long blooming, profuse, cheerful yellow to yellow and maroon daisy-like flowers summer to fall. Moderate water until established</td>
<td></td>
</tr>
<tr>
<td><strong>Tidy Tips</strong></td>
<td>Layia platyglossa</td>
<td>1.5ft ht x 1.5ft wide</td>
<td>Ca Native Native annual wildflower. Spring 2” yellow with white edges daisies. Many types of bees at low numbers. Pollen and nectar source.</td>
<td></td>
</tr>
<tr>
<td><strong>Toadflax</strong></td>
<td>Linaria purpurea</td>
<td>2-3ft ht x 1ft wide</td>
<td>Easy slender spikes of tiny violet lavender purple snapdragon like flowers over narrow blue grey leaves. Blooms summer. Perennial and reseeds. Many pollinators attracted.</td>
<td></td>
</tr>
<tr>
<td><strong>Wayne Roderick Daisy</strong></td>
<td>Erigeron glaucus 'Wayne Roderick'</td>
<td>1ft ht x 1-2ft wide</td>
<td>Ca Native Pollen and Nectar source for bees. Profusion of 2” lavender daisies with golden centers, easy tough and reliably perennial. Long blooming Spring to Fall with some deadheading. Drought tolerant. Better with some summer water.</td>
<td></td>
</tr>
<tr>
<td><strong>Western Yarrow</strong></td>
<td>Achillea millefolium</td>
<td>1-3ft ht x 3ft wide, variable, prune to keep low.</td>
<td>Ca Native Usually a low spreading ferny leaved perennial with 3-4” clusters of white to pink flowers. Long bloom season. Attractive to pollinators.</td>
<td></td>
</tr>
</tbody>
</table>
D-3. Butterfly Habitat Guidelines

"The power to enrich a patch of earth with beautiful butterflies, no matter how humble the plot or simple the effort, is awesome"

-Robert Michael Pyle, author, lepidopterist

Our Bay Area is home to 142 species of butterflies and they depend on specific types of plants. The Bay Area also has the largest concentration of endangered butterfly species in California.

Habitat loss is a primary cause of decreasing populations of butterflies. Berkeley is home to many of these species and by planting for their specific needs we can help keep butterflies flying in our neighborhoods.

Despite the common and understandable focus on planting pretty flowers to provide nectar for adult butterflies, butterflies actually have two more essential needs. First, each species has certain plants—sometimes just one kind of plant—on which its larva / caterpillars feed; planting those species is the way to provide useful habitat, even if there aren’t flowers in the same place. Second, pesticides kill butterflies and their caterpillars and should not be used in their habitat.

There are four stages of the butterfly's lifecycle —the egg, the caterpillar or larva, the chrysalid in which the larva turns into the winged butterfly, and the adult butterfly. A traffic circle can provide excellent space for all these life stages, starting with low growing caterpillar food plants.

Some spectacular species common to Berkeley are the Monarch, Western Tiger Swallowtail, Anise Swallowtail, Pipevine Swallowtail, West Coast Lady, Red Admiral, Gulf Fritillary, Buckeye, Cabbage White and Fiery Skipper Butterfly.

The suggested plants below can all grow low and thrive in traffic circles and provide food plants that will help generate a glorious annual bloom of butterflies like these for the surrounding neighborhood.
<table>
<thead>
<tr>
<th>Plant</th>
<th>Nectar Or HOST</th>
<th>Scientific Name</th>
<th>Height</th>
<th>CaNa</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apricot Monkey-flower Bush</td>
<td>Larval Host</td>
<td>Mimulus bifidus</td>
<td>2-3 ft ht x 2-3 ft wide, might need some pruning to keep lower</td>
<td>Ca</td>
<td>Native Spectacular 2” azalea like flowers. No irrigation once established, but better with a little water. Attracts hummingbirds. Host plant for Checkerspot and Buckeye Butterflies.</td>
</tr>
<tr>
<td>Pincushion Flower 'Butterfly Blue'</td>
<td>Nectar only</td>
<td>Scabiosa 'Butterfly Blue'</td>
<td>12-18” ht x 12-18” wide</td>
<td>Ca</td>
<td>Native One selection of many scabiosa. This one is perennial, low mounding and blooms for a long period. Summer to late fall. Fluffy flat lavender 2” flowers. Moderate water best.</td>
</tr>
<tr>
<td>California Aster</td>
<td>Nectar &amp; Host</td>
<td>Corethrogyne filaginifolia</td>
<td>1-3 ft ht x 3 ft wide, variable, prune to keep low.</td>
<td>Ca</td>
<td>Native Deciduous perennial. Bright lavender yellow centered 1” daisy like flowers summer into fall. A wildflower, pollinator and butterfly plant.</td>
</tr>
<tr>
<td>California Lomatium</td>
<td>Larval Host</td>
<td>Lomatium californicum</td>
<td>1 ft ht x 1 ft wide, narrow flower stalk 30” ht</td>
<td>Ca</td>
<td>Native Forms clumps of beautiful ferny blue green leaves. Looks like celery. No irrigation once established. Anise Swallowtail Butterfly host plant.</td>
</tr>
<tr>
<td>California Lilac Low Blue Blossom</td>
<td>Nectar &amp; Host</td>
<td>Ceanothus thyrsiflorus repens</td>
<td>2 ft ht x 6 ft wide, prune to keep low</td>
<td>Ca</td>
<td>Native Evergreen prostrate shrub that can be 6” ht but also mounds - pruning required to keep low. Round dark green leaves, clusters of light blue flowers in spring. Drought tolerant, but likes to washed off occasionally. Tortoiseshell Butterfly host plant. Attractive to pollinators too.</td>
</tr>
<tr>
<td>California Showy Milkweed</td>
<td>Larval Host and nectar Host</td>
<td>Asclepias speciosa</td>
<td>3-4 ft ht x 3 ft wide</td>
<td>Ca</td>
<td>Native Monarch Butterfly caterpillar food. Deciduous (disappears in winter) Fuzzy leaved stalks with 5’clusters of star shaped rose &amp; white flowers. Spreads by underground rhizomes. Sun. Some summer water appreciated.</td>
</tr>
<tr>
<td>Checker-bloom</td>
<td>Nectar &amp; Host</td>
<td>Sidalcea malviflora</td>
<td>2 ft ht x 1 ft wide</td>
<td>Ca</td>
<td>Native Perennial wildflower. Dense low 6” mound of small round scalloped leaves, 12-20” spikes of bright to dark pink 1” flowers in spring. Native larval host plant for Westcoast Lady Butterfly.</td>
</tr>
<tr>
<td>Plant Name</td>
<td>Category</td>
<td>Scientific Name</td>
<td>Height x Width</td>
<td>Origin</td>
<td>Characteristics</td>
</tr>
<tr>
<td>-------------------------------</td>
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</tr>
<tr>
<td>De la Mina Verbena</td>
<td>Nectar</td>
<td>Verbena lilacina 'De La Mina'</td>
<td>3ft ht x 3ft wide</td>
<td>Ca Native</td>
<td>Long blooming perennial, profuse 1” clusters of lavender flowers spring summer into fall. Better with occasional summer water. Attracts pollinators.</td>
</tr>
<tr>
<td>Dill</td>
<td>Larval Host</td>
<td>Anethum graveolens</td>
<td>2ft ht x 6” wide</td>
<td>Herb</td>
<td>Annual grown from seeds. Widely used culinary herb by many Old World cultures. Anise Swallowtail Butterfly caterpillars use as host plant. Start seed in summer, regular water.</td>
</tr>
<tr>
<td>Fernleaf Carpet Tickseed</td>
<td>Nectar only</td>
<td>Bidens frondifolia</td>
<td>12” ht x 1.5 ft wide</td>
<td>Ca Native</td>
<td>Short lived perennial (3-5yrs) Native to US/Mexico. Drought, deer and heat tolerant. Bright yellow daisies summer to fall or more. Small butterfly nectar. Moderate to low water.</td>
</tr>
<tr>
<td>Frikart’s Aster</td>
<td>Nectar only</td>
<td>Aster x frikartii ‘Monch’</td>
<td>2ft ht x 2ft wide</td>
<td>Herb</td>
<td>Moderate water, sun part shade, pruning late spring will lower overall ht. Cut to ground after bloom. Late summer fall bloom provides nectar and pollen late in season. Lavender Blue 2” daisy flowers in profusion. Attractive to butterflies &amp; bees.</td>
</tr>
<tr>
<td>Frogfruit Lippia</td>
<td>Nectar and Host</td>
<td>Lippia nodiflora</td>
<td>1-4” ht x 2ft wide. Can be invasive spreader Or lawn substitute</td>
<td>Ca Native</td>
<td>Evergreen perennial flat groundcover. 1/2” flower clusters like tiny lantana in pink and white. Host for Buckeye Butterfly. Attractive to pollinators.</td>
</tr>
<tr>
<td>Grasses</td>
<td>Larval Host</td>
<td>Poacea family</td>
<td>1-2ft ht x 1ft wide</td>
<td>Ca Native</td>
<td>Fiery Skipper butterfly caterpillars feed on grasses. In urban areas mostly on Bermuda Grass. Also feed on several native grasses ex. Purple Needlegrass (Nassella pulchra)</td>
</tr>
<tr>
<td>Lovage</td>
<td>Larval Host</td>
<td>Levisticum officinale</td>
<td>2-6ft ht x 4ft wide Usually much smaller in our dry climate. Prune to keep low for traffic circles.</td>
<td>Herb</td>
<td>Perennial Herb. Looks and grows like a big Parsley, leaves all originating from central basal rosette. Carrot like flowers. European herb that Anise Swallowtail caterpillars eat. Prune to keep low growing. Need moderate water. All parts of plant edible to humans too.</td>
</tr>
<tr>
<td>Narrow leaved Milkweed</td>
<td>Larval Host</td>
<td>Asclepias fascicularis</td>
<td>2-3ft ht x 2-3ft wide</td>
<td>Ca Native</td>
<td>Deciduous/semi deciduous perennial. 5”flower heads creamy white. Larval host plant for Monarch Butterfly. Full sun, occasional summer water.</td>
</tr>
<tr>
<td>Narrowleaf Plaintain</td>
<td>Larval Host</td>
<td>Plantago lanceolata</td>
<td>3-15” ht x 10” wide</td>
<td>Rosette forming perennial herb. Lance shaped base leaves. Flower stalks narrow ending in 1” club. Often seen in lawns. Primary Bay Area Larval host of the Buckeye Butterfly. Moderate water.</td>
<td></td>
</tr>
<tr>
<td>Plant</td>
<td>Larval Host</td>
<td>Height &amp; Width</td>
<td>Bloom Season</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>Nasturtium</strong></td>
<td>Tropaeolum majus</td>
<td>1ft x 2-3ft wide</td>
<td>Annual trailing herb. Sow seeds before winter rains. Reseeds. Larval host for European Cabbage White Butterfly. Better with some summer water. Clean up dead foliage after flower slows.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Parsley</strong></td>
<td>Petroselinum crispum</td>
<td>10&quot; x 1ft wide</td>
<td>Herb</td>
<td>Biennial grown as annual, reseeds. Mediterranean herb/vegetable used by Anise Swallowtail caterpillars as host plant. Grows best with regular water, bees and birds also attracted.</td>
<td></td>
</tr>
<tr>
<td><strong>Pellitory</strong></td>
<td>Parietaria judaica</td>
<td>18&quot; x 3ft wide</td>
<td>Weed</td>
<td>Herbaceous perennial, considered a weed. Larval food plant for the Red Admiral butterfly. Drought tolerant, evergreen, dense mound forming. May cause allergic reactions in some people.</td>
<td></td>
</tr>
<tr>
<td><strong>Red Buckwheat</strong></td>
<td>Eriogonum grande var. rubescens</td>
<td>12&quot; x 2-3ft wide</td>
<td>Ca Native Long Blooming Drought tolerant, short growing. Drought tolerant, Larval host for Lycaenid butterflies.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Seaside Buckwheat</strong></td>
<td>Eriogonum latifolium</td>
<td>1ft x 2ft wide</td>
<td>Ca Native</td>
<td>Compact mound of softly felted blue grey spoon shaped leaves topped by pale pink 1&quot; clusters of flowers blooming summer into fall. Drought tolerant. Caterpillar host for Blue butterflies.</td>
<td></td>
</tr>
<tr>
<td><strong>Sulphur Buckwheat</strong></td>
<td>Eriogonum umbellatum</td>
<td>1ft x 2ft wide</td>
<td>Ca Native</td>
<td>Compact evergreen mound. Blooms late spring to end of summer. Needs little or no water once established. Caterpillar food for Gossamer Wing butterflies.</td>
<td></td>
</tr>
<tr>
<td><strong>Toadflax</strong></td>
<td>Linaria purpurea</td>
<td>2-3ft x 1ft wide</td>
<td>Easy to grow, slender spikes of tiny violet lavender purple snapdragon like flowers over narrow blue grey leaves. Blooms summer. Perennial and reseeds. Larval host of Buckeye Butterfly caterpillar.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Western Yarrow</strong></td>
<td>Achillea millefolium</td>
<td>1-3ft x 3ft wide, variable, prune to keep low.</td>
<td>Ca Native</td>
<td>Usually a low spreading ferny leaved perennial with 3-4&quot; clusters of white to pink flowers. Long bloom season. Attractive to pollinators.</td>
<td></td>
</tr>
<tr>
<td><strong>Yampah spp.</strong></td>
<td>Perideridia spp ex.P.kelloggii - Native to SF Bay Area. P.bolanderi native to western US.</td>
<td>1-3ft x 1ft wide</td>
<td>Ca Native</td>
<td>Ancient Native host plant for Anise Swallowtail Butterfly. Current urban caterpillars feed on introduced Fennel. Yampah is perennial, small greyish parsley-like plant with tall flat topped carrot-like flower stalk. Plant several to provide food for caterpillars</td>
<td></td>
</tr>
</tbody>
</table>
D-4. Native Wildflowers Guidelines

This palette draws on the rich wildflower meadows and flowering trees of the East Bay, bringing the colors and aromas of native California into our neighborhoods. The mix of native flowers provides pollen and nectar for native bees, butterflies, and other insects as well as providing high-value leaves and seeds for birds and insects. This array of flowering plants provides floral continuity through the year, so local species have reliable resources year-round.

One possible source for Wildflower seeds would be Larner Seeds of Bolinas CA. https://www.larnerseeds.com/store/term/wildflower-seed-mixes

UNDER CONSTRUCTION

Suggested Wildflower Plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Scientific Name</th>
<th>Height</th>
<th>CalNa</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azalea flowered Monkeyflower</td>
<td>Diplacus grandiflorus</td>
<td>1-2 ft ht x 2 ft wide</td>
<td>Ca Native</td>
<td>Large azalea-like flowers. No irrigation once established, better with a little water and some shade. Attracts hummingbirds. Host plant for Checkerspot and Buckeye Butterflies.</td>
</tr>
<tr>
<td>Bolander's Phacelia</td>
<td>Phacelia bolanderi</td>
<td>1 ft ht x 0.5 ft wide</td>
<td>Ca Native</td>
<td>Papery inch wide lavender flowers late spring thru summer. Perennial groundcover, appreciates some summer water and some shade. Bee pollen and nectar source.</td>
</tr>
<tr>
<td>California Fuchsia</td>
<td>Zauschneria or Epilobium canum</td>
<td>1-2 ft x 2-3 ft wide</td>
<td>Ca Native</td>
<td>Fire textured gray green to silver leaves, mounding habit and bright red orange tubular flowers in clusters late summer into fall. Can be winter deciduous. Best hummingbird attracting plant. Drought tolerant. Cut back during winter.</td>
</tr>
<tr>
<td>California Poppy</td>
<td>Eschscholzia californica</td>
<td>1-1.5 ft ht x 1 ft wide</td>
<td>Ca Native</td>
<td>Iconic California Wildflower. Perennial often grown as Annual. Re-seeds. Start from seeds or plants. Drought tolerant state flower. Mainstay Pollen source for many native bees.</td>
</tr>
<tr>
<td>Coast Gum Plant</td>
<td>Grindelia stricta platypylla</td>
<td>6” ht x 2-3 ft wide</td>
<td>Ca Native</td>
<td>Low herbaceous perennial groundcover with 2” wide sunny yellow daisies, summer to fall. Drought tolerant, but best with some summer water. Bee pollen and nectar source.</td>
</tr>
<tr>
<td>Douglas Iris</td>
<td>Iris douglasiana and hybrids and selections (ex. ‘Canyon Snow’ Iris Pacific Coast Hybrid)</td>
<td>1 ft ht x eventually 3 ft wide (Canyon Snow)</td>
<td>Ca Native</td>
<td>Perennial. Appreciates some summer water. Many hybrids, many colors, most lavender purple blue white and yellow. Example ‘Canyon Snow’ recognized as an outstanding white flowered selection. Disease resistant, little water, evergreen. Blooming in the spring.</td>
</tr>
<tr>
<td>Dwarf Lupine</td>
<td>Lupinus nanus</td>
<td>12-18&quot; ht x 18&quot; wide</td>
<td>Ca Native</td>
<td>Also called Sky Lupine. Annual wildflower that turns California fields blue in the spring. Reseeds. Seeds need moisture to germinate.</td>
</tr>
<tr>
<td>Fairyfan</td>
<td>Clarkia williamsonii</td>
<td>12-14&quot; ht x 12&quot; wide</td>
<td>Ca Native</td>
<td>Magenta blotched lavender pink silky cup shaped flowers in late Spring into Summer. Annual that reseeds. Needs good drainage. Appreciates a little supplemental water.</td>
</tr>
<tr>
<td>Great Valley Phacelia</td>
<td>Phacelia oiliata</td>
<td>18&quot; ht x 16&quot; wide</td>
<td>Ca Native</td>
<td>Beautiful self sowing annual. Clusters of cupped lavender blue flowers over ferny foliage. Good for bees.</td>
</tr>
<tr>
<td>Red Buckwheat</td>
<td>Eriogonum grande var. rubescens</td>
<td>12&quot; ht x 2-3 ft wide</td>
<td>Ca Native</td>
<td>Low growing perennial. Drought tolerant, attractive to butterflies and bees. Red-pink pom pom clusters of flowers summer thru fall.</td>
</tr>
<tr>
<td>Sulphur Buckwheat</td>
<td>Eriogonum umbellatum</td>
<td>1-3 ft ht x 2 ft wide, can mound high, may need pruning to keep lower</td>
<td>Ca Native</td>
<td>Compact evergreen mound. Cream to yellow flower clusters late spring to end of summer. Needs little or no water once established. Attractive to Bee and Butterfly.</td>
</tr>
<tr>
<td>Western Yarrow</td>
<td>Achillea millefolium</td>
<td>1-2 ft ht x 2 ft wide</td>
<td>Ca Native</td>
<td>Usually a low spreading ferny leaved perennial with 3-4&quot; umbels of flowers in cream, white, yellow, salmon pink or red. Flowers summer thru fall. Drought tolerant, but better with a little water. Cut flowers back in late fall/winter. Attractive to pollinators.</td>
</tr>
</tbody>
</table>

E. Pruning Standards & Guidelines: