

## Appendix A:

### Green Building, Certification Systems, and Measurement & Verification

To ensure the Mace Ranch Innovation Center (MRIC) is designed, built and operated in a manner that achieves sustainability targets, the applicants are committed to establishing a Master Owners Association (MOA) that will be responsible for measurement and verification of project performance metrics. MRIC is committing to achieve the City of Davis' Climate Action and Adaption Plan (CAAP), and establishes an entity charged with regularly reporting on progress to the City. Creation and implementation of the MOA and its reporting function allows sustainability at MRIC to be more than an entry point for occupancy; instead MRIC will engage in an ongoing process with goals that track those of the city.

This approach allows MRIC to learn and improve as the project is developed, to build upon what works and optimize underperforming systems and facilities. The flexible 'Infinity Loop' infrastructure platform accommodates new technology as well as software optimization, and will be fully integrated with M&V data streams. For a project of this scale, which includes a diversity of uses and unknown users, and which is anticipated to build out over roughly twenty years, committing to rigorous measurement and verification allows the site to innovate as it is developed and be operated to truly achieve sustainability goals.

A thorough evaluation of sustainable development rating systems has been conducted; aspirational sustainability goals have been incorporated into the MRIC and are codified in the Sustainability Framework. The assessed certification programs provide value and rigor to defining the sustainability goals of the project, and targets have been incorporated from the LEED, Living Building Challenge, Envision, One Planet Living, and Cal Green rating systems. Beyond these targets, the Cal Green Tier 1 has been adopted by the City of Davis, and is the standard to which MRIC will be built. Development consistent with Cal Green Tier 1 is widely considered to be equivalent to LEED Silver certification. Further supporting these published opinions, the USGBC created a new Cal Green pathway to LEED certification in 2015. As such, the project will be LEED Silver equivalent. The Mace Ranch Innovation Center Sustainability Framework uses Cal Green Tier 1 as a baseline and draws upon other rating systems and long term goals of the City of Davis, County of Yolo, and State of California to set aspirational project goals that are achievable and measurable.

Major investment in a uniquely forward thinking district infrastructure that supports a Low Carbon District at the core of the site, tenant access to waste-flow and tailored water systems, a microgrid energy platform that integrates battery storage and diverse on-site generation, and full software integration provides opportunity for long term sustainability goals beyond what can be guaranteed by a point-of-occupancy certification process.

With this in mind, the commitments appended to the MRIC Sustainability Framework, represent firm sustainability measures that will be undertaken by the project and measured over time.

## Appendix B: Ecological Axis

The proposed Mace Ranch Innovation Center lies at the eastern edge of Davis. Historically subject to seasonal flooding, the area is now protected by a robust levee system and drained by the Mace Drainage Channel, which flows to the Yolo Bypass. Long since converted to agriculture, the location of the site on the edge of the city suggests a connection to the natural assets that lie beyond. According to the EIR, only marginal habitat exists on the site today, with the notable exception of hawk forage.

The MRIC landscape is envisioned as a tapestry of agricultural, natural, and civic landscapes. Native plants and landscapes are a strong design element throughout the site and particularly prevalent in the agricultural buffer area serving as a transition to neighboring uses. Native plantings will also be organized around a revived riparian corridor along the drainage channel and supported by hedgerows that run in a north-south direction. These features provide an ecology axis within the site and create potential for raptor nesting along the channel as well as in hedgerows and a robust planting of shade trees selected to provide habitat.

The riparian connection running through the site from west to east is intended to catalyze an extended corridor to the East along the Mace Drainage Channel. This would provide connectivity and access to the Yolo Basin Wildlife Area, approximately 3 miles to the east. The drainage corridor provides an opportunity for a new connection with the potential to provide habitat and bicycle/hiking access between the city of Davis and this valuable community resource.

For its contribution to ecological sustainability, at buildout MRIC will do the following:

Proposal
Conserve approximately 212 acres for Swainson’s Hawk foraging habitat
Install three burrowing owl dens in the agricultural buffer
Plant a minimum of 1,000 native trees
Plant 50% of public landscapes with native species for habitat and ecological diversity within the urban core. Extend these plantings to the edge of the property to align with public spaces and adjacent ecological assets
Use non-potable water for publicly accessible ornamental landscape irrigation
Plant 90% drought tolerant and/or native landscape plantings suitable to the local climate
Rainwater management: Treat 85th percentile 24hr stormwater runoff

## Appendix C: Sustainable Agriculture

It is a primary goal of Mace Ranch Innovation Center to support the agricultural history, economy, culture, and academic leadership of the Davis community through the integration of agricultural systems in the design and programming of the site. It is anticipated that businesses likely to locate in MRIC will be engaged in agricultural innovation and crop sciences with strong connections to research occurring at UC Davis.

Agriculture is integrated into the fabric of the MRIC, with working agricultural landscapes incorporated into the green space, urban agricultural innovations promoted and incentivized, and buffer zones designed to integrate with adjacent agricultural lands. Food and agriculture is envisioned as a key element of the MRIC, including restaurants, research, a farmers market, and resources to position the center as a contributor to innovation and thought leadership in the food and agriculture marketplace.

To further sustainable agriculture in Davis, at buildout MRIC shall do the following:

Proposal
Conserve agricultural land by placing agricultural easements on approximately 384 acres
Plant food producing trees within the agricultural buffer area and select green spaces
Create a minimum of 20 acres of working agricultural lands within the project site
Designate 1/2 acre for a weekly farmer’s market managed by existing organizations within Davis
Food scraps and other green waste will be managed on site via composting, digesters, or animal feed OR integrated with City Green Waste Program
Provide infrastructure to allow for agricultural research including: land available for lease, tailored irrigation water supply, and opportunities for closed-loop recycling of nutrients and organic waste
Provide a minimum 150 ft wide agricultural buffer between the site and ag lands to the north and east
Utilize an integrated pest management approach to landscape management
Manage on-site public landscape systems organically

## **Appendix D:**

### **Sustainable Urban Design**

Building performance, urban impacts, and behavior-oriented sustainability measures are incorporated into a vision for a diverse and dense development that provides high quality user experience. This is incorporated within a design context of beneficial interaction with natural processes and the built environment, and didactic awareness of interaction with local and global ecological processes. This creates a unique urban setting that is intended to transparently reflect sustainability goals and foster a culture of innovation, entrepreneurship, and global stewardship.

A high performance urban fabric, that positions MRIC within regional ecological and socioeconomic frameworks, is intended to create an inspirational setting for businesses to achieve all phases of operation, from concept to production, within a set of values and experiences that reflect the unique culture and community of Davis.

This includes building performance, with metrics and targets for resource efficiency, responsible and non-toxic materials sourcing, and siting/massing of buildings for passive site integration. These elements are supported by site and district approaches to sustainable design such as centralized utility management, thermal exchange, and a program mix optimized for high performance in the local climate.

Proposal
Approximately 64 acres of green/open space to be constructed (see DEIR Figure 3-12)*
All publicly accessible green spaces to be managed and maintained by master owners group at no cost to the
Use only Energy Star certified appliances
Zero Net Energy Public Site Lighting: the energy demand for lighting of public spaces offset with on-site solar
Energy budget will be 25% below standard building model simulation according to Title 24, for all office and R+D buildings
Utilize low or no-VOC paints, finishes, adhesives, and sealants during construction and O&M guidelines
Shade all parking areas with minimum 50% coverage within 10 years
Use open-grid pavement system or pervious or permeable pavement system
Achieve minimum 80% construction waste diversion for recycle or salvage
Employ cool roof techniques for reduction of heat island effect. Use roofing materials having a minimum aged solar reflectance value of at least .30 as determined in accordance with ASTM Standards E 1918 or C 1549. 2.
Outdoor lighting systems shall be designed and installed to comply with requirements in the California Energy Code for Lighting Zone 1-4 as defined in Chapter 10 of the California Administrative Code; and 2. Backlight, Uplight and Glare (BUG) ratings as defined in IE TM-15- II
A separate water sub-metering device shall be provided for any tenant within a new building or addition that is projected to consume more than 1,000 gal/day
The effective flush volume of all water closets shall not exceed 1.28 gallons per flush. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-Type Toilets
The effective flush volume of urinals shall not exceed 0.5 gallons per flush
Nonresidential lavatory faucets shall have a maximum flow rate of 0.5 gpm at 60 psi
Outdoor potable water use. For new water service not subject to the provisions of <i>Water Code</i> Section 535, separate meters or submeters shall be installed for outdoor potable water use for landscaped areas of at least 500 square feet.
Use weather-based irrigation controllers for all irrigation systems.
Reduce the use of potable water to a quantity that does not exceed 55 percent of ETo times the landscape area.
Nonpotable water systems will be provided for indoor and outdoor use that complies with the current edition of the <i>California Plumbing Code</i> .
Wood framing, where it occurs, will employ advanced wood framing techniques or OVE, as permitted by the enforcing agency.
Outside air delivery for mechanically or naturally ventilated spaces in buildings will meet the requirements of Section 120.1 of the <i>California Energy Code</i> and Chapter 4 of CCR, Title 8 or the applicable local code, whichever is more stringent.

## Appendix E: Infinity Loop

The Mace Ranch Innovation Center will implement a forward thinking infrastructure platform to achieve aggressive sustainability goals and attract forward thinking tenants able to leverage the unique asset provided by an “Infinity Loop” that manages Energy, Water, Technology, and Waste Systems. This internal resource management platform allows for several opportunities to benefit users and the City of Davis. The system will be managed via phased “Infracenter” central plants that provide district scale resource management, and is accessible to MRIC tenants via an underground “utilidor” that houses distribution systems, and is managed by a comprehensive technology platform for optimization of site-wide utilization of resources over time.

Benefits include tenant access to very high-speed broadband internet connectivity, unique energy optimization and integration, tailored water supplies for specific uses, access to nonpotable water supplies, and access to waste streams for resource recovery applications and research for water, energy, and waste infrastructure applications.

**Technology.** MRIC will provide internet capacity far beyond what is conventionally available, inviting technology users needing to process large amounts of information; particularly those participating in global large density research efforts. The Infinity Loop leverages this opportunity by creating a district resource management software platform that allows for the integration of multiple building control system typologies as well as co-optimization of water and energy resources for cooling, heating, and other infrastructure on the site. This software platform will integrate with building and tenant activities to monitor, track, and iterate toward long term sustainability goals.

**Energy.** The Infinity Loop creates an energy “micro-grid” within the site that allows unique access for energy-producing tenants as well as those with special energy needs, and opportunities for R+D in energy production, storage and efficiency. As part of design development, monitoring devices and sensors will be integrated throughout the project, recording data that will inform smart controls and district scale infrastructure systems. Unique to MRIC is the ability to extract energy producing waste streams such as organic solids.

**Water.** The Infinity Loop provides an internal water conveyance system for both supply and waste flows, with two phases of integrated central facilities. These facilities can provide a variety of water quality, from potable to distilled laboratory water, allowing small operations to initiate productivity quickly and with limited startup capital. A site-wide nonpotable water supply will also be accessible to all buildings, greatly improving conservation of an increasingly valuable resource. Also uniquely accessible are waste streams to support opportunities for the development of resource recovery systems including nutrients valuable to agriculture, energy production, chemicals applicable to laboratory use, and innovative water treatment applications.

Proposal
Install a private utilidor with points of connection to all building sites with services including but not limited to nonpotable water, wastewater lift stations, and energy grid
50% of energy, a minimum of 14 MW, generated with renewable on-site
Develop sufficient fiber optic capability to attract and support technology endeavors; allow other users, including the City, to connect to the fiber optic network under terms to be negotiated
Provide free public Wi-Fi at the transit plaza
Install purple pipe infrastructure, including roughly 3,600 feet (0.7 miles) of off-site pipe for a future connection to the City's mainline when made available
Partner to help the City obtain grants to become a purveyor of recycled water and to expand the use of recycled water to other locations in Davis
Install a site-wide recycled water network with connection points to each building site
Software integration of load controls on all tenant facilities to provide energy demand flexibility and maximize on-site renewable energy
Integrated locations for staged deployment of battery energy storage to provide local demand charge reduction as well as grid services, including ancillary services and capacity
Use non-potable or recycled water for 100% of ornamental landscape irrigation in publicly accessible spaces
For buildings with over 10 tenant-occupants, provide changing/shower facilities in building or document arrangements with nearby changing/shower facilities
Participate in the local utility's renewable energy portfolio program that provides a minimum of 50-percent electrical power from renewable sources. Maintain documentation through utility billings
Nonpotable water systems for indoor and outdoor use shall comply with the current edition of the <i>California Plumbing Code</i> .

## Appendix F: Democratic Grid

In addition to net zero lighting in the public spaces and street trees designed to create shade and habitat, the streets of Mace Ranch Innovation Center will be designed as multi-functional public space -- a social space within a next-generation streetscape that integrates with green space and acts as a research chassis for alternative modes of low carbon transportation.

The MRIC will feature a ‘Complete Streets’ approach that includes narrow low-speed car lanes, visible green stormwater infrastructure, and a focused program to reduce Vehicle Miles Traveled (VMT’s) with Transit Oriented Development principles and a Travel Demand Management Program (TDM).

The Project’s proposed circulation network is designed as a modified grid and provides a hierarchy of streets, bicycle paths, trails, transit, and pedestrian promenades designed to support a wide range of uses and activities. The network fosters easy connectivity and looks for ways to reduce the needs for automobile travel within the Project Area and the larger community/City.

Bicycles are the preferred method of access to and from MRIC, as well as within the center. Shower facilities, bicycle kiosks, a staffed facility, prevalent bicycle parking, and improved regional connectivity all contribute to a robust bicycle infrastructure.

At the core of the MRIC is a “Low Carbon District” that allows for scalable strategies to achieve Davis’ goal of becoming Carbon Zero. This LCD ultimately limits accessibility for internal combustion vehicles and features a bicycle, pedestrian, and electric vehicle gateway at Mace Blvd and Alhambra Drive. Within this area, all parking spaces will be equipped with charging stations. The ability to limit vehicles with carbon emissions is dependent on minimum electric vehicle trips, and is only possible within the constraints of the transportation and congestion management plan, which incentivizes electric vehicles.

The Transit Plaza will serve as a primary drop off/pick up area for local shuttles to downtown Davis and the Amtrak Station, provide Unitrans bus stops for local public transit, carpool drop-offs, taxi (Uber/Lyft), and other more direct destination shuttles (e.g. UC Davis, Sacramento Airport). In addition, some car-share parking spots and dedicated carpool/vanpool drop-offs will be located here to facilitate the use of alternative modes of transportation.

Proposal
Develop a minimum of 4.2 miles of Class I bike paths and 3.0 miles of Class II bike lanes and dedicate to City for
Fund construction of two bicycle maintenance and repair kiosks at strategic on-site locations that will be made available to the public
Build the connection of the existing bike trail on Mace Blvd to East Covell Blvd. along the inside of the curve
Fund study for bicycle circulation at and around the project to identify a location and design for a safe crossing at Mace Blvd., and investigate regional connections
Create a low carbon district where industry collaborates with public sector to help the City prototype and attain carbon free objectives
Catalyze urban activation by providing public furniture and public artwork at 2 primary intersections
Meet minimum 22.5% reduction of GHG from 1990 baseline, for all sources of emissions including transportation & infrastructure and demonstrate a downward trajectory toward meeting the City's goal of zero net GHG emissions by 2050. The MOA shall report MRIC's GHG reduction progress to the City every five years.
Build a New Transit (Bus + Private Shuttle) Pavilion
Reduce Roadway widths to (2) 11 ft wide vehicular lanes wherever possible
A TDM with 2035 targets that reduce Vehicle Mile Trips(VMT) to 40% below 2010 City of Davis average, and associated GHG emissions reduction targets for light duty passenger vehicles set at 16 percent below 2008 levels
Provide EV Charging Stations compatible for 110V and 240V vehicles; provide Fast Charge Stations; all parking spaces in the Low Carbon District shall be e-ready