

FIRST STEPS

A plan to make slavery visible at Brazil's Valongo Wharf

THE EDGES OF PARIS

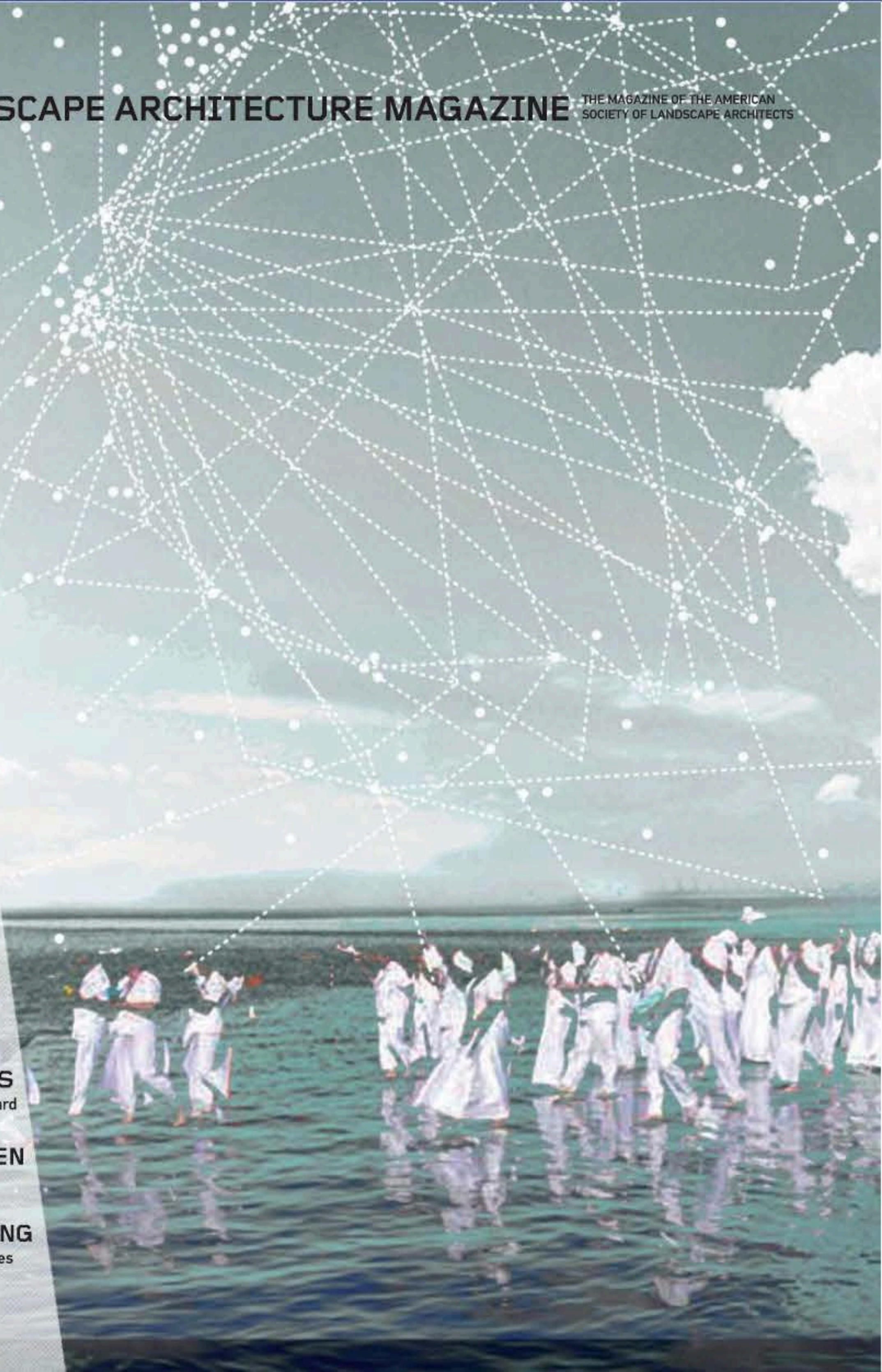
Three new parks pull the city outward

MOSCOW IN THE OPEN

The novel idea of public space

STEEP SLOPE PLANTING

Details for big trees on sharp inclines



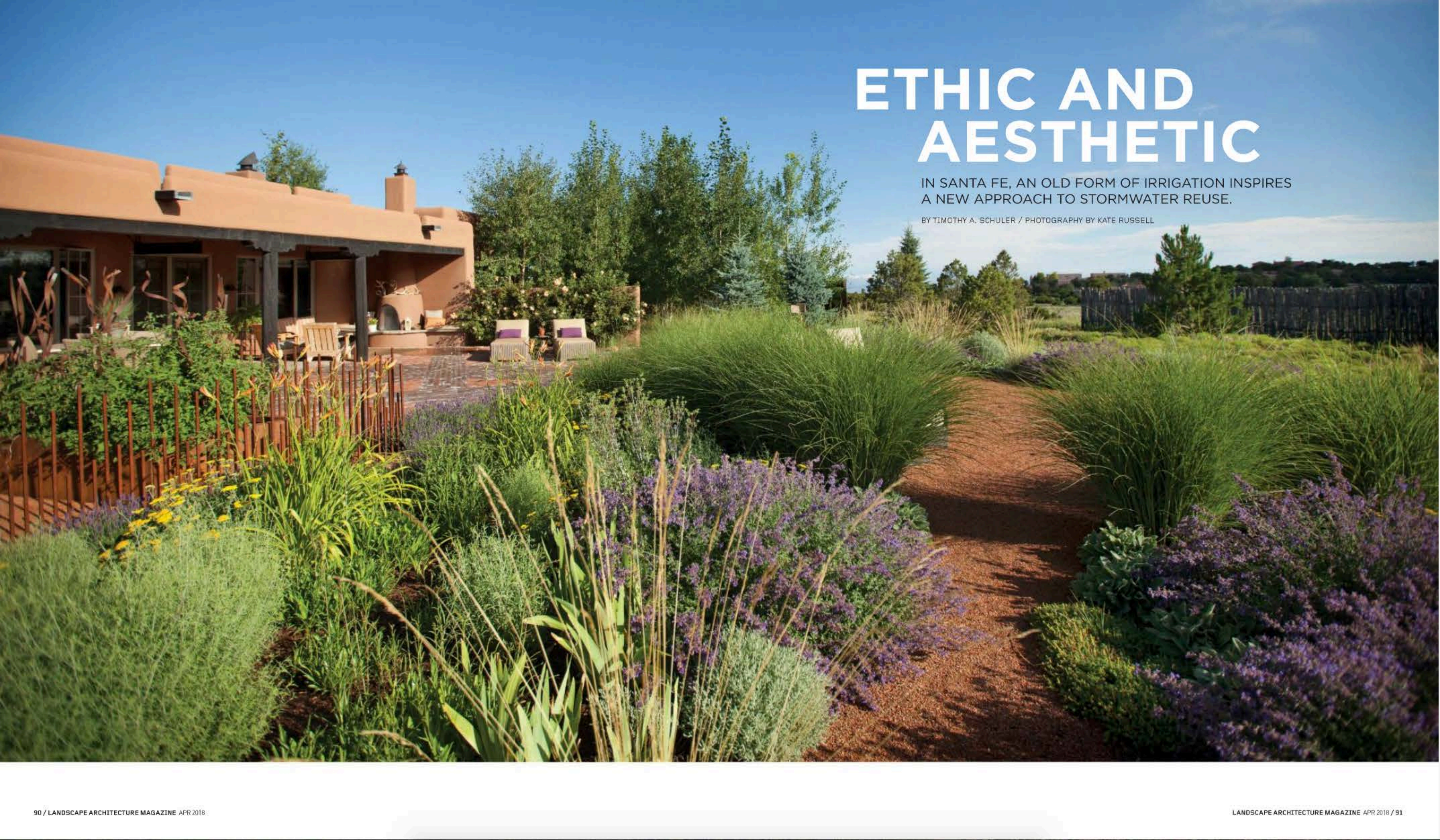
KATE RUSSELL

FEATURES



SANTA FE, NEW MEXICO

At Woven Plains, a gravel-bottomed *acequia* gives stormwater a place to run, page 90.



ETHIC AND AESTHETIC

IN SANTA FE, AN OLD FORM OF IRRIGATION INSPIRES
A NEW APPROACH TO STORMWATER REUSE.

BY TIMOTHY A. SCHULER / PHOTOGRAPHY BY KATE RUSSELL



IN 2005, Kenneth Francis, ASLA, received a grant from the Penny White Project Fund to travel to northern New Mexico and study its historic *acequias*. An acequia is a network of gravity-fed irrigation canals, first dug more than 400 years ago by the Pueblo peoples of the Southwest and expanded by the Spanish. Francis, then a student at the Harvard Graduate School of Design, was interested in the acequias as a part of the cultural landscape, but also in how they might be adapted to a more urban condition. "It's like 400-year-old green infrastructure," he says.

A few months later, Francis moved to New Mexico. He joined the Santa Fe office of Design Workshop, then in 2008 started Surroundings, a multidisciplinary design studio offering landscape architecture, architecture, and planning, with two other former Design Workshop principals, Faith Okuma, ASLA, and Sandra Donner, ASLA. The studio has made its mark on Santa Fe. In particular, it has worked to refine the notion of a "stormwater acequia," a system of unobtrusive channels that could better manage runoff.

Among the earliest prototypes is a system of rock-lined, open-air canals that Surroundings designed for a two-mile stretch of downtown Santa Fe's El Parque del Rio, a linear park along the Santa Fe River. The system intercepts runoff—previously diverted into pipes and dumped straight into the stream—and reroutes it to the river's native cottonwoods and other orchard trees, reducing erosion and pollutant loads. "It was the first time we had ever termed that idea as a strategy for taking urban runoff and putting it back into a parkway that was being starved of its natural watershed," Francis says.

Since then, acequias of various scales have found their way into a good portion of Surroundings's work, including its residential projects. This past October, Francis took me to see a house that, he says, put Surroundings on the map.

The residence is known as Woven Plains. It's 15 minutes outside Santa Fe, on a 2.5-acre lot that used to be just high desert scrub, dotted by the occasional juniper and piñon pine. The roads to the

ABOVE
A nod to New Mexico's native grasslands, *Nassella tenuissima* flanks the entrance to Woven Plains.

house are lined with yellow-feathered chamisa, and in the distance, gold-leaved aspens glitter against the velvety blue of the Sangre de Cristo Mountains. Though neighbors aren't plentiful, they are visible—each house a large, boxy intrusion on the otherwise fluid and unbroken landscape.

The architecture at Woven Plains is largely unremarkable, featuring a typical adobe structure with charred wood beams. The clients (a husband and wife who asked that their name not be used) had bought the property in 2008 as a getaway from their lives in Midland, Texas. When they sold their house in Midland, downsizing to an apartment, and began to spend more time in Santa Fe, they found the landscape lacking. It was, in the wife's words, "awful."

The Surroundings team was asked to enliven the landscape, as well as to enhance privacy: The house, modest in size, was exposed to traffic on the nearby road. Lights and noise both made their way into the clients' bedroom. The clients also requested a vegetable garden and a larger outdoor area for entertaining.

The most exigent request, however, was for an aspen grove. Aspens here, down near the city—which is high in terms of elevation (7,200 feet) but low in terms of the trees' preferred range—are somewhat ill-advised, Francis tells me. Santa Fe receives an average of just 11 to 14 inches of rainfall each year, often in short, intense bursts. In that kind of environment, aspens can be finicky, he says. They can die of thirst or any

2013



2015



number of diseases. For the trees to thrive, the conditions have to be just right.

The design team began with two key analyses: stormwater runoff and the house's main viewsheds. For the latter, the designers identified both places where the house's privacy was compromised and objects that the owners would rather avoid seeing. Rather than fence the entire property and lose the expansive views, the landscape architects proposed a series of berms, freestanding metal screens, and trees. To attenuate traffic noise, a large landform was added at the northwest corner of the house and then sliced vertically with a Cor-Ten steel retaining wall to create a small side yard, the landscape's only bit of lawn.

Wherever possible, the designers worked to give the landscape a sort of logic, extending the program of a particular interior space into the adjacent outdoor area. The vegetable garden is just outside and visible from the kitchen window.

The lounge (designed for stargazing or smoking cigars, depending on whom you ask) is directly off the back *portal*, the local term for a covered porch. And outside the master bedroom, next to the side yard, is a grove of quaking aspens, their leaves dappling a shaggy, swirling carpet of sheep fescue.

The Surroundings team knew that the trees, if they were to survive, needed a lot of water. Unfortunately, the stormwater analysis had revealed that nearly half of all the available water was being channeled to the opposite end of the house, running onto the roof of the garage and cascading to the ground via a series of *canales*, a type of wide

CLOCKWISE, FROM TOP LEFT
A constructed berm helps screen the house from the nearby road while also giving the landscape definition.



ABOVE
A rock-lined acequia carries water to the aspen grove and also serves as a threshold.

metal scupper common to Santa Fe architecture. It was a decent amount of stormwater—10,850 gallons a year—but it was just in the wrong place.

So the designers did what New Mexico's early farmers did. They created several points of diversion and channeled the water to where they needed it. In a traditional acequia, a *presa*, or check dam, diverts water from a natural source, such as a river, into the *acequia madre*, which carries it to agricultural fields via smaller canals called *sangrias*. Any excess water is returned to the river. At Woven Plains, roof runoff is directed to an aboveground cistern just south of the vegetable garden and to an 80-foot-long, rock-lined acequia, which cuts diagonally from the corner of the main house to the edge of the aspen grove.

From the acequia, the water flows into two scoria wicks, bands of porous volcanic rock that serve as passive irrigation systems. Like pumice, scoria is full of tiny holes. "Water molecules just kind of bind and grab onto it, and it holds water for a longer period of time. So there's a water source

that's sitting there for the aspens to continually feed off of," Francis says. Each wick is made up of individual scoria rocks ranging from one to three inches in size, and though they function mostly underground, the wicks also are expressed on the surface, a visual reminder of how water moves across the site.

Given Santa Fe's arid climate, Surroundings worked to squeeze every drop of water out of the site that it could, regrading the driveway (which flooded anyway) so that it too would drain to the acequia. Unlike the acequia designed for El Parque del Rio, the channel at Woven Plains is lined with a heavy pond liner to ensure that the water makes it to the aspen grove. "It's a carrier, rather than an infiltrator," Francis says.

The acequia also became a threshold between the more formal landscape near the house and the looser, more natural landscape beyond. Lined with lavender, the waterway can be crossed only in two places: at the north end, via a brick-paved bridge that links the portal to the outdoor lounge, and at



ABOVE
Farther from the house, the landscape dissolves into a more naturalistic native meadow.

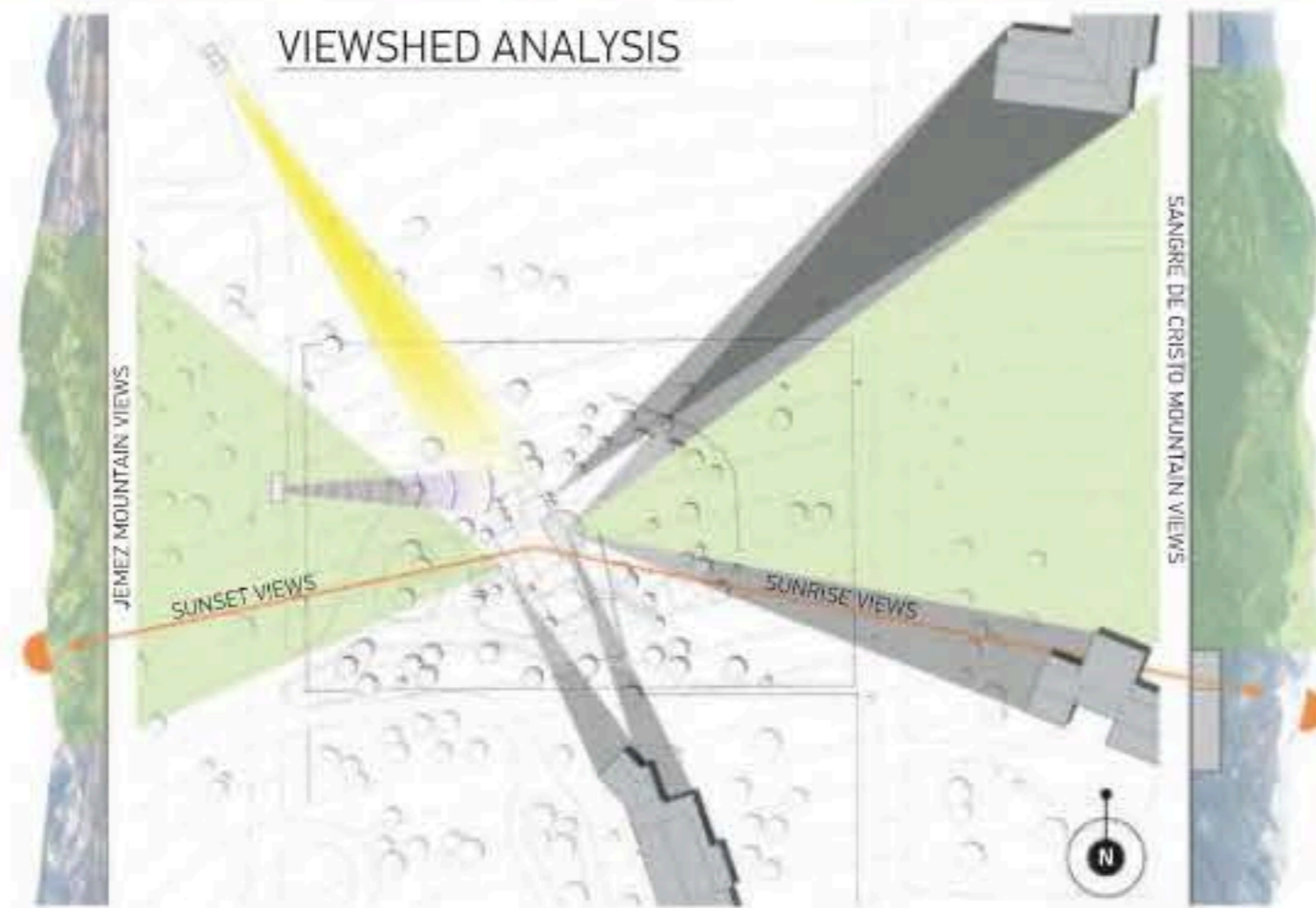
RIGHT
The design considered views both to and from the house.

the south, via a weathered steel stair that leads to a small guest *casita*. The stair, in fact, was existing. With the addition of the acequia, however, the stair's sculptural qualities are emphasized by the void beneath it, its ribbonlike handrail curling out over the water.

One of Francis's favorite details is actually a pair of existing trees, a juniper and a piñon, which are so intertwined that they appear to be a single tree. The species, he explained, are symbiotic. "They do this really cool thing where, in drought times, piñons will suffer much more readily, whereas junipers thrive in drought; they know how to harness water in the soils to keep going. So the piñons that do really well are the ones that are closer to these junipers."

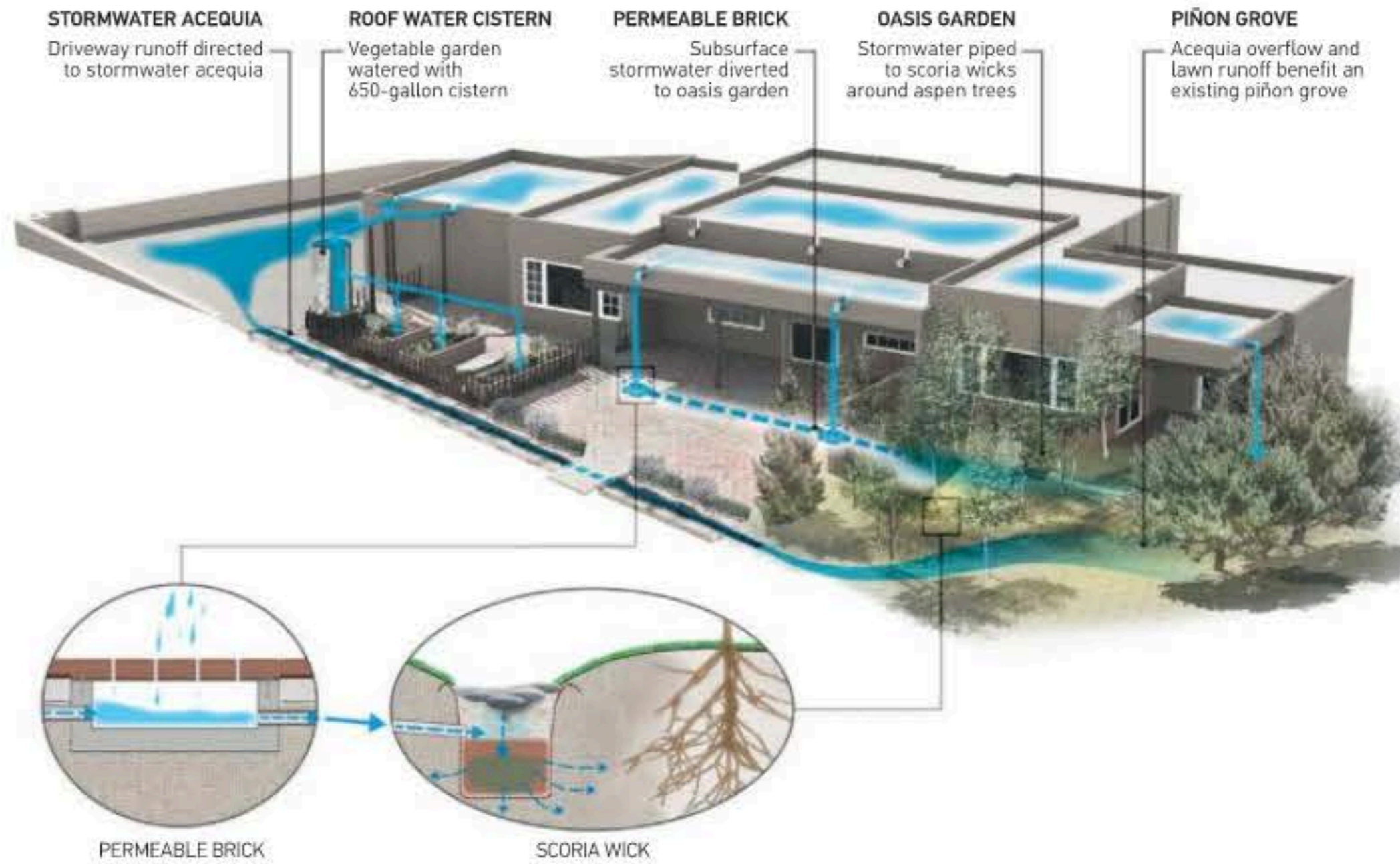
Like many firms in arid climates, Surroundings adheres to what Francis calls a "water ethic," a commitment to using only that water which is

necessary. "We're always trying to be conscious about every move we make," he says. That ethic drove the planting design. Santa Fe lies within northern New Mexico's semiarid grasslands, and the landscape architects developed a plant palette inspired by a native meadow, with a colorful array of grasses and wildflowers, including

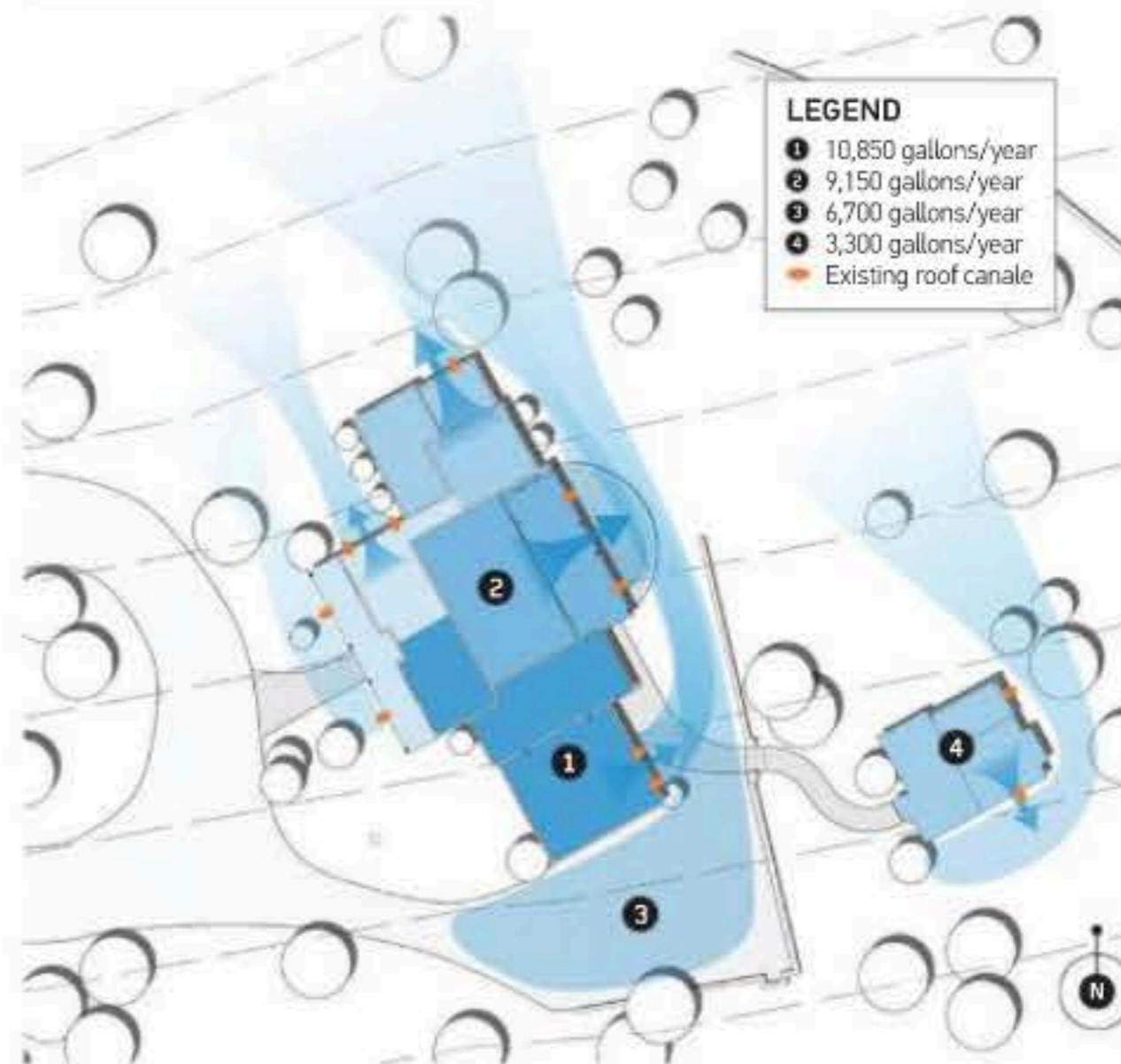


SURROUNDINGS, BOTTOM

STORMWATER PLAN



STORMWATER ANALYSIS



SURROUNDINGS

purple-blooming *Allium*, which dissolve into the existing scrub as you move from the house out toward the edges of the property. In front of the house, which is screened with burgundy-leaved crabapples, a propane tank is covered by a low, wildflower-strewn hillock. What little turfgrass exists is Reveille, an engineered sod designed to use 40 percent less water than typical bluegrass.

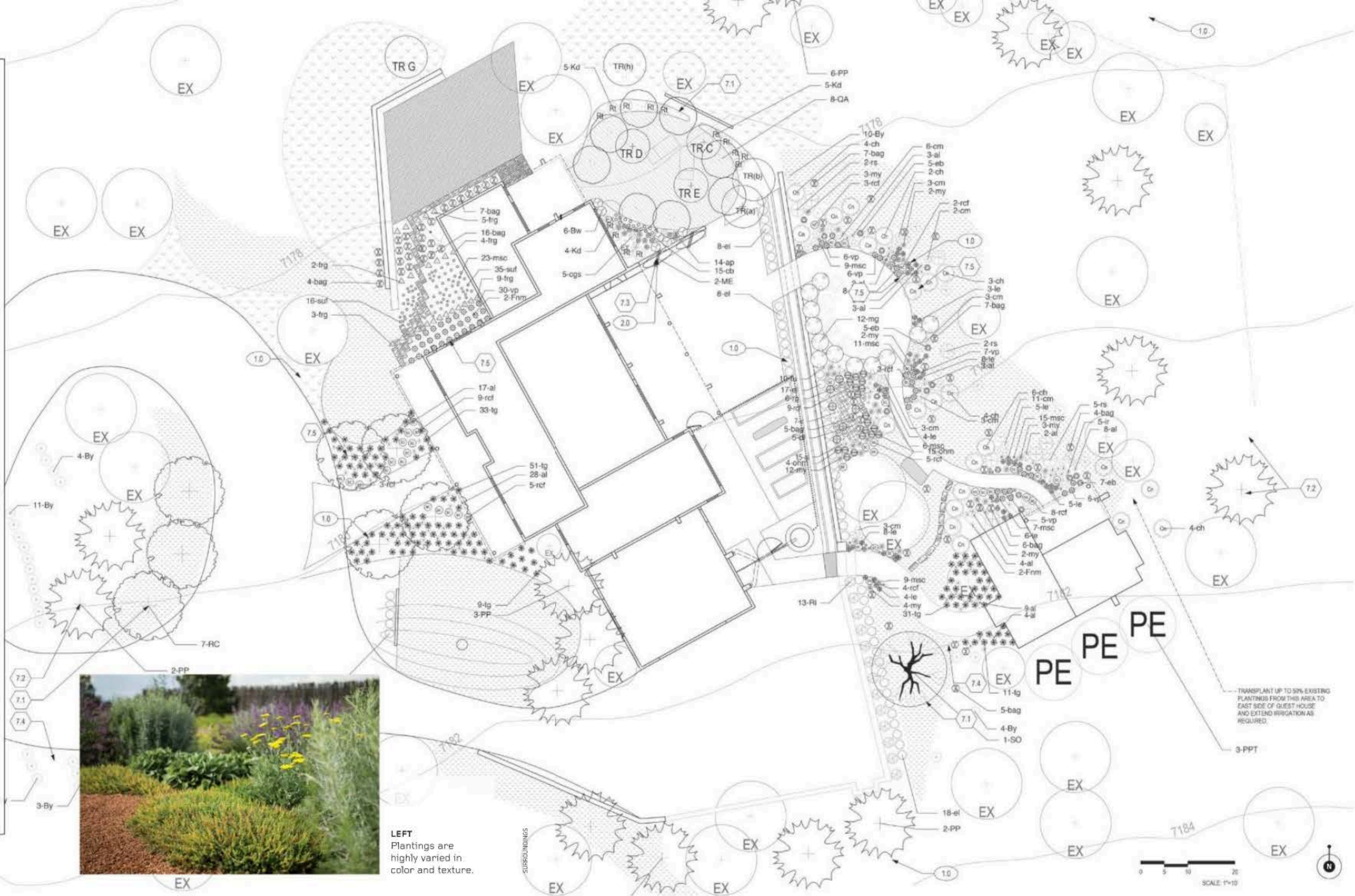
The project necessitated a number of custom details, which in the hands of the Surroundings team are highly refined and expertly crafted. Beneath the two canals that jut off the back portal are two nearly invisible drains that whisk the runoff to one of the two scoria wicks. Where the drains are located, the bricks sit on a perforated metal screen and are gapped a fraction of an inch with polymeric sand so that the water can drain quickly. The change in spacing is so subtle that I wouldn't have noticed had it not been pointed out. Francis credits the landscape contractor, Charles Doerwald of El Toro Landscape, who oversaw all the stone and brickwork, including the desire lines expressed in darker-colored

PLANTING PLAN

TREES			
SYMBOL	ID	QTY	BOTANICAL NAME / COMMON NAME
ME		2	Melia eucalypt / Melia eucalypt
PP		15	Pinus edulis / Pinon Pine
PPT		3	Prunus persica var. TBD / Fruiting Peach Tree var. TBD
DA		8	Populus tremuloides / Quaking Aspen
RC		7	Melia tozeri / Radiata Casahuate
SO		1	Specimen Olive / Specimen Olive
SHRUBS			
Bw		6	Buxus microphylla / Winter Gem Boxwood
By		63	Yucca baccata / Banana Yucca
ch		23	Chytanthus nussbaumi / Chama Rubber Rabbitbrush
fm		4	Forestiera neomexicana / New Mexico Privet
Kd		14	Cornus sericea / Keisley Dwarf Dogwood
PERENNIALS			
ap		14	Aegilops podagraria / Variegated Bishop's Weed
bag		61	Halogeton amplexicaulis / Blue Awned Grass
cb		15	Ajuga reptans / Dwarf Carpet Bugle
cp		5	Aquilegia chrysantha / Golden Spur Columbine
cm		34	Nepeta faassenii / Walker's Low Catmint
d		5	Hemerocallis fulva / Orange Daylily
eb		17	Eryngium 'Big Blue' / Big Blue Sea Holly
el		58	Lavandula 'Hidcot' / English Lavender
fg		23	Calamagrostis acutiflora / Feather Reed Grass
fr		52	Stachys byzantina / Helen von Steier
g		12	Miscanthus sinensis / Maiden Grass
my		28	Achillea 'Moonshine' / Moonshine Yarrow
ok		19	Agastache 'Auspicio Orange' / Auspicio Orange Hummingbird Mint
of		42	Santolina / Gray Santolina
or		9	Echinacea 'Tomato Soup' / Hybrid Red Coneflower
ri		13	Rosmarinus officinalis / Inera Rosemary
rp		8	Papaver orientale / Beauty of Livermore
rs		9	Perovskia atriplicifolia / Russian Sage
ru		51	Festuca glauca / Sea Urchin Blue Fescue
tg		135	Nassella tenuissima / Silky Thread Grass
vp		60	Veronica patinata / Blue Woolly Speedwell
BULBS			
al		99	Allium / Ornamental Onion
ib		12	Iris - Purple Bearded / Purple Bearded Iris
mc		88	Muscari amurensis / Christmas Pearl / Grape Hyacinth
td		10	Tulip - Orange Double / Tulip - Orange Double

SEED MIX LEGEND:

- REVELLE SOI, SOURCE: GARDNER TURF FARMS, INC. SEE SPECIFICATIONS
- NATIVE GRASS RE-SEED MIX (PLANTS OF THE SOUTHWEST DRYLAND BLEND)
- WILDFLOWER SEED MIX (3 PARTS PLANTS OF THE SOUTHWEST HIGH DESERT MIX, 1 PART DRYLAND BLEND)
- SHEEP FESCUE SEED MIX (PLANTS OF THE SOUTHWEST OR EQUAL)



LEFT Plantings are highly varied in color and texture.

TRANSPLANT UP TO 50% EXISTING PLANTINGS FROM THIS AREA TO EAST SIDE OF QUEST HOUSE AND EXTEND IRRIGATION AS REQUIRED.

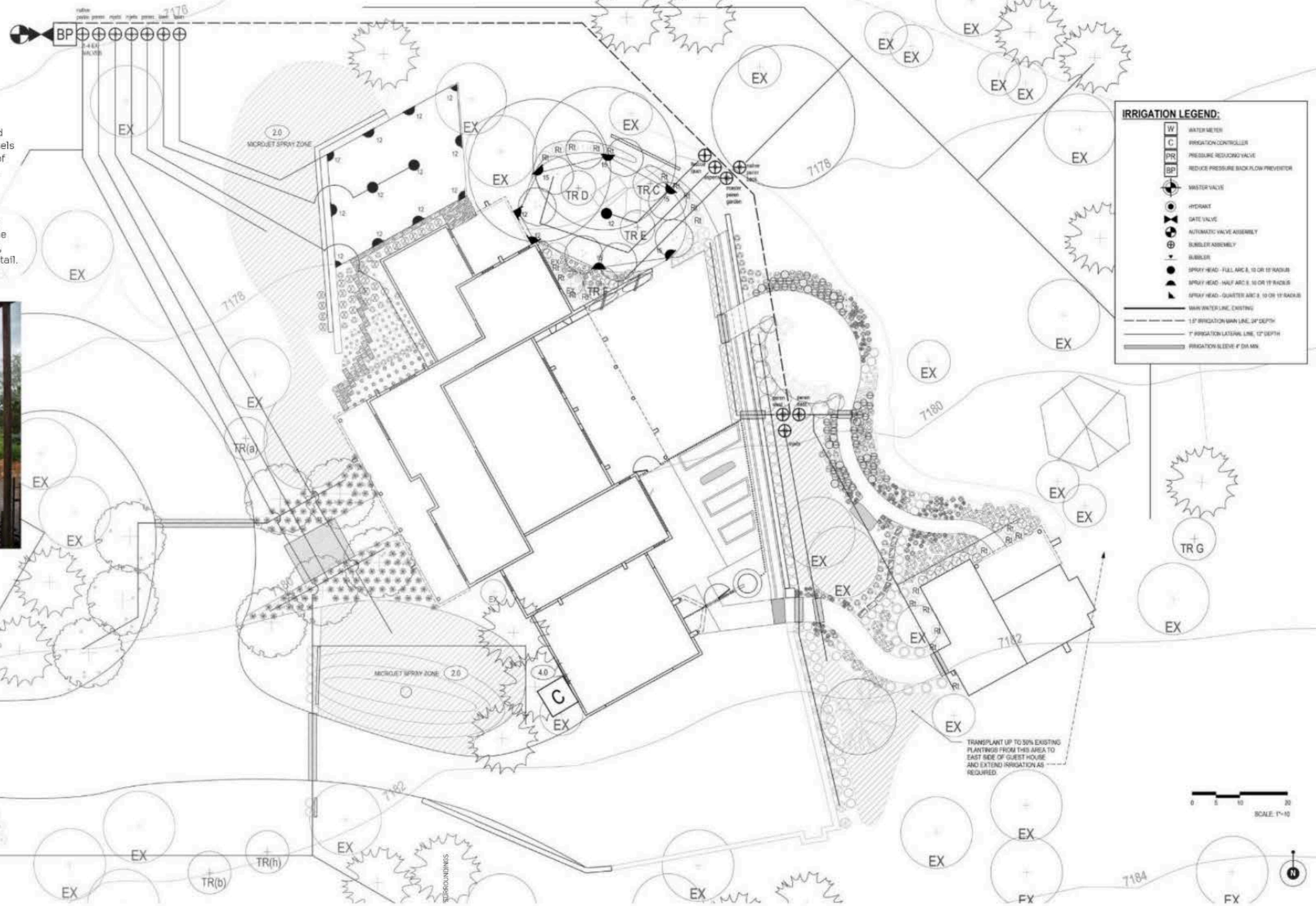
IRRIGATION PLAN



LEFT
A custom-designed steel trough channels water from the roof into a corrugated-metal cistern.



BELOW
Recaptured runoff is used to water the vegetable planters, another custom detail.



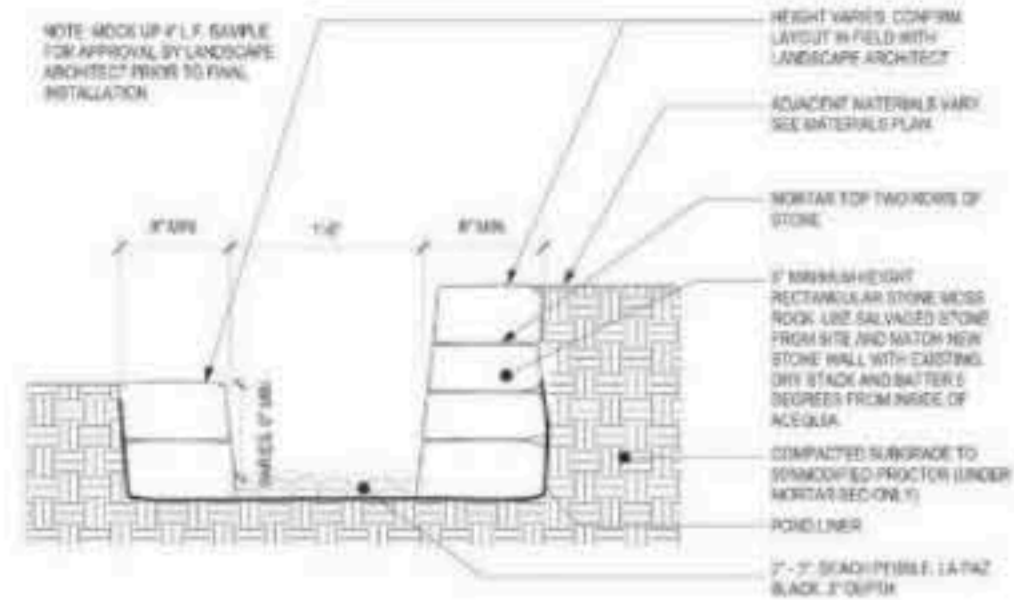
IRRIGATION LEGEND:

W	WATER METER
C	IRRIGATION CONTROLLER
PR	PRESSURE REDUCING VALVE
BP	REDUCE PRESSURE BACKFLOW PREVENTOR
(Circle with cross)	WASTER VALVE
(Circle with dot)	HYDRANT
(Circle with X)	GATE VALVE
(Circle with cross and dot)	AUTOMATIC VALVE ASSEMBLY
(Circle with dot and cross)	SUBIRIGATOR ASSEMBLY
(Circle with dot)	SUBIRIGATOR
(Circle with dot and cross)	SPRAY HEAD - FULL ARC 8, 10 OR 12" RADIUS
(Circle with dot and cross)	SPRAY HEAD - HALF ARC 8, 10 OR 12" RADIUS
(Circle with dot and cross)	SPRAY HEAD - QUARTER ARC 8, 10 OR 12" RADIUS
(Solid line)	MAIN WATER LINE, EXISTING
(Dashed line)	1" IRRIGATION MAIN LINE, 24" DEPTH
(Thin solid line)	1" IRRIGATION LATERAL LINE, 12" DEPTH
(Thick solid line)	IRRIGATION SLEEVE 4" DIA MIN.

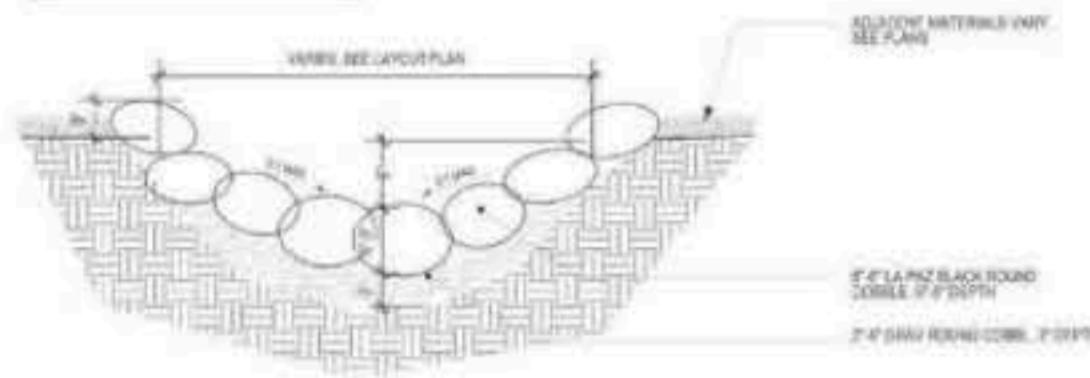
TRANSPLANT UP TO 50% EXISTING PLANTINGS FROM THIS AREA TO EAST SIDE OF GUEST HOUSE AND EXTEND IRRIGATION AS REQUIRED.



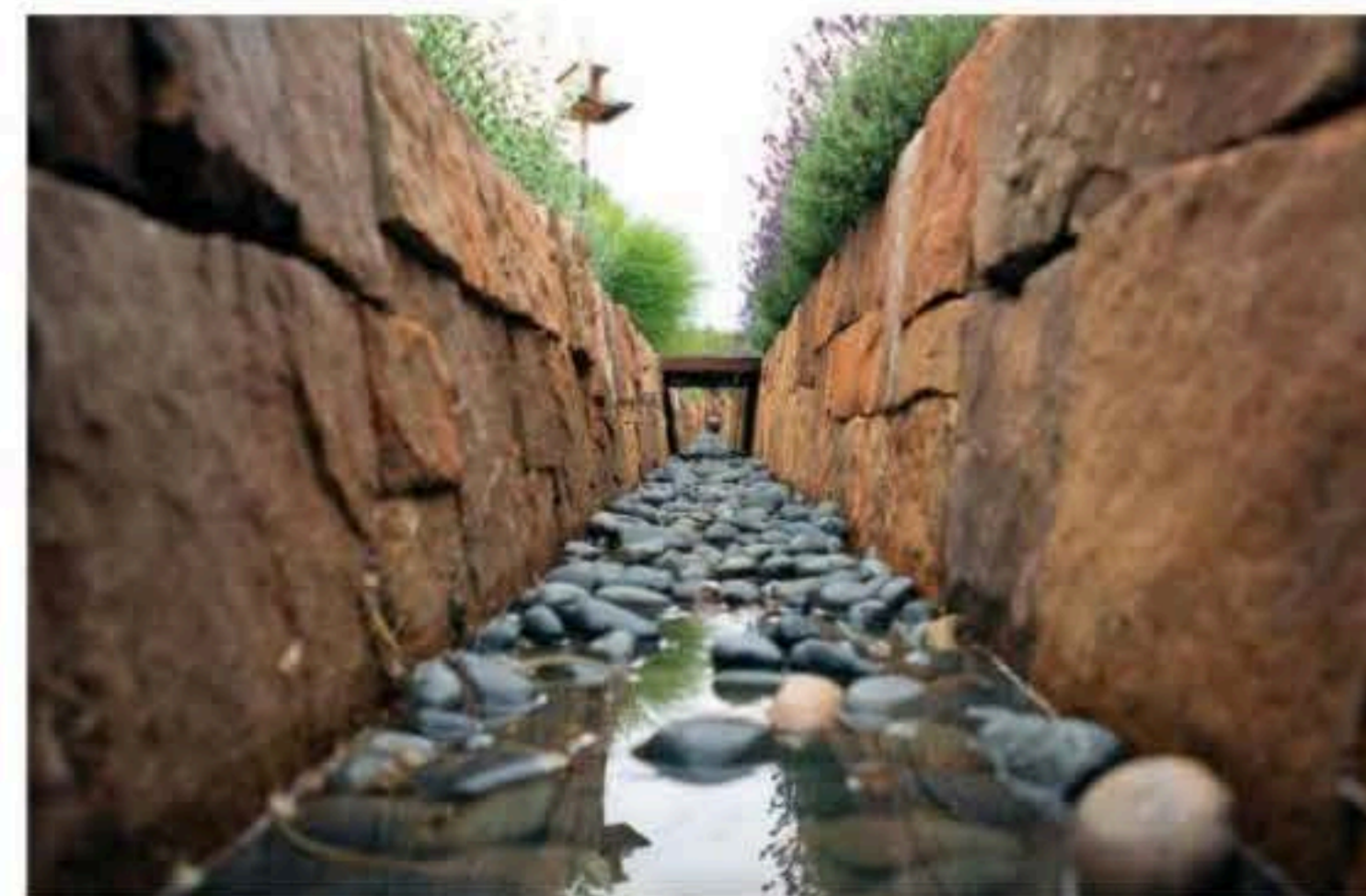
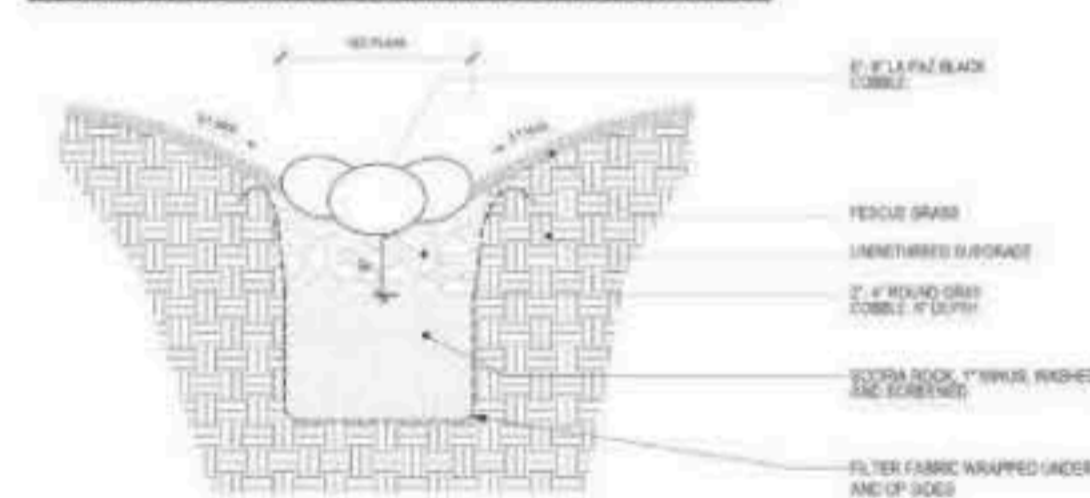
STORMWATER ACEQUIA



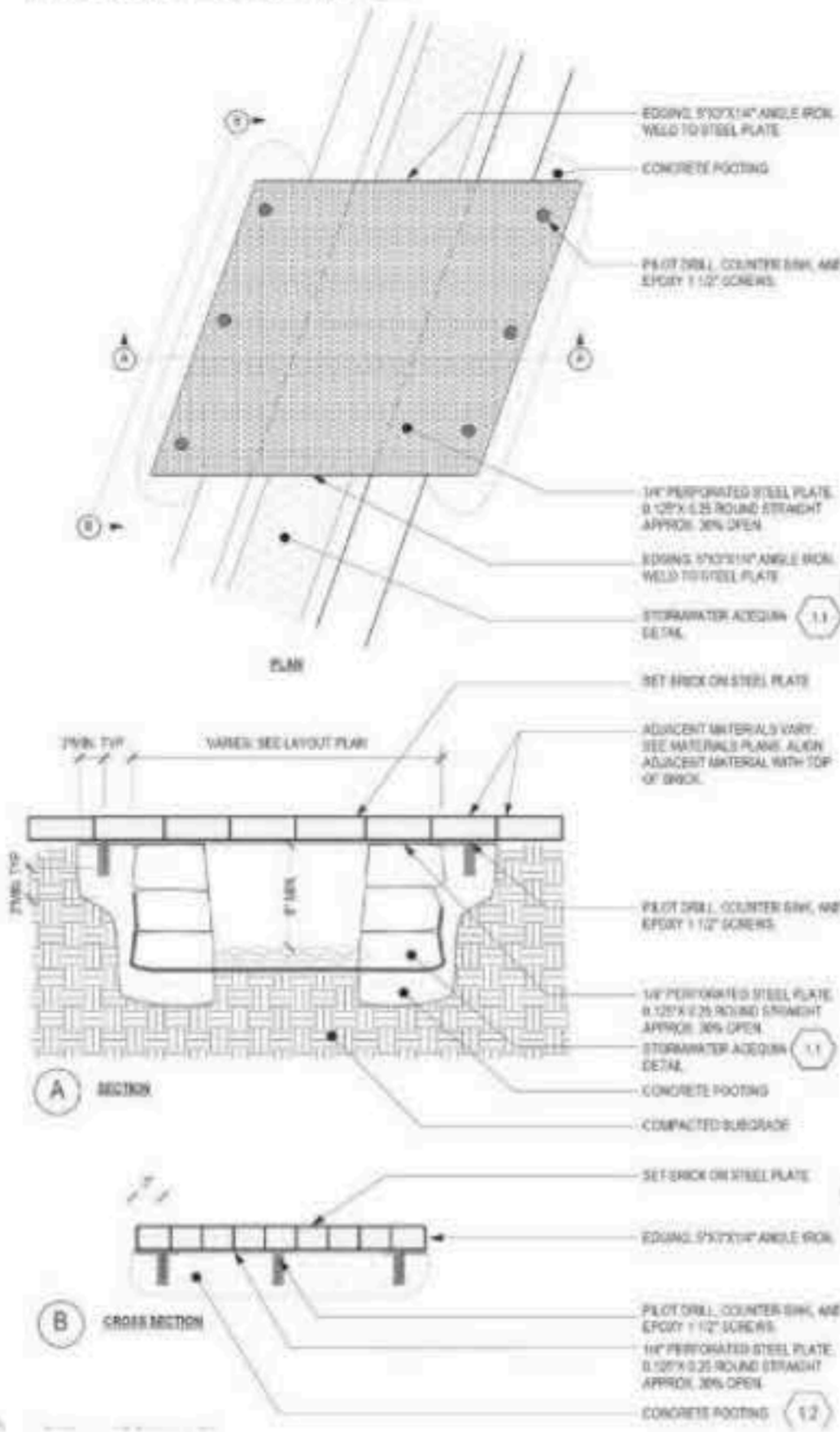
COBBLE SWALE



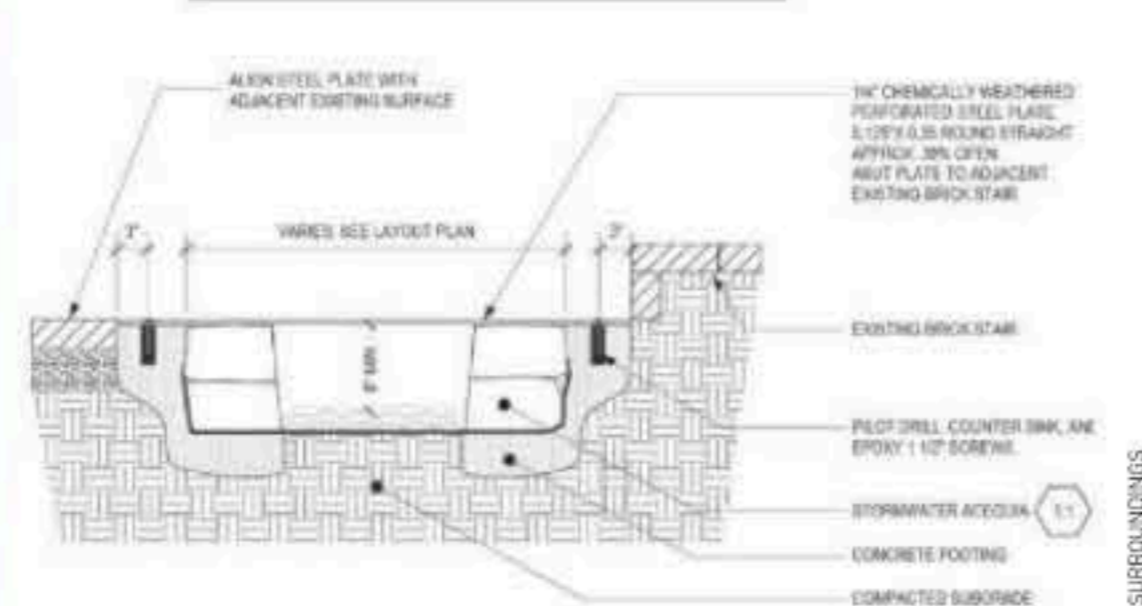
COBBLE SWALE WITH PUMICE WICK



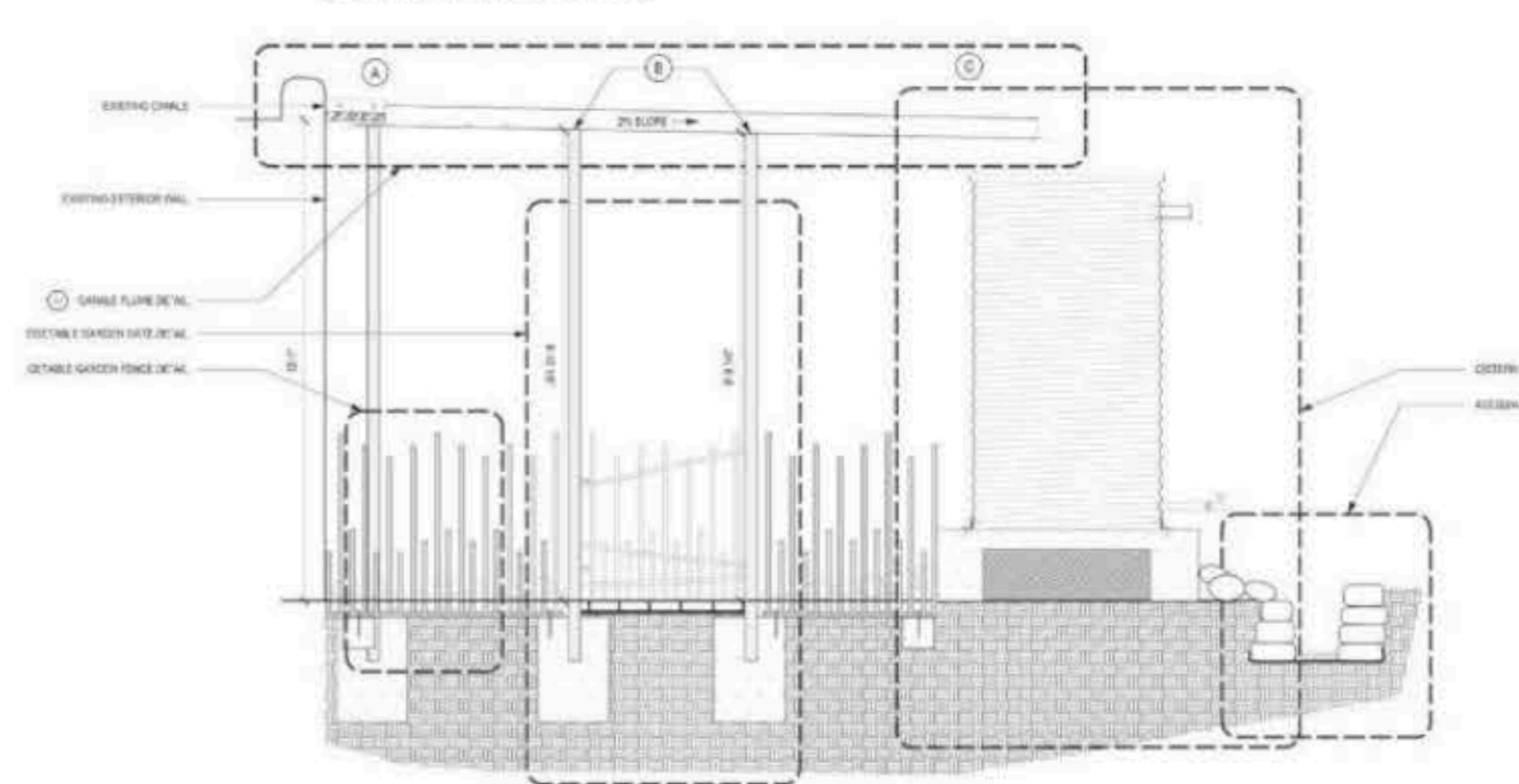
ACEQUIA FOOTBRIDGE



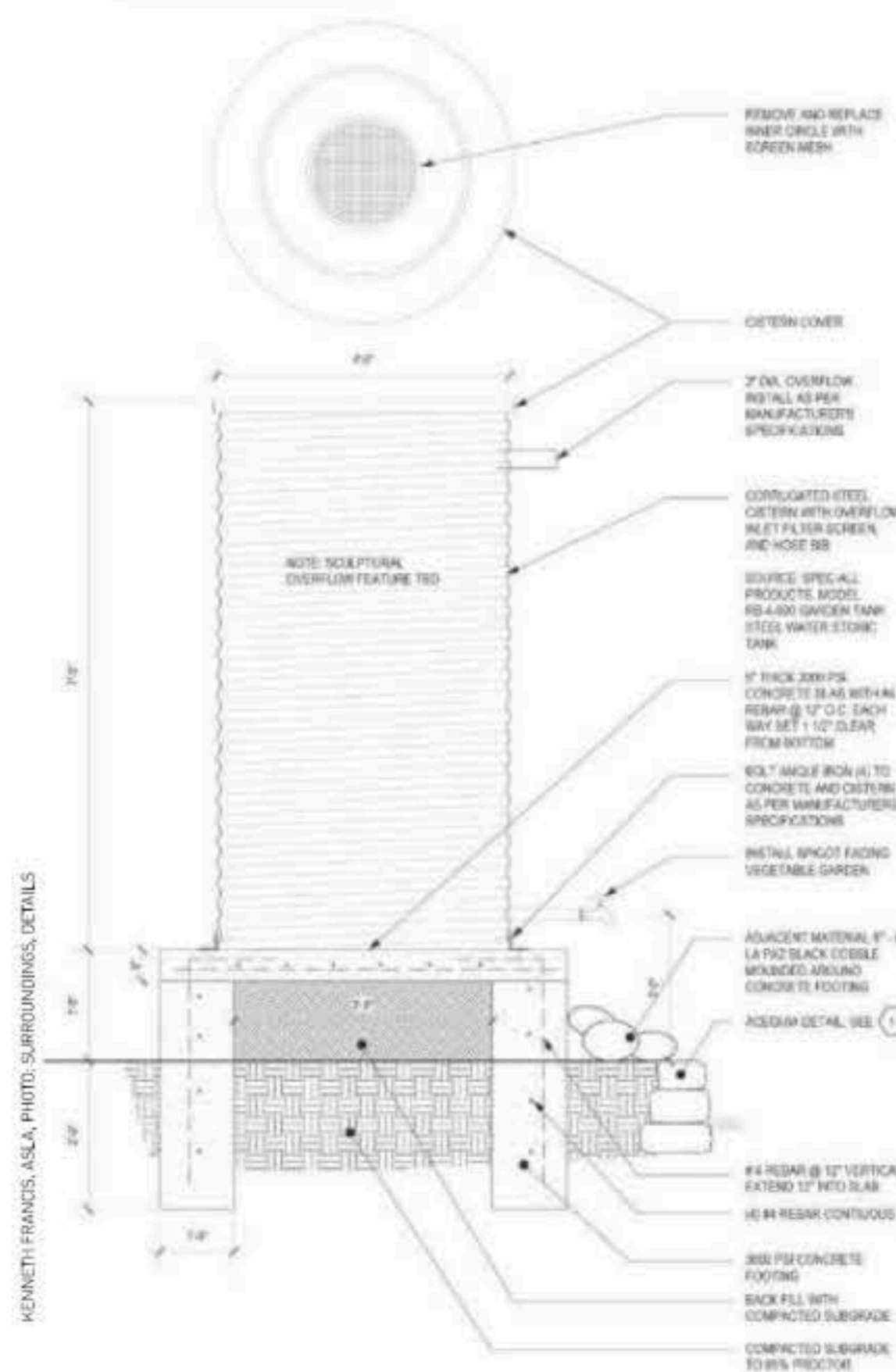
PARKING AREA FOOTBRIDGE



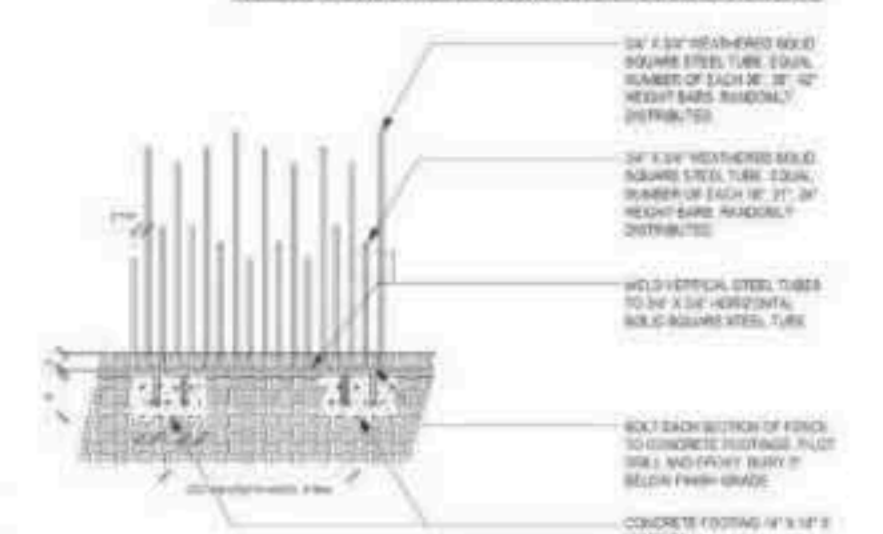
SECTION AT CISTERN



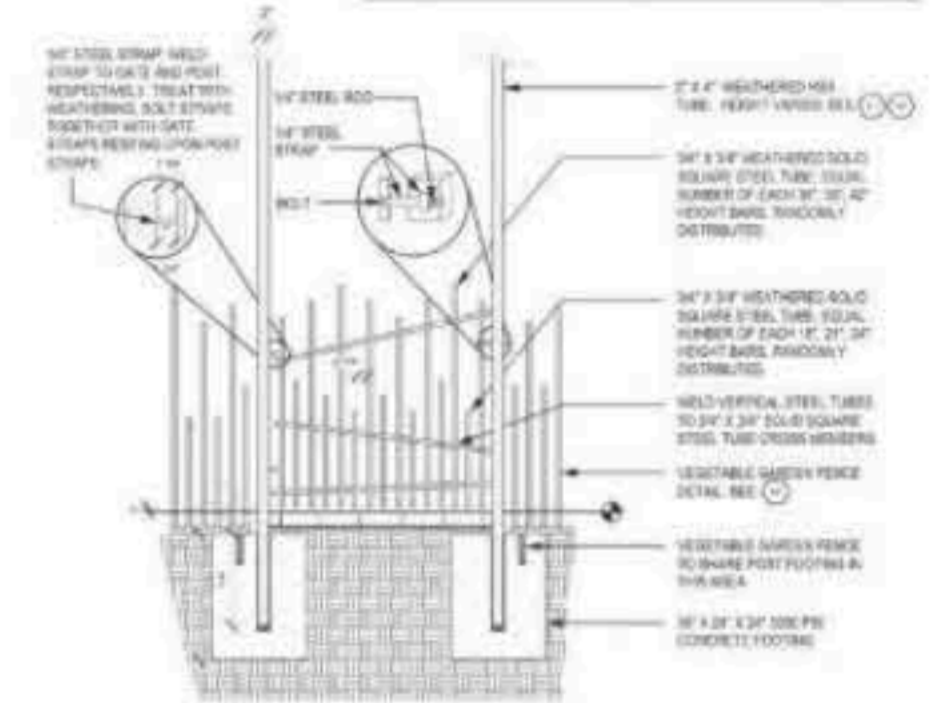
CISTERN DETAIL



VEGETABLE GARDEN FENCE

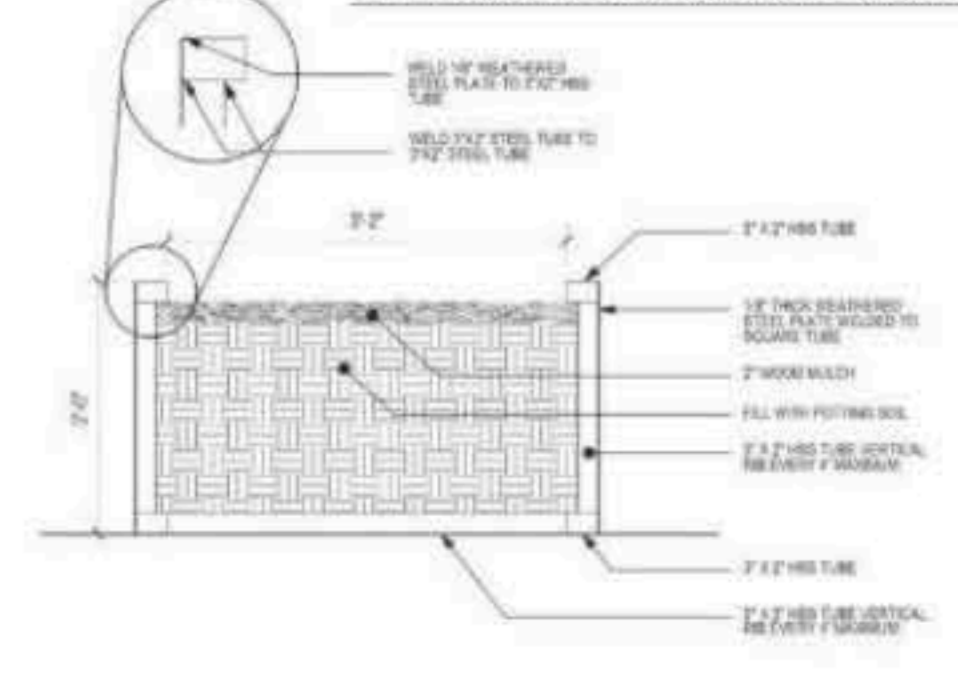


VEGETABLE GARDEN GATE



LEFT The vegetable garden lies just outside the kitchen, giving the owners a visual connection from indoors to outdoors.

VEGETABLE GARDEN PLANTER





RIGHT
Silky thread grass is regionally appropriate and less harsh than some desert xeriscape species.

LEFT
Desire lines are expressed in the house's hardscape.

BELOW
The pathways feature bricks several shades darker than those around them and oriented longitudinally.



↳ brick that extend from both the front and back of the house and intersect in the ground plane, requiring tiny brick wedges cut to exacting specifications.

Although a vast majority of Surroundings's work is landscape architecture, two of the firm's three principals—Francis and Donner—also have degrees in architecture, and their understanding of building materials and structure informed several design decisions, including the choice to make the Y-shaped steel trough, which directs water from the garage roof's canales to the cistern, freestanding. To attach it to the house would have risked damage to either or both structures when the water froze in the winter.

Some custom details fell short of their intent, such as the steel fence that secures the vegetable garden. The pickets are spaced too far apart to prevent rabbits' slipping through. Other details were serendipitous, like the side yard, where the angled retaining wall echoes the shape of the Jemez Mountains in the distance. Francis hadn't noticed the relationship until a friend complimented him on it. "Yeah, yeah, we did that," Francis says wryly.

Francis said he doubts he would have thought to add an acequia to the landscape had he not needed to find a way to water the aspens, which today are huge, 30 feet high, and shimmering. Several volunteer trees have even joined the grove.

NARRATIVE MEDIA, TOP

"It wouldn't be there if it wasn't necessary to our approach," he said of the acequia. "It's sort of symbiotic, like the junipers and piñons."

Four years in, the landscape at Woven Plains is mature, spellbinding in its mélange of color and texture. It is high performance and low maintenance. It mimics the northern New Mexican landscape even as it delivers contemporary comforts. Most important, for Francis, it is one more example of the wisdom contained within vernacular forms of water management, and how landscape architects can embrace them. Geologically speaking, New Mexico hasn't changed all that much in the past 400 years, which means that this ancient infrastructure is ripe for adap-

tation. Santa Fe residents connect with the idea of an acequia "because it has a story," he says. "I don't want to put Portland green infrastructure into Santa Fe." ●

TIMOTHY A. SCHULER WRITES ABOUT LANDSCAPE ARCHITECTURE, ECOLOGY, AND URBAN DESIGN. HE LIVES IN HONOLULU.

Project Credits

LANDSCAPE ARCHITECT SURROUNDINGS, SANTA FE, NEW MEXICO (KENNETH FRANCIS, ASLA, PARTNER IN CHARGE; CHRISSY SCARPITTI, PROJECT MANAGER; SANDRA DONNER, ASLA; WILL TADEVATA, ASLA). **LANDSCAPE CONTRACTOR** EL TORO LANDSCAPE, SANTA FE, NEW MEXICO. **STEEL FABRICATOR** METAL MOGUL, SANTA FE, NEW MEXICO. **BRICK MASONRY** RIGHT THE FIRST TIME CONSTRUCTION, SANTA FE, NEW MEXICO. **STAIR HANDRAIL SCULPTOR** JODY NORSKOG, SANTA FE, NEW MEXICO.