Recreational Level Field maintenance includes: weekly field inspections; 2x/week litter removal; 2x/week skin maintenance; mowing/trimming (1x/week March through October, as needed November through February); field marking when permitted for games; and warm-season turfgrass maintenance program.

Practice Level Field maintenance includes: monthly field inspections; litter removal every 3 days; skin maintenance once biweekly; and mowing/trimming every 10 days. Field marking becomes the responsibility of the permit group when permit begins.

The SOP also outlines our administrative and record keeping functions. Daily work assignments (tasks) are detailed on work order tracking forms. The crew supervisor notes tasks performed and completion time, travel, equipment and supplies used. This data is entered into a database that enables me to generate reports that help to quickly identify whether we are meeting our maintenance standards, track costs associated with field maintenance and compare cost versus revenue per field.

Municipalities across the nation are forced by today’s economic downturn to tighten their budgets. Houston is no exception. As this article is being written we are exploring ways to continue providing a high level of service to our community while reducing costs. The most important resource a sports turf manager can have when preparing a budget is data. Look at the number of fields you are responsible for maintaining. Know the square foot or acreage of all your fields. Know what it cost to maintain fields at the various field classifications.

Some considerations that must be taken into account when preparing your budget are the expectation of the field user and city officials. Resources must be allocated strategically so as to maintain established standards. The sports turf manager must be aware of how their fields are being used for practice, for example, are user groups allowed to exceed field capacity hours? This will greatly affect your budget allocation. We have found that by encouraging community participation in sports turf maintenance we are able to stretch our budget dollars. We promote community involvement in sports field maintenance through our “Adopt-a-Sports Field” program. This program welcomes organizations or individuals who wish to “adopt” a sports field in lieu of paying permitting fees associated with the use of ball fields. This adoption
is available for youth leagues only. We currently have 75 fields that are adopted and maintained by youth organizations. We have had an increase in participation each year since the program’s inception in 2005.

Youth organizations enter into an agreement with the Parks and Recreation Department to provide field maintenance for a 6-month period. All maintenance tasks are clearly defined. The organization essentially agrees to perform field maintenance at our Recreational Field level. The organization conducts weekly field inspections and forwards the report to my office. My staff inspects each adopted field monthly to ensure compliance with maintenance standards.

Our sports field staff conducts two field maintenance clinics each year. We invite all Adopt-a-Sports Field participants and other field use groups to attend. We review maintenance standards, explain our field inspection form and demonstrate proper maintenance procedures. An annual meeting is held each year with field users where department guidelines are reviewed. The objective is to have open lines of communication with our user groups.

I am always looking for opportunities to speak with field users. It could be at a field maintenance clinic that we host or the opening day of little league season. My job is to educate and inform individuals, and organizations on proper field maintenance techniques, tools or supplies that will enable them to be effective in maintaining sports fields.

To facilitate communication with city officials, department directors, recreation program managers, and the general public we are working on the enhancement of our department website. This generation depends more and more on web-based information. Using our department website offers us the opportunity to convey our mission and vision.

Our goal is to have a website that communicates field standards, procedures for permitting fields, field locations and the ability to voice comments or express concerns regarding their field use experience. We will use the site to feature a monthly article with field maintenance tips and our exceptional fields along with the responsible staff. The site will list current programs and highlighting historical event such as the 2008 Division II Women Softball and Lacrosse Championship and the USA Olympic Softball Team exhibition game.

The positive impact of sports facilities at the community level is frequently overlooked. Every city would like to boost about the “quality of life” it provides for the residents. By providing safe, playable and aesthetically pleasing fields, we enhance the “quality of life” in our community. Yes, you too can make a difference in your community.

Thanks to the many members of STMA who have shared their winning strategies with me. Thanks also to my department director Joe Turner and deputy director Abel Gonzales who encourage my staff and I to take advantage of training opportunities through STMA, Texas Turfgrass Association and numerous video resources. ■

Anthony R. Wise is Division Manager for the Sports Field Management Section, City of Houston-Parks & Recreation.

<table>
<thead>
<tr>
<th>EXHIBIT E</th>
<th>Level 1 Maintenance Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Name:</td>
<td>Address:</td>
</tr>
<tr>
<td>Type of Field:</td>
<td></td>
</tr>
<tr>
<td>Condition:</td>
<td>Compaction:</td>
</tr>
<tr>
<td>Type of Grass:</td>
<td>Drainage:</td>
</tr>
<tr>
<td>Type of Mower:</td>
<td>Irrigation:</td>
</tr>
<tr>
<td>Type of Soil:</td>
<td>Thatch:</td>
</tr>
<tr>
<td>Soil Test: Date:</td>
<td>Nitrogen:</td>
</tr>
<tr>
<td>pH:</td>
<td>Notes:</td>
</tr>
<tr>
<td>Time of Year</td>
<td>Fertilization</td>
</tr>
<tr>
<td>March</td>
<td>24-0-6 or 60% SCU</td>
</tr>
<tr>
<td>April</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>21-0-0</td>
</tr>
<tr>
<td>June</td>
<td>21-0-0</td>
</tr>
<tr>
<td>July</td>
<td>Solid Tine</td>
</tr>
<tr>
<td>August</td>
<td>24-6-13 or 50% SCU</td>
</tr>
<tr>
<td>September</td>
<td>Core 4&quot; 2 Directions</td>
</tr>
<tr>
<td>October</td>
<td>21-0-0</td>
</tr>
<tr>
<td>November</td>
<td></td>
</tr>
<tr>
<td>December</td>
<td></td>
</tr>
<tr>
<td>January</td>
<td></td>
</tr>
<tr>
<td>February</td>
<td></td>
</tr>
</tbody>
</table>

*FERTILIZER N-P-K BASED ON SOIL AND TISSUE ANALYSIS. **APPLICATION RATE SHOULD YIELD 6LB NS PER YEAR.**
This little module converts irrigation controllers to 2-wire. You’ll save a ton in wiring costs, installation and maintenance.
Mirage M-160 pictured at right with artificial turf lid covering to blend in with surroundings when not in use.

Incredible but true... with its huge 164 ft. radius throw, the M-160 can shower a regulation size football field with only 6 heads!

The superior characteristics of Mirage sprinklers is proven daily around the world: from the futuristic Allianz Arena in Munich, to the Olympic stadiums in Athens 2004 and Beijing 2008, to large collegiate sports complexes in the United States.

---

**model selection guide**

<table>
<thead>
<tr>
<th></th>
<th>M-115</th>
<th>M-125</th>
<th>M-160</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Radius</td>
<td>115 ft. (35 m)</td>
<td>125 ft. (38 m)</td>
<td>164 ft. (50 m)</td>
</tr>
<tr>
<td>Valve Type</td>
<td>In Head or Block</td>
<td>In Head or Block</td>
<td>3” Sleeve Valve</td>
</tr>
<tr>
<td>Lid Cover</td>
<td>Sod Cup - Natural Grass 4” (101 mm) Depth 9.5” (242 mm) Diameter</td>
<td>7” (180 mm) Diameter</td>
<td>15.6” (395 mm) Diameter</td>
</tr>
<tr>
<td>Typical</td>
<td>Natural Turf: Play Areas</td>
<td>Artificial Turf: Sideline Areas</td>
<td>Positioned at Sidelines: Artificial Turf Cooling Natural Turf Irrigation</td>
</tr>
<tr>
<td>Applications</td>
<td>Natural Turf: Play Areas</td>
<td>Artificial Turf: Sideline Areas</td>
<td>Natural Turf: Sidelines</td>
</tr>
<tr>
<td>Field Usage</td>
<td>All Sports</td>
<td>All Sports</td>
<td>Football, Soccer, Race Tracks</td>
</tr>
<tr>
<td>Examples</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nozzle #s (mm)</td>
<td>7, 8, 9, 10, 11, 12, 13, 14, 15</td>
<td>7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17.5</td>
<td>16, 18, 20, 22, 24, 26</td>
</tr>
<tr>
<td>Pop-Up Height</td>
<td>8.1” (206 mm)</td>
<td>4” (99 mm)</td>
<td>2 3/4” (70 mm)</td>
</tr>
<tr>
<td>Arc</td>
<td>30 - 360 degrees</td>
<td>30 - 360 degrees</td>
<td>30 - 360 degrees</td>
</tr>
<tr>
<td>Trajectory</td>
<td>22 degrees</td>
<td>22 degrees</td>
<td>23 degrees</td>
</tr>
<tr>
<td>Rotation Speed</td>
<td>60 seconds</td>
<td>60 seconds</td>
<td>Precision Adjustable 100-240 seconds</td>
</tr>
<tr>
<td>Inlet (Specify)</td>
<td>1 1/2”</td>
<td>1 1/2”</td>
<td>2 1/2” side inlet</td>
</tr>
<tr>
<td>Height</td>
<td>26.7” 678 mm</td>
<td>17.7” 450 mm</td>
<td>24.5” 622 mm</td>
</tr>
</tbody>
</table>

**ordering**

- Part # M160-FP  Mirage™ 160 full/part circle
- Part # M160-EP  Mirage™ 160 full/part circle, with 3” electric valve
- Part # M125-EF  Mirage™ 125 full circle, valve-in-head
- Part # M125-EP  Mirage™ 125 full/part circle, valve-in-head
- Part # M125-BF  Mirage™ 125 full circle, block
- Part # M125-BP  Mirage™ 125 full/part circle, block
- Part # M115-EF  Mirage™ 115 full circle, valve-in-head
- Part # M115-EP  Mirage™ 115 full/part circle, valve-in-head
- Part # M115-BF  Mirage™ 115 full circle, block
- Part # M115-BP  Mirage™ 115 full/part circle, block
2Wire

**JUST TWO WIRES AND ONE MODULE FOR CONTROL OF UP TO 48 STATIONS**
With over 150,000 field successes, Underhill™ 2WIRE irrigation control systems are a proven leader in converting controllers like the Hunter® ICC to the simplicity and low cost of two-wire technology. Installation is a breeze and after your system is in, you’ll enjoy reduced maintenance costs and unbelievably easy system expansion (just splice into the 2-wire path and add a decoder). Add the Hunter® IRC remote control and you’ve created the ultimate (and most affordable) way to syringe anywhere on your field at the press of a button.

**EXPAND EXISTING MULTI-WIRE SYSTEMS**
To run a 2WIRE system in tandem with your existing system, simply install the decoder module into the controller, run a 2-wire path to the new valves, and operate your ICC as normal for all stations (up to 48 total). To add stations in hard to reach areas (across a road, path, parking lot, etc.), you can even “piggyback” onto the existing system out in the field and avoid trenching back to the controller!

**NO GROUNDING NECESSARY**
Underhill™ decoders quickly install anywhere along a 2-wire path, and they require no grounding. So reliable, they are backed by a 2-year warranty that includes direct lightning hits! Each decoder can control one or two valves per station.

An irrigation installation featuring the powerful Mirage™ M-125 sprinkler (see page 2-3) and 2Wire decoders becomes an on-demand syringing system with the Hunter® IRC remote control.

Setting up stations is a breeze with our portable decoder programmer. And for troubleshooting wiring in the field, the digital clamp meter measures AC volts, current and resistance, and the faultfinding transformer adds the proper voltage to the two-wire path.

**ordering**
- Part # TW-ICC-48  ICC Decoder Module
- Part # TW-TK-DEC-1  2WIRE Decoder (includes 4 DBY connectors)
- Part # DEC-PROG-115  Portable decoder programmer, 115V
- Part # DEC-PROG-240  Portable decoder programmer, 240V
- Part # TW-DCM  Digital Clamp Meter
- Part # Transfrmr-115  Faultfinding Transformer 30V, 5A
- Part # TW-2C-14-1000  2-conductor, 14 AWG wire reel, 1000 ft.
- Part # TW-2C-14-2500  2-conductor, 14 AWG wire reel, 2500 ft.
Gulp™ Series Pumps

WATER REMOVAL SUCTION PUMPS

Whether you need to remove water from sprinklers and valve boxes or displace gallons of standing water in the field, the Underhill Gulp™ series of water removal hand pumps has the right tool for the job. Constructed from heavy-duty, corrosion-proof materials, these pumps are self-priming and easy to clean. The Gulp Syringe™ and Gulp™ are ideal for carrying on maintenance carts for small, routine needs. For larger water removal jobs, BigGulp™ pumps a gallon of water in only four strokes and SuperGulp™ can move 16 gallons of water in one minute.

SUPER GULP
- 16 GPM pumping capability
- 4” dia. x 2 ft. pump chamber
- 3” dia. x 3 ft. outlet hose
- 3” dia. x 7 ft. outlet hose

BIG GULP
- 35 oz./stroke
- 3 ft. pump chamber
- 36” or 72” outlet hose

GULP
- 8 oz./stroke
- 1 ft. pump chamber
- 10” outlet pipe

GULP SYRINGE
- 8 oz./stroke
- 1 ft. pump chamber
- 11” outlet tube

Use the BigGulp™ Riser Attachment to help prevent mud and rocks from entering the pump chamber.

ordering
Part # A-G12  Gulp™
Part # A-G12S  Gulp™ Syringe
Part # A-G3636K  BigGulp™ with 36” outlet hose
Part # A-G3672K  BigGulp™ with 72” outlet hose
Part # A-G2484  SuperGulp™ with 84” outlet hose
Part # A-G01  BigGulp™ Riser Attachment
Magnum™

**SOLID METAL HOSE NOZZLE**
Underhill™ Magnum™ contains no plastic internal parts to break, stick or wear out. Our unique ratchet mechanism easily adjusts from gentle fan to powerful jet stream and prevents over-tightening damage. Precision-machined, incredibly smooth operation and outstanding distribution patterns make it ideal for high-demand areas like sports fields. Magnum™ is also an excellent equipment wash-down nozzle.

**features**
- Built for 1" and 3/4" flow rates
- Fire hose quality nozzle feels great in your hands
- Ultra-durable construction withstands any abuse
- Solid metal internal body - no plastic parts to break or wear out
- Beautiful, consistent spray patterns for life
- Ratchet mechanism prevents over-tightening damage
- Multi-pattern sprays - effortless control with hydraulic assist on/off

**specifications**
Materials: stainless steel, aluminum, TPR rubber
Flow: 37 GPM at 80 psi
Inlet: 3/4" hose thread (1" brass adapter available, see Page 7)

CoolPro™

**Cool Without Over Watering - No Root Damage**
A hot summer day can be murder on high quality turf areas (like baseball infields and golf greens). Use too much water and you risk damage to the roots. CoolPro™ is the first nozzle specifically designed for the single purpose of lightly misting the turf canopy to cool without over watering. And its 25 foot fogging pattern gets the job done quickly.

**features**
- 3/4" inlet (1" brass adapter available, see Page 7)
- Ergonomic handle/valve provides easy grip and variable on/off control.
- Solid metal design for durability: zinc, aircraft aluminum and stainless steel.
- Patented Precision™ nozzle fogs at 70 psi to deliver a 25 ft. pattern with only 4-6 GPM

Perfect for tournament play, CoolPro™ puts down only enough water to cool the turf canopy. It prevents wilting while maintaining good ball speed. CoolPro is a great tool for protecting grass on hot days without damaging roots.

**ordering**
- Part # NG450 MAGNUM Hose Nozzle
- Part # HNC075 CoolPro™ Hose Nozzle

Products that work...smart.
PATTERNS SO REMARKABLE, NOZZLES SO GOOD... THEY'RE PATENTED.
It’s hard to beat a variable spray nozzle for versatility...unless you have this set of solid metal fixed spray hose nozzles precisely engineered for specific watering needs. Millions of soft, uniform droplets provide rapid yet surprisingly gentle water application. From watering fragile seed beds to drenching sports fields, Precision™ spray patterns are designed with ideal flow rates and droplet sizes to offer you the ultimate solution for every hand watering application.

Rainbow™
LOW FLOW RATE: LANDSCAPING, LIGHT WATERING
Ideal for watering transplants and seed beds. Excels at lower pressure flows. 15 GPM @ 80 psi.

Rainmaker™
LOW TO MEDIUM FLOW: SYRINGE AND SPOT WATERING
Perfect for syringing and great for hand watering turf and landscape with 3/4” hose at lower pressures. 23 GPM @ 80 psi.

Cloudburst™
MEDIUM TO HIGH FLOW: SUPPLEMENTAL TURF WATERING
High volume drenching and syringing. Ideal flow rate for 3/4” and 1” hoses. 48 GPM @ 80 psi.

Cyclone™
HIGH FLOW RATE: PRE-GAME SKINS WATERING, SOAKING
Powerful fan-shaped spray covers a HUGE area - gets heavy watering jobs done quickly. Ideal flow rate for 1” hoses. 50+GPM @ 80 psi.

GPM will vary with pressure at nozzle.

high-flow valves
COMPOSITE / STAINLESS STEEL
- 3/4” hose thread inlet/outlet
- oversized handle
- up to 55 GPM
SOLID BRASS
- 3/4” hose thread inlet/outlet
- up to 50 GPM

hose adapters / quick-connectors

ordering
Part # HN1500 Precision™ Rainbow™ Hose Nozzle
Part # HN2300 Precision™ Rainmaker™ Hose Nozzle
Part # HN4800 Precision™ Cloudburst™ Hose Nozzle
Part # HN5000 Precision™ Cyclone™ Hose Nozzle
Part # CV075H High-Flow 3/4” Valve - Brass
Part # A-BV77FM High-Flow 3/4” Valve - Composite/Steel
Part # A-BA107FM 1” FHT x 3/4” MHT Brass Hose Adapter
Part # A-BA107MF 1” MHT x 3/4” FHT Brass Hose Adapter
Part # A-BQ7M 3/4” Quick-Connect, male end
Part # A-BQ7F 3/4” Quick-Connect, female end
Part # HN-075W replacement washer, 3/4” hose
Tracker™

PORTABLE IRRIGATION MACHINE

The Tracker™ offers a very economical solution for supplementing seasonal watering needs of 1/4 acre to 2 acre areas. It is also ideal for irrigating athletic fields, cemeteries, golf course roughs, or other large areas where an underground system is impractical. Built to last with precision German engineering and high quality materials, this portable powerhouse can irrigate an entire football field in just two passes.

Tracker™ requires minimal labor to operate. Powered by water, it pulls itself along a nylon cable, dragging up to 360 ft. of 1” reinforced heavy-duty hose (sold separately). Each pass irrigates about 2/3 acre per 8 hours of operations.

features

• Adjustable Speed Control: 20–70 ft./hr.
• 360 ft. nylon cable provides maximum irrigated length of 400 ft.
• Standard full or part circle sprinkler (8-15 GPM)
• 70-85 ft. pass width
• Automatic shut-off at end of pass
• Galvanized anchor stake
• Water turbine drive and gear box
• Includes 1” brass quick-connect adapter

specifications

• Weight: 58 lbs.
• Size: Length 33”, Width 22”, Height 22”
• Materials: Aluminum, Brass, ABS

ordering

Part # T-400 Tracker™ Portable Irrigation Machine
Part # A-BQ7M 3/4” Quick-Connect, male end
Part # A-BQ7F 3/4” Quick-Connect, female end

Use Tracker™ to help irrigate sports fields, golf courses, driving ranges, or supplement watering in other areas where an irrigation system is not available. Tracker’s maximum 400 ft. irrigation path makes it also ideal for large campuses and corrals and its compact size allows it to operate in narrow spaces such as cemetery rows.