

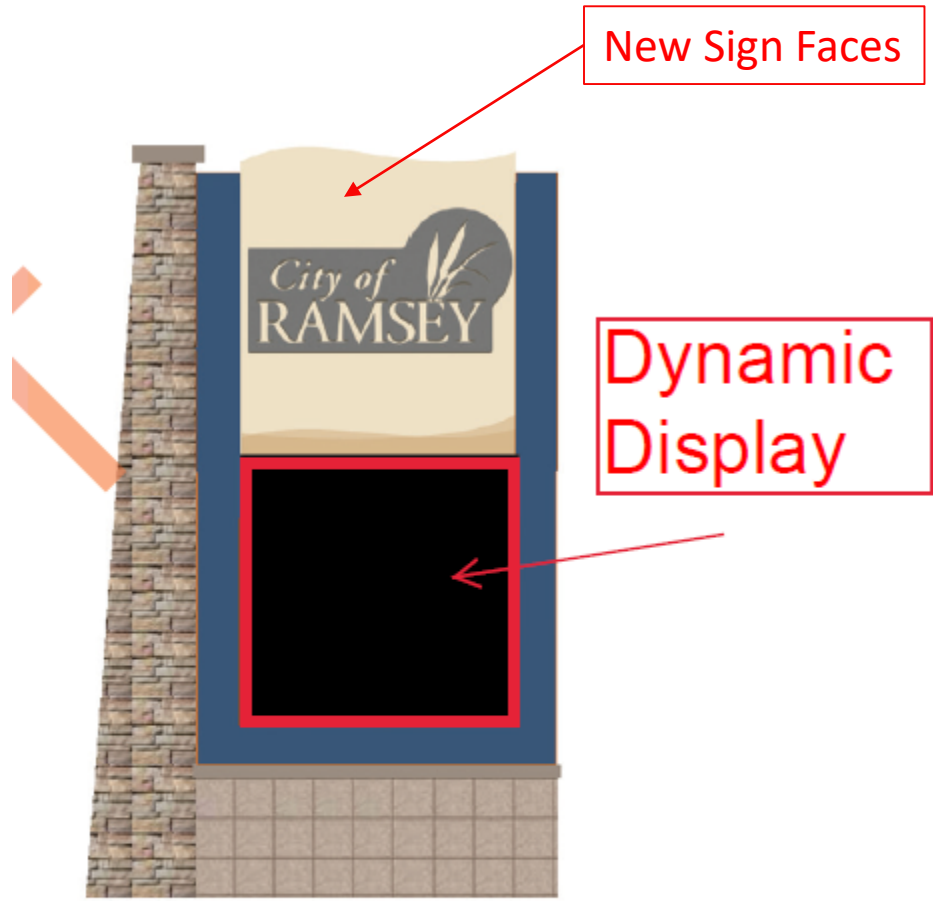
City of Ramsey

Hwy 10, Ramsey, MN

Signage Project: EMC Monument

April - 2019

Electronic Message Center "EMC" Sign Project



- RETROFITTED EXISTING X-LARGE SIGNAGE**
- REPAINT WITH BLUE TO MATCH RAMSEY LOGO
 - ADD "CITY OF RAMSEY" PANEL TO TOP OF SIGN
 - REPLACE TENANT SIGNAGE WITH "THE COR" LOGO



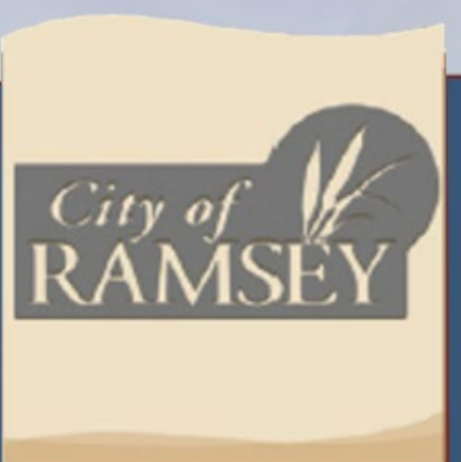
New Sign Faces

Paint Sign Structure

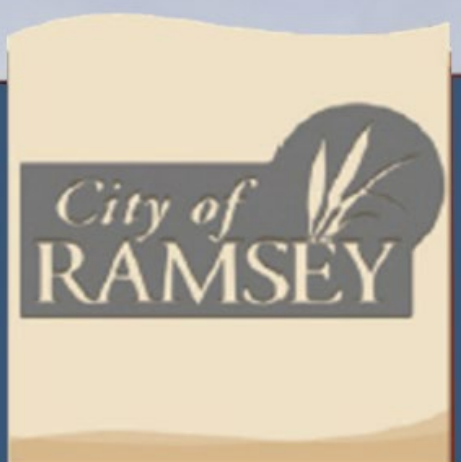


New Watchfire Digital Message Center

- Two New Sign Faces:
- Flat Aluminum Faces
 - Routed Aluminum / Acrylic Backed
 - Cut off the old sign faces
 - Installer will affix new sign faces to the old cabinet
 - Final design text, graphics and colors to be determined



10' x 10' Message Center



10' x 11' Message Center

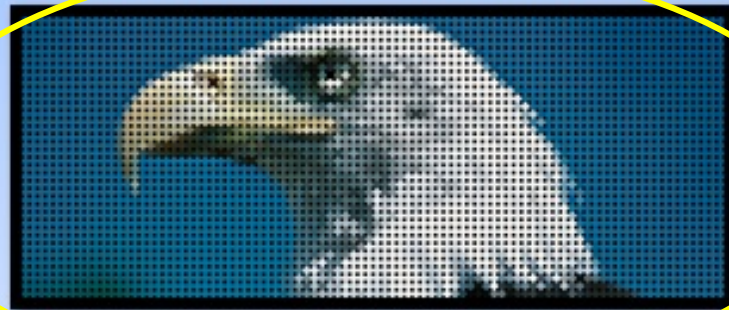
Electronic Message Center – Sign Resolution



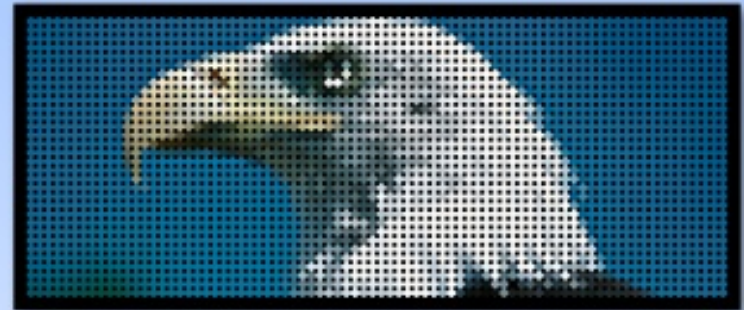
29" x 5'3" 10mm



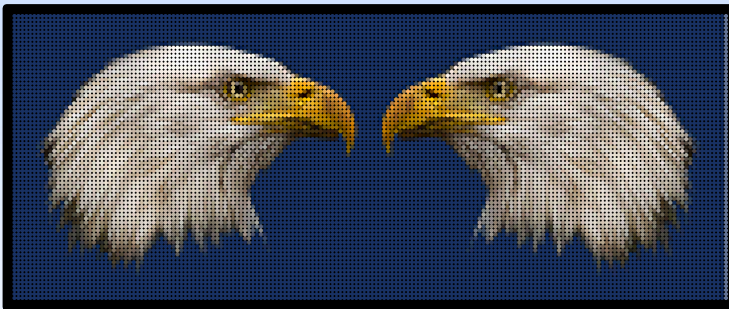
29" x 5'3" 12mm



29" x 5'3" 16mm



29" x 5'3" 19mm

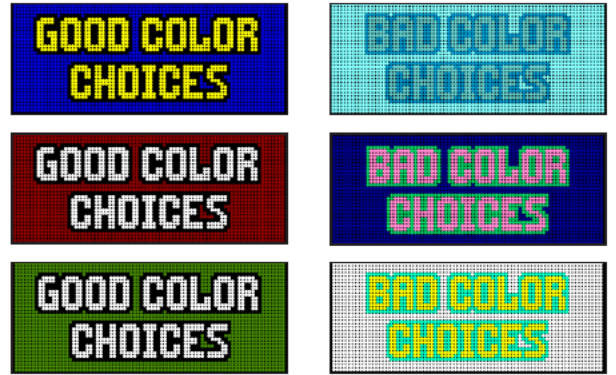
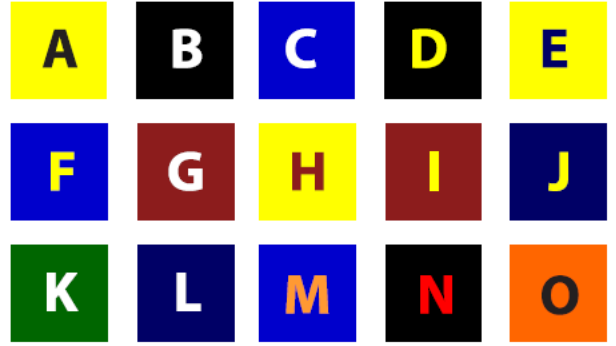
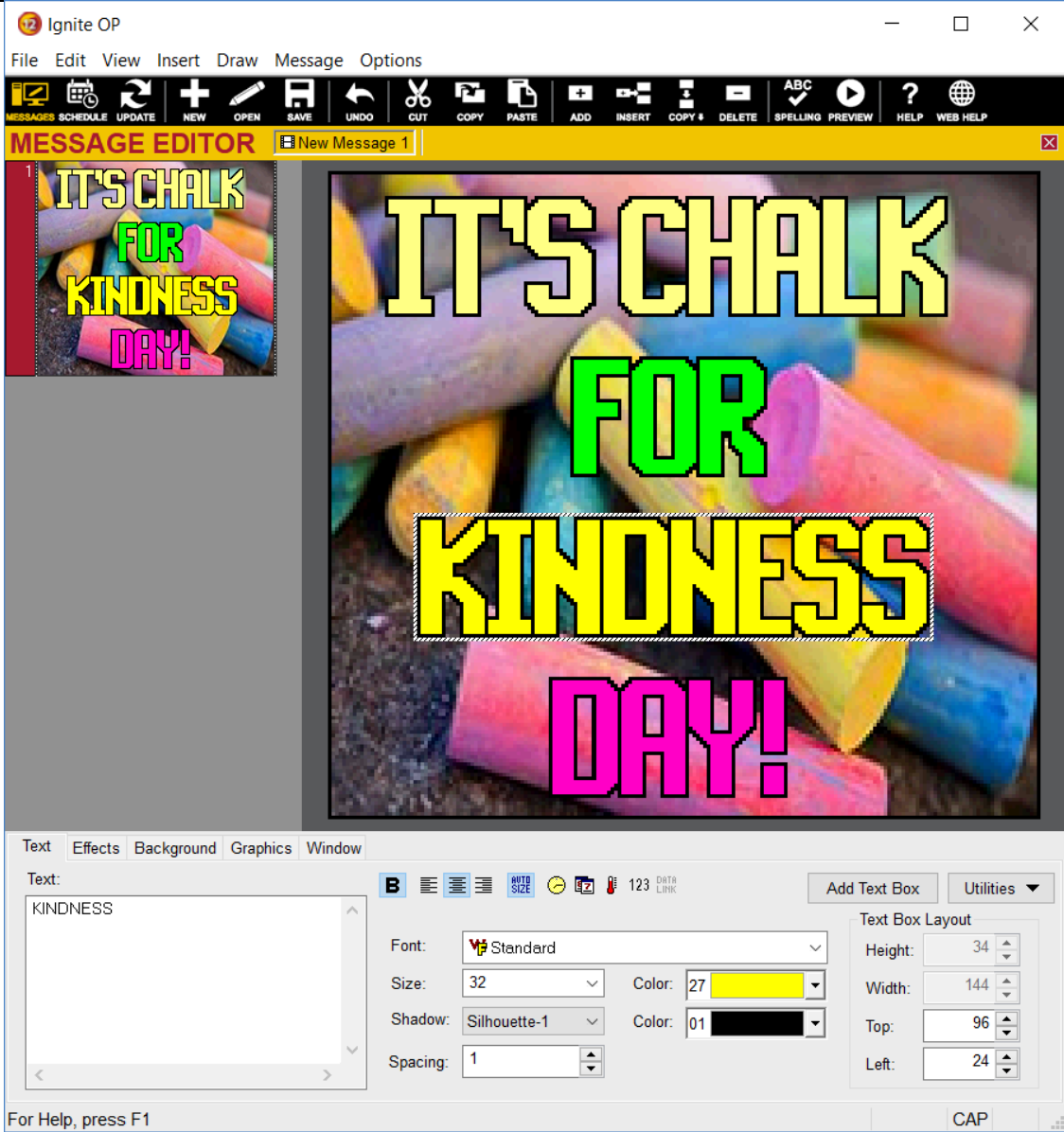


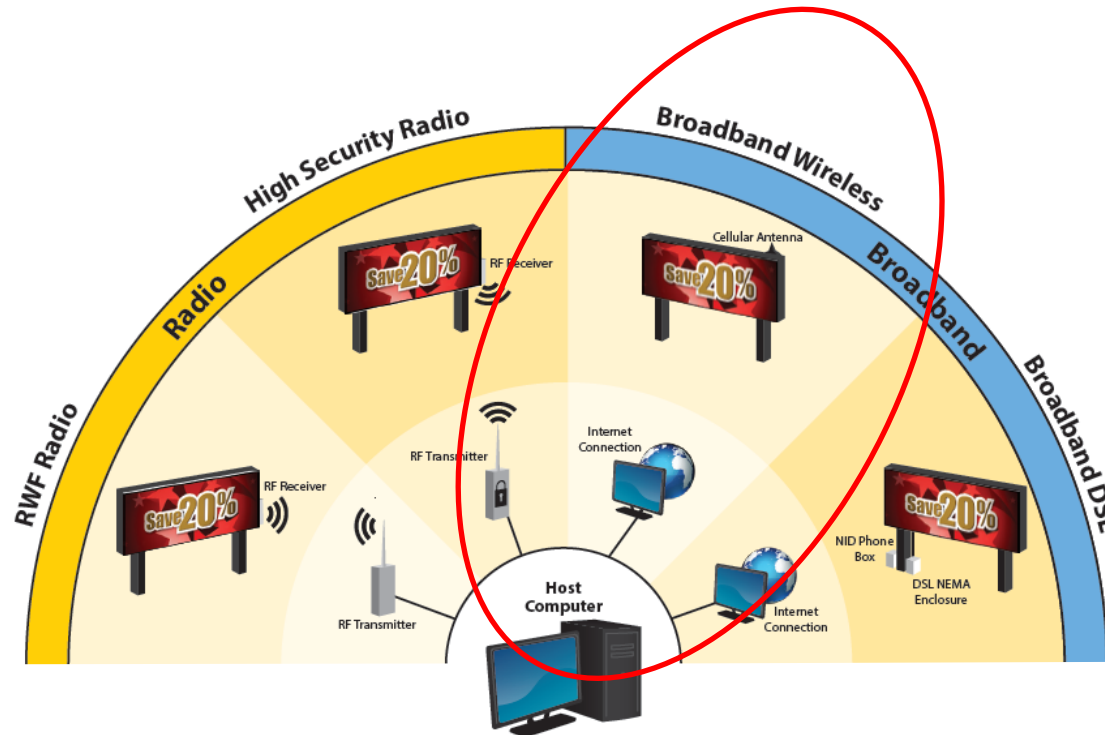
24" x 5' 8mm

This quote includes a 16mm resolution message center.

Watchfire Electronic Message Center

Easy to Use: Ignite Sign Design and Scheduling Software





Broadband

Broadband Wireless and DSL both use a high-speed internet connection to communicate with the sign. This type of connection offers the ability to update and troubleshoot the sign from any location. Broadband Wireless communication also makes it easier to network and control several signs from a single computer, which can simplify sign management for businesses with multiple locations.

4G Wireless Broadband Communication:

- Fast Secure Internet Connection to Sign
- Simplified Sign Management
- Easy Installation
- Sign Updates are Quick and Easy
- Mobile Updates
- Watchfire Runs Daily Remote Diagnostics

City of Ramsey

Quote Estimate: Message Center Monument

Sign Components: Large EMC Sign	Quote	Description
Watchfire 10x10 16mm Double-Sided Message Center	\$ 71,500.00	10x10 16mm Resolution Watchfire Message Center 10x11 Message Center: Add \$7,000 11x11 Message Center: Add \$14,700
EMC Sign: (2) New Flat Sign Faces for Upper Sign Cabinet	\$ 6,590.00	Flat Routed Aluminum Sign Faces / Acrylic Backed. Installed onto existing sign cabinet.
Installation		All Installation Estimates Are Provided at Cost.
EMC Sign: Installation	\$ 13,900.00	Includes all hardware and infrastructure to install new EMC and new sign faces. Assumes adequate electrical power exists at sign location.
EMC Sign: Install LED Lighting into Upper Cabinet	\$ 1,000.00	LED light replacement into upper sign cabinet.
Subtotal	\$ 92,990.00	
Sales Tax (7.125) (Assume City of Ramsey is Tax Exempt)	NA	
Total	\$ 92,990.00	

Message Center
5-Year Parts Warranty
1-Year Labor Warranty

Installation includes electrical connection, communications, software and training.

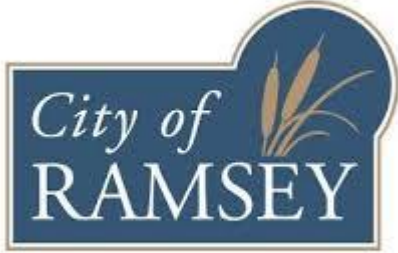
- > All required hardware for message center installation
- > Electrical connection assumes adequate electrical exists at sign location.
If additional electrical service is required, we can provide an estimate.
- > **Lifetime Broadband** Sign Communication Agreement
- > New Sign Faces for Upper Sign Cabinet
- > New LED Lighting for Upper Sign Cabinet
- > Permit Administration – Included (Permit Fees paid by Client)
- > Software training includes:
 - Initial Training - day of installation
 - Webinar Training from Watchfire
 - Ongoing training from Think Digital Signs as needed

Terms: 75% Deposit at time of Order
25% at Installation

Watchfire Demo Truck Visit

In order to help you and other important decision makers determine the appropriate sign size & resolution and create enthusiasm for a new communication tool, we can arrange for a Watchfire demo truck visit.





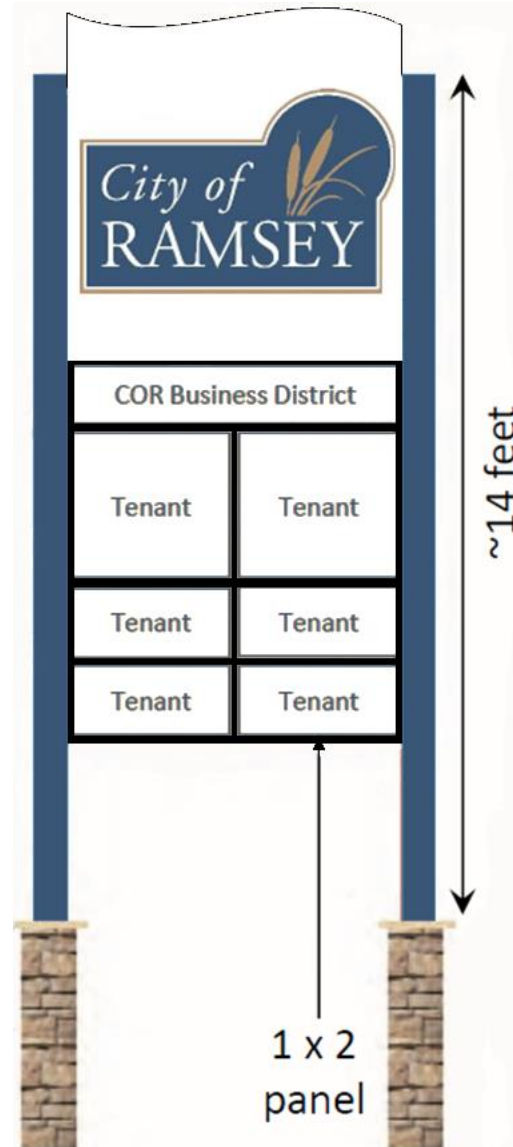
City of Ramsey

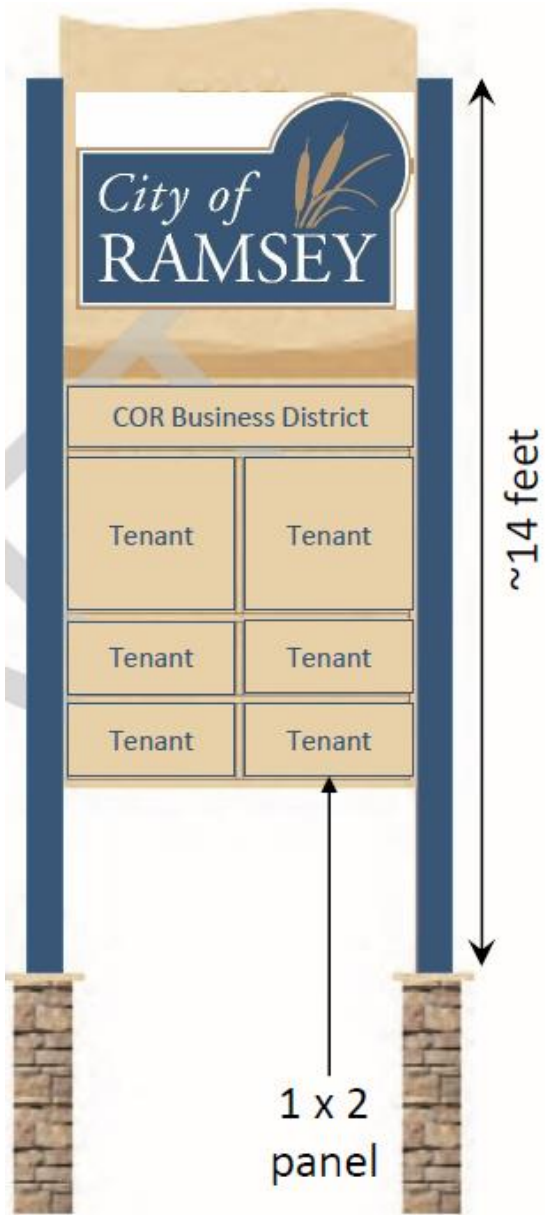
Hwy 10, Ramsey, MN

Signage Project: Non-EMC Monument

April - 2019

Non-EMC Sign Monument Project

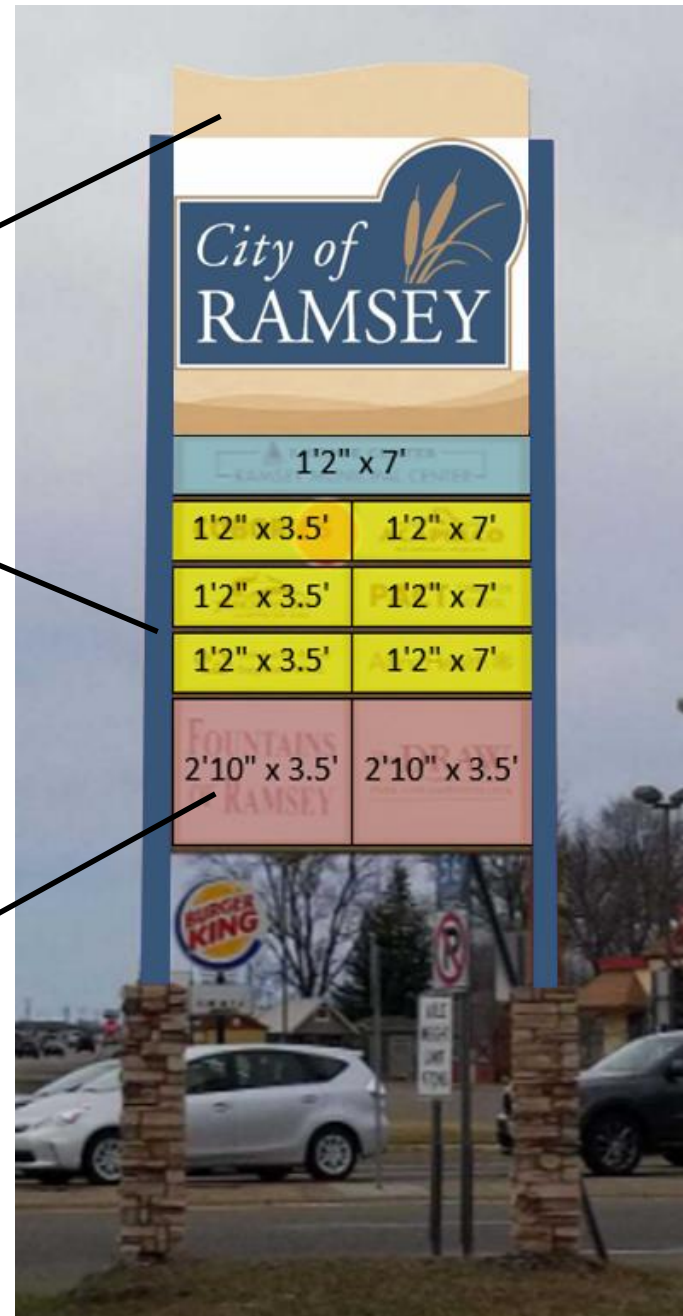


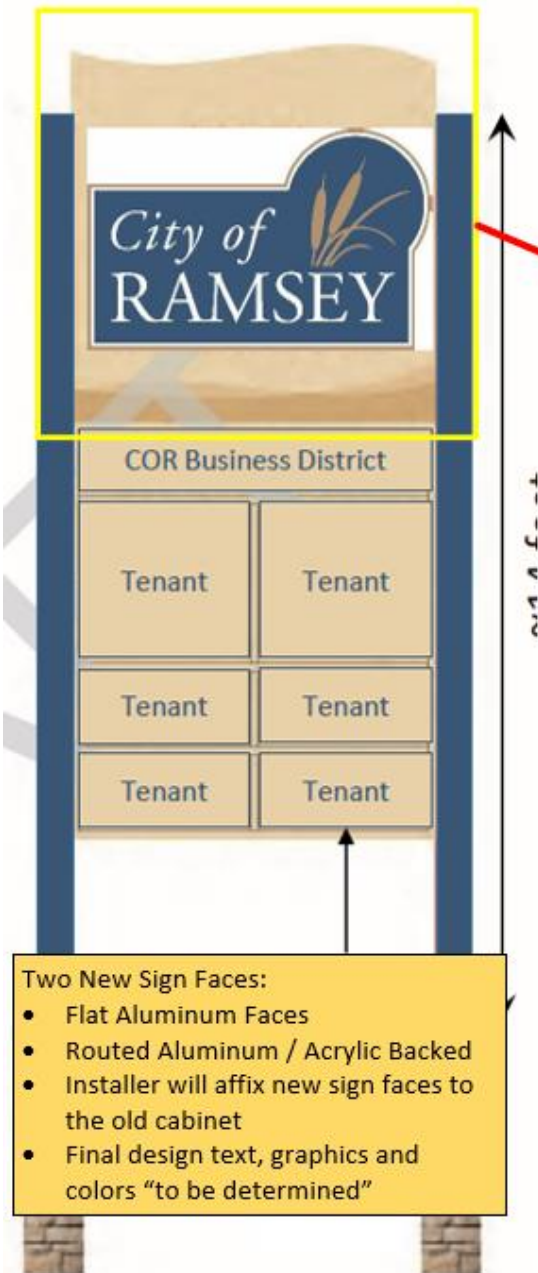


New Sign Faces

Paint Sign Structure

New Polycarbonate Sign Faces





City of Ramsey

Quote Estimate: Non-EMC Monument Sign

Sign Components: Non-EMC Monument Sign	Quote	Description
Non-EMC Sign: New Flat Sign Faces - Upper Sign Cabinet	\$ 2,810.00	Flat Routed Aluminum Sign Faces / Acrylic Backed. Installed onto existing sign cabinet.
Non-EMC Sign: New Tenant Sign Faces - Lower Sign Cabinet	\$ 3,550.00	New polycarbonate Tenant Panels. Sized to fit existing sign.
Installation		All Installation Estimates Are Provided at Cost.
Non-EMC Sign: Installation	\$ 2,000.00	Includes replacement of all tenant sign faces and new upper sign cabinet faces.
Non-EMC Sign: Install LED Lighting into Upper Cabinet	\$ 1,500.00	LED light replacement into upper sign cabinet.
Non-EMC Sign: Install LED Lighting into Lower Cabinet	\$ 2,000.00	LED light replacement into lower sign cabinet.
Subtotal	\$ 11,860.00	
Sales Tax (7.125) (Assume City of Ramsey is Tax Exempt)		NA
Total	\$ 11,860.00	

Installation includes:

- > New Sign Faces for Upper Sign Cabinet
- > New LED Lighting for Upper and Lower Sign Cabinets
- > New Polycarbonate Tenant Panels for Lower Sign Cabinet
- > Permit Administration – Included (Permit Fees paid by Client)

Terms: 75% Deposit at time of Order
25% at Installation

LED SIGN BUYER'S GUIDE

MAKE DIGITAL ADVERTISING WORK FOR YOU



TGI FRIDAYS TIMES SQUARE

NEW YORK, NY

10mm XVS

6.2 MILLION
EXPOSURES PER YEAR

11' x 5'4"
6'5" x 46'11"



WHY THINK DIGITAL SIGNS

Happy Customers. That's not just our goal, it's our track record. To achieve it, we treat every organization we work with as if it were our own. From navigating local city codes, regulations, and permitting to installing your sign and creating your ongoing messages, Think Digital Signs helps organizations just like yours through the process of making digital signage part of their location's marketing strategy.

There is power in working with an expert. We live and breathe this technology every day, and we know the value of a well-placed message for attracting customers and connecting with your community. Our promise to you is that we will be the expert in your corner, every step of the way, from concept to a finished sign that works for you every day. And our goal is that you are as happy with your sign 10 years from now as the day it's installed.

WHY WATCHFIRE

That's why we've chosen Watchfire exclusively as our partner source for LED dynamic displays.

Watchfire's reputation for unmatched quality and reliability makes their LED signs a top choice for the most reputable sign dealers and designers in the industry. They engineer and design every aspect of their displays to help you grow your business. With more than 60,000 LED displays in operation, they have the experience and the expertise to put the most powerful advertising tool in the market to work for you.


PAGES	CONTENTS
2-3	COMMUNITY Education, Civic/Municipal, Medical, Professional Services, Worship
4-5	COMMERCIAL Automotive, Convenience Stores, Financial, Multi-tenant, Restaurants, Retail
6-7	ENTERTAINMENT Arts and Theater, Casinos, Hospitality, Sports and Convention Venues
8-9	EFFECTIVENESS How to get more impressions and reduce your advertising budget
10-11	QUALITY See why our design minimizes maintenance and enhances reliability
12-13	EASE OF USE How to easily plan, buy and operate your sign

HSHS MEDICAL GROUP
SPRINGFIELD, IL
10mm XVS
9.4 MILLION
EXPOSURES PER YEAR
3'5" x 7'3"

PriorityCare



*Experience
true care.*

 HSHS
Medical Group

COMMUNITY

“It has done more than just save us time and money. It has allowed us to present everyone with what’s going on in the community in a clear, interesting and ever-changing way. The sign provides us with visibility, it lets us change messages constantly, and it connects us with the community.”

WENDY GOODALE | PERRY AREA CHAMBER OF COMMERCE

“Lourdes Hospital installed a Watchfire digital display, and we have received many positive comments while promoting health-related topics. The sign is placed at the hospital’s main entry intersection, capitalizing on the estimated 70,000 weekly impressions from traffic on the main road.”

ANDREA BARKER | LOURDES HOSPITAL

“We have been able to tie sales of fundraising raffle tickets and visits directly to the new sign. It has given us a way to capture the attention of both residents and out of town visitors, so more people are being exposed to this gem of a museum.”

MIMI MEREDITH | COSMOSPHERE



COSMOSPHERE | HUTCHINSON, KS

10mm XVS 5'5" x 10'3"

SUNY | OSWEGO, NY

12mm 29" x 14'3"

ST. FRANCIS SCHOOL | AUSTIN, TX

10mm XVS 7'5" x 12'3"

For organizations and businesses, a Watchfire sign is the best, most cost-effective way to get messages across to the local community. No other form of advertising offers the same flexibility to quickly and responsively communicate with your audience. LED signs at churches, schools and municipal buildings often become landmarks in their communities. Visibility and public presence are vital to the success and strength of your organization. With a Watchfire sign, you can enhance your brand, broadcast your mission, and advertise upcoming events and schedule changes to thousands of people passing by your location every day.

HARRISBURG MALL
HARRISBURG, PA

16mm XVS

5.8 MILLION
EXPOSURES PER YEAR

27'4" x 11'



HARRISBURG MALL

COMMERCIAL

“Last year we had a 50% off sale in September and we only advertised it on our Watchfire sign out front. For the first time ever, we completely sold out of inventory. We knew the sign made a difference, but this sale confirmed that it was measurably effective.”

CHRIS FITCH | DEVITT'S NURSERY & SUPPLY

“We have seen a substantial increase in both accounts and loans. Having the opportunity to share what we have to offer has been so productive for our credit union. We are proud to communicate this through our new LED sign. We definitely consider this to be one of our most valuable assets.”

JEN SWANNE | WHITE ROSE CREDIT UNION

“This sign has clearly helped us to attract new tenants while also helping us to retain our existing ones. Our tenants have attributed an increase in foot traffic and sales directly to the eye-catching content on the LED messaging center. We feel that this investment has paid for itself already and will continue to be a huge benefit to us for years to come.”

BILL RUSSELL | HARRISBURG MALL



MONTGOMERY MALL | NORTH WALES, PA

19mm XVS 6'5" x 18'3"

BRENDON'S CATCH 23 | LOUISVILLE, KY

10mm XVS 10' x 3'

MIAMI TOWNSHIP | MILFORD, OH

19mm XVS 10' x 19'

For retailers, the competition from both online stores and those down the street is greater than ever. At the same time, the advertising landscape has shifted dramatically in recent years, away from old standards like newspapers, radio and television toward interactive digital advertising like LED signs. The cost-effectiveness of digital signs allows businesses to reduce advertising budgets while increasing audience reach. An LED sign is a great tool for advertising high profit products and services to customers who might not be aware of them.

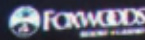
FOXWOODS CASINO
MASHANTUCKET, CT

19mm

9.5 MILLION
EXPOSURES PER YEAR

8'4" x 17'

MIKE EPPS
& FRIENDS
DECEMBER 31



MASHANTUCKET PEQUOT TRIBAL NATION

FOXWOODS

RESORT ♦ CASINO

TangerOutlets

RAINMAKER ENTRANCE



ENTERTAINMENT

“This Watchfire sign gives the Speedway a whole new avenue for race night advertising, and allows everyone to see the replays and marketing elements.”

MATT THOMAS | TRACKWIDE THUNDER, INC.

“Our traffic and visibility have increased significantly each month since the new sign was installed. The graphics have allowed our casino staff to alert the public to special events, holiday promotions and upcoming additions to our ever-expanding facility. We could not be more pleased with the results!”

STEPHAN BURRIS | IOWAY CASINO

“Watchfire message centers offer our movie theater marquee the energy and attractiveness our movies deserve while giving us a way to provide accurate information on our movies in a very vibrant way.”

MANAGER | AVALON THEATER



WAMESIT LANES | TEWKSBURY, MA

12mm 3'5" x 8'3"

SPA RESORT & CASINO | PALM SPRINGS, CA

10mm XVS 7'5" x 5'4"

IOWAY CASINO | CHANDLER, OK

19mm 7'5" x 12'3"

LED signs offer a vibrant, dynamic way to make your advertising come alive, with eye-catching graphics that grab the attention of passing traffic and pedestrians. A Watchfire sign gives your facility an updated look that is more than just an infrastructure improvement. Whether you have an upcoming event, a special giveaway, or lodging or dining specials to advertise, an LED sign is the most cost-effective and responsive way to communicate with your potential customers.

EFFECTIVENESS

Effective advertising is key to increasing foot traffic and boosting sales. Traditional advertising mediums, like newspaper, radio and television, are decreasing in reach while requiring costly production time. An LED sign offers an economical and profitable advertising tool for delivering messages to your customers 24 hours a day, 365 days a year. Watchfire signs are unmatched in responsiveness, ease of use and effectiveness. Compared with other mediums, our signs reduce production time and cost, and reach a wider audience.

Better Results That Cost Less

The true value of an advertisement is measured in cost per thousand impressions (CPM). The more people you can reach for less money, the better. LED sign advertising has a lower CPM than radio, newspaper or television, which brings you the greatest return on your investment.

Use the Impact of Instant Messaging

Newspaper, radio and television ads take valuable time and money to produce. Watchfire signs allow you to communicate instantly with your audience and tailor your messaging by time of day or other conditions. React to changing inventories and weather conditions with messages that grab the attention of consumers.

Make the Most of Your Advertising Budget

A Watchfire sign is a boost for your bottom line. You can reach a wider audience, which increases foot traffic and sales. With a simple change in how you allocate monthly advertising dollars, an LED sign becomes a very affordable option.

Successful Advertising is About Location, Location, Location

No other form of advertising allows you to communicate with customers who are in close proximity to your business. In a national research study, 59% of small business owners reported more sales after installing an on premise sign. Your local Watchfire sign dealer can help you choose the LED sign that's perfect for your location.

TRADITIONAL MEDIA FALLS

- 26%

Weekly time spent listening declined 26% from 2007 to 2012.



- 27%

Overall newspaper readership across all demographics has declined by over 27% since 2009.



LED SIGNS ON THE RISE

+20 Hours

The average time per week American travelers spend on the road driving the same route every day, according to a study by Arbitron.



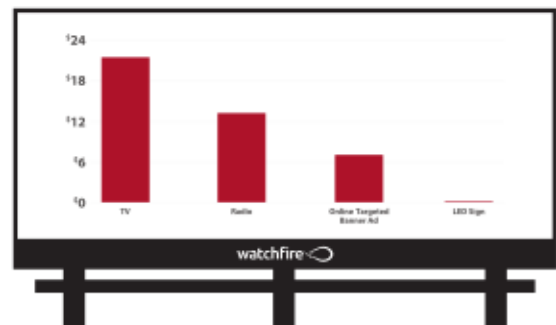
59%

The percentage of small business owners who reported more sales after installing an on premise sign, according to the National Signage Research & Education Conference.



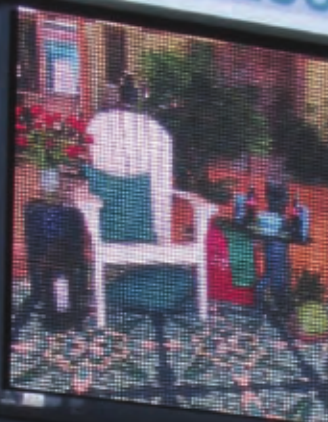
74¢ CPM

An LED sign's CPM (cost per thousand impressions) compared with \$7 for an online targeted banner ad, \$13 for radio and over \$22 for television.



ALLWEIN
CARPET ONE

FLOOR & HOME



New For Spring

Indoor/
Outdoor
Area Rugs

watchfire

1475

"We do other advertising, but our Watchfire sign performs better at getting customers into the store, hands down."

Sue Lane | Sales Manager, Allwein Carpet One

QUALITY

Watchfire wants your display to look and perform great, not just on day one, but for its lifetime. With our engineering and manufacturing teams under one roof, we continuously evaluate and streamline our processes to give you the very best products and service in the industry. We focus on minimizing your cost of ownership and maximizing your return on investment.

Built Strong

Our signs are built to withstand the most severe weather conditions. Full silicone encapsulation protects every Watchfire module from salt, humidity, wind, rain, ice and sand. Our displays are subjected to extensive in-house environmental and electrical testing to meet our high standards.

Low Maintenance

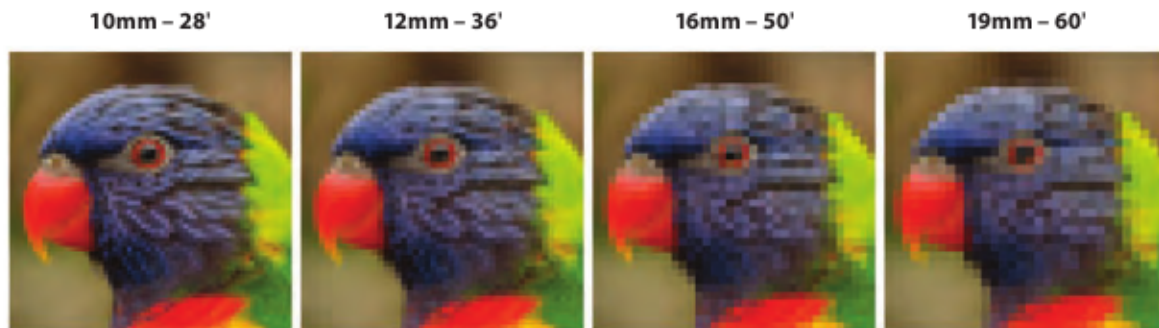
We design our signs with superior components for energy efficiency to keep your operating costs low. Our patented front ventilation design cools the sign cabinet without the use of costly air conditioners and filters that need to be replaced regularly.

Vibrant, Crisp Images

The quality of your messaging depends on the quality of your display. LED signs with blank modules or tiling can disrupt your content and negatively affect your brand. Our unique color and brightness calibration ensures that your Watchfire sign will display the most beautiful and vibrant images, pixel by pixel, for years to come.

Peace of Mind

Watchfire has been in the outdoor sign business since 1932. We offer a full 5-year parts warranty, which represents the least we will do for our customers. We offer a 10-year guarantee on exact replacement parts, so we stock parts for a minimum of 10 years after the last model ships.



Sign Resolutions and Minimum Viewing Distance

Character Height	5"	10"	12"	15"	18"	24"	30"	36"
Max. Viewing Range	250'	500'	600'	750'	900'	1050'	1500'	1800'
Max. View Time at 30 MPH	5 sec.	11 sec.	14 sec.	17 sec.	21 sec.	24 sec.	34 sec.	41 sec.
Max. View Time at 55 MPH	3 sec.	6 sec.	7 sec.	9 sec.	10 sec.	12 sec.	17 sec.	21 sec.

USSC Legibility Study states 1" sign characters are readable at a distance of approximately 30'.

QUALITY THAT MATTERS



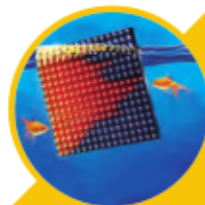
*Performance at
Extreme Temperatures*



*Reliable Operation,
Minimal Failure Points*



*Precision-Mitered
Corners*



Full Silicone Encapsulation



Salt Fog Testing



EASE OF USE

Watchfire's employees are a critical part of our legendary quality and service. Our extensive history in this industry shapes every aspect of our engineering, design and manufacturing processes to give you a product that delivers. We build our signs with the highest quality components to offer you world class products and support. We work with a network of experienced and reputable sign dealer partners who are passionate about providing you with the best advertising tool to grow your business. Our focus is to work with companies large and small, to provide messaging solutions tailored to every unique situation.

Design for Impact

We design our proprietary Ignite content management system to make creating content for your sign as straightforward and simple as possible. Ignite gives you the tools you need to design the most effective messages, and we offer complimentary software training with every purchase.

Choosing the Right Sign

Our sign dealer partners have the expertise to help you choose the sign that's right for your business, budget and location. Watchfire is here to provide the best quality sign on the market and share best practices that will make the most of your sign purchase.



CREATE



SCHEDULE



UPDATE

Our easy-to-use Ignite content management system simplifies message creation and scheduling. Data feed integration, advanced diagnostics and a cloud-based option make Ignite more than just a content scheduler.

Fast, Secure Connection

Uploading content to your sign quickly and securely is critical for connecting with your audience. Watchfire's 4G Wireless requires no additional fiber or cable installation, and gives you a turn-key solution for updating your sign from any internet-connected device.

A Trusted Partner

With more than 85 years in business, we are experts in delivering world-class customer service and support. We're known for building strong, long-term relationships. Watchfire and our network of certified service technicians are here to support you for the life of your signs.



When you are researching which sign model is best for your location, arrange an on-site demo with a Watchfire representative so you can compare different signs at your location.



“From day one, Watchfire was willing to work closely with us on the design, engineering, and content development of this piece. Almost one year into the project, and we couldn’t be more pleased with the result. We are proud to have worked with Watchfire to make this project a reality.”

Lili Huston | Manager, Public Studio



952-456-2575

ThinkDigitalSigns.com



Ready to put a Watchfire sign to work for you? Call 800-637-2645 or talk to your Watchfire representative.
630026 | ©2017 Watchfire Signs | Danville, Illinois, USA



Think Digital Signs
 7760 France Avenue S
 Suite 1100
 Edina, MN 55435

Estimate

Date	Invoice #
6/21/2019	125

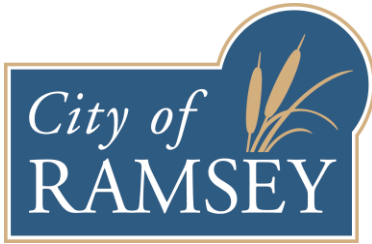
Bill To
City of Ramsey Chloe McGuire Brigl 7550 Sunwood Drive NW Ramsey, MN 55303

Terms	Warranty
75% Deposit / 25% at Install	

Item	Description	Qty	Rate	Amount
Foundation	Repair Damaged Foundation and Sign Monument Project Includes: > Removal of damaged brick and framing with disposal. > New stone at the bottom of the monument to match stone above it. > Repair stone and structural support of the upper portion of existing stone. > New framing and supports for lower portion of monument. > Plywood forming to support new brick/stone around bottom of monument. > New brick around bottom of the monument. > We will work with client to choose brick/stone. > New metal top cap around bottom portion of monument. > Removal and cleanup. > Reroute electrical if required.		29,000.00	29,000.00

Subtotal			\$29,000.00
Sales Tax (7.125%)			\$0.00
Total			\$29,000.00

Phone #	E-mail
952-456-2575	mattduffy@thinkdigitalsigns.com



7550 Sunwood Drive NW • Ramsey, MN 55303

City Hall: 763.427.1410 • Fax: 763.427.5543

www.cityoframsey.com

Scope of Work for Highway 10 Monument Sign Refurbish

Summary: The City of Ramsey Highway 10 Sign near the Northstar Commuter Rail stop with digital display boards on both sides, and update with current City branding.

Items to be included in proposal:

1. Remove northbound and southbound existing faces from cabinet
2. Replace top portion of sign with "City of Ramsey" logo
3. Backlight logo with LEDs
4. Remove existing display board
5. Remove tenant panels
6. Replace tenant panels with an 11 x 11 dynamic display from Daktronics or Watchfire (16mm) on both north and southbound sides of sign
7. Include 5 year warranty on parts and labor
8. Include all hookup and connection costs
9. Replace stone wrap on northbound and southbound sides of sign
10. Remove all secondary stone pilaster and replace with properly engineered load path/base

Please quote replacement of stonework and base wrap separately from refurbish for insurance purposes.



**Tim Gladhill, AICP
City of Ramsey
7550 Sunwood Drive NW
Ramsey, MN
55303**

5/31/2019

Dear Mr. Gladhill,

As requested, Kyle Olson, Associate Partner of BKV Group, visited Ramsey City Hall on May 23rd, 2019 to evaluate the City owned sign along Highway 10 that was damaged by a vehicle. Tim Gladhill, City of Ramsey, provided existing documentation of the sign consisting of sketches and structural calculations for the primary structure and foundation. Chloe Brigl, City of Ramsey, provided access to the sign and accompanied Kyle for observation.

Primary sign structure consists of two cantilevered HSS12x12x1/2 steel tube columns that are embedded into concrete piers. At least one horizontal steel tube connecting the two columns was observed above the area of damage that occurred. Secondary framing supporting the cladding consists of 2x wood members and plywood sheathing. Secondary framing is supported entirely from the two primary columns with miscellaneous steel angle pieces connecting the wood framing to the steel columns. There is a full-height pilaster of stone veneer adhered to the secondary wood framing on the side of the sign opposite the highway.

Cladding and secondary framing located at grade and between the primary steel tube columns was heavily damaged, requiring removal and/or replacement. The bottom section of the stone pilaster was rotated due to vehicle impact. Primary structure (steel HSS) was not damaged.

Secondary framing of the pilaster was only partially visible. Based on observations made, it could not be determined if the secondary framing supporting the pilaster was constructed with a properly engineered load path to resolve all possible load conditions into grade. Considering the damage observed to the bottom of the pilaster, BKV Group recommends complete removal and/or replacement of the pilaster.

Sincerely,

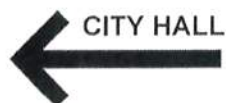


Kyle Olson, PE, SE

Senior Structural Engineer, Associate Partner

BKV Group





410 93rd Ave.™
Coon Rapids, MN 55432
763.786.5545

DATE: 4.25.11

SALESMAN: Tim Olson

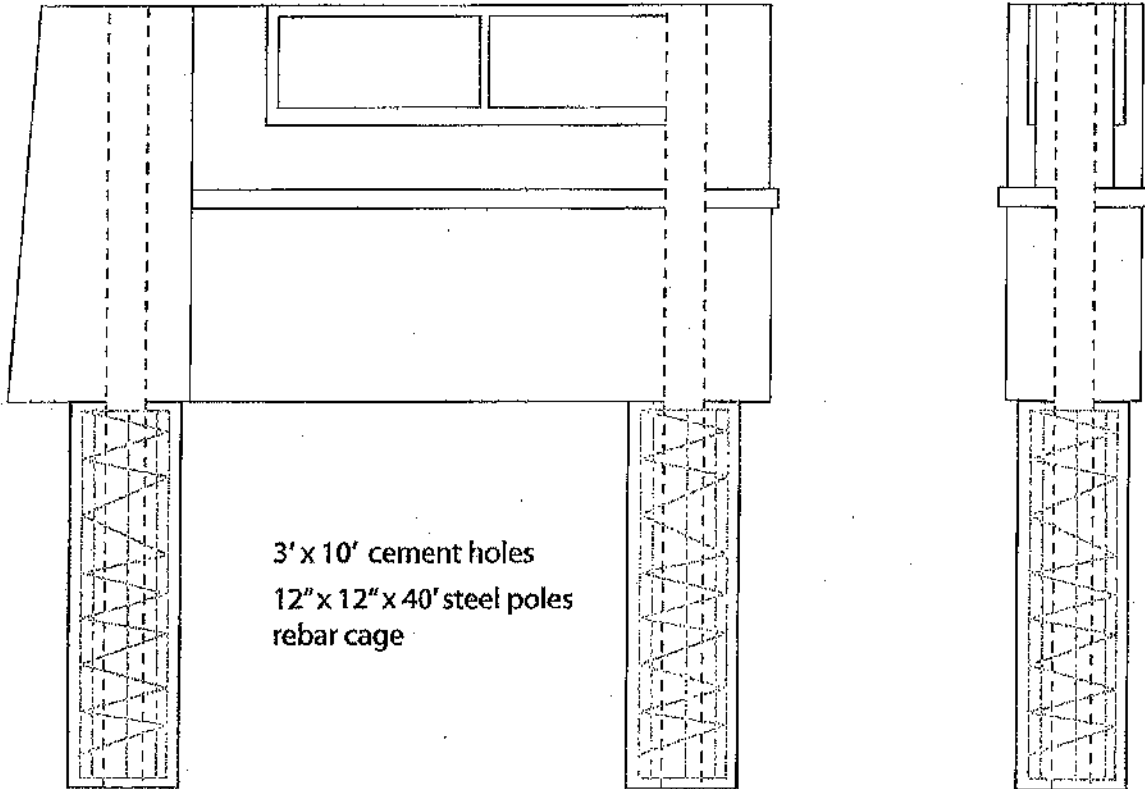
LOCATION: Ramsey

NOTES: All stone is Boulder
Creek Stone Products

These plans are the exclusive property of DeMars Signs Inc. and are the result of the original work of its employees. They are submitted to your firm for the sole purpose of your approval, assuming the signage will be manufactured by DeMars Signs Inc. Artwork and design may not be distributed outside your firm without written consent from DeMars Signs Inc. Use of this artwork and/or design without written consent is prohibited; DeMars Signs Inc. reserves the right to pursue legal action in violation of this agreement. This may include, but is not limited to: a) Reimbursement for creating above drawing. b) Any associated legal fees.

CUSTOMER APPROVAL X

footing



410 93rd Ave.™
Coon Rapids, MN 55432
763.786.5545

DATE: 4.25.11

SALESMAN: Tim Olson

LOCATION: Ramsey

NOTES:

These plans are the exclusive property of DeMars Signs Inc. and are the result of the original work of its employees. They are submitted to your firm for the sole purpose of your approval, assuming the signage will be manufactured by DeMars Signs Inc. Artwork and design may not be distributed outside your firm without written consent from DeMars Signs Inc. Use of this artwork and/or design without written consent is prohibited; DeMars Signs Inc. reserves the right to pursue legal action in violation of this agreement. This may include, but is not limited to: a) Reimbursement for creating above drawing, b) Any associated legal fees.

CUSTOMER APPROVAL X

SHT 1 of 3R

RAMSEY SIGN
ALTERNATE DESIGN

6-20-11

J.J.HILL

USE 2 HOLES AT 3'-0" DIAMETER

$$x^4 - \frac{8(14989)}{2(960)}x^2 - \frac{12(14989)(1376)}{2(960)} - \left[\frac{2(14989)}{2(960)} \right]^2 = 0$$

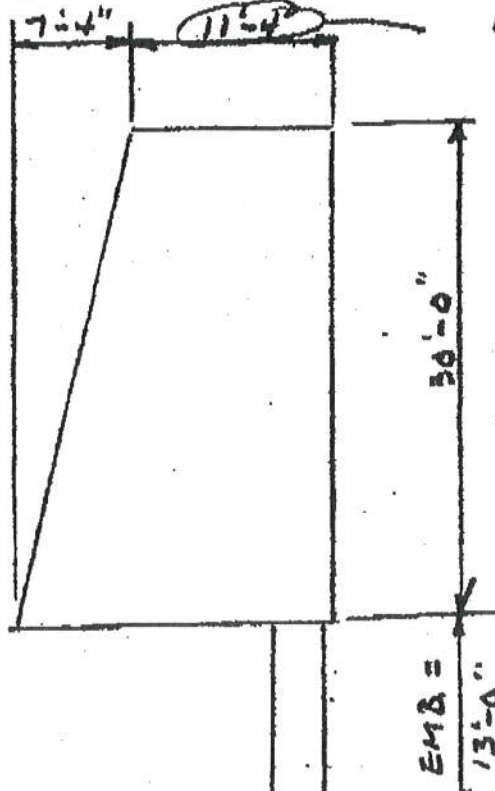
$$x^4 - 62.45x^2 - 1290.93x - 243.78 = 0$$

$$12 \rightarrow -3992 \quad 12.5 \rightarrow -1724 \quad 13 \rightarrow 981 \quad 12.173 \rightarrow 26.52$$

USE 2 @ 3'-0" ϕ BY 13' DEEP

RECOMMEND 2 @ 3'-0" HOLES, 13 FEET DEEP

DESIGN OF 12" x 12" x 1/2" TUBE STEEL COLUMNS
USED FORCE OVER 2 COLUMNS -- VALUES FOR
DESIGN ARE STILL OK.



if $17'-6"$, $P = 14,700 \frac{2}{15} + 910 \frac{2}{10} = 15,610$

$$M = 220,500 + 9100 = 229,600 \text{ lb}$$

$$SM_{REQD} = 137.8 \text{ in}^3$$

$$2 @ 12" \times 12" \times \frac{1}{2}" \text{ TUBES, } SM = 169.3 \text{ in}^3 \text{ OK}$$

$$\text{HOLES } L = 14.71'$$

$$x^4 - 65.04x^2 - 1435x - 264.4 = 0$$

$$6x \quad x = 13' \rightarrow -1350$$

$$13.25 \rightarrow +125.4$$

$$13.17 \rightarrow -376$$

CALL 3'-0" HOLES @

13'-0" DEEP

CHECK TUBE SIZE
MOMENT

24 X 24 X 1/2" TUBE

$$M = 14,989(13.78) = 206,548 \text{ IN}^2$$

$$S_{M \text{ REQD}} = \frac{206,548(12)}{24,000} = 124.0 \text{ IN}^3$$

$$S_{M \text{ ACT}} = \frac{24^4 - 23^4}{6(24)} = 360.6 \text{ IN}^3$$

20 X 20 X 1/2" TUBE

$$S_M = \frac{20^4 - 19^4}{6(20)} = 247.9 \text{ IN}^3$$

12 X 12 X 1/2" TUBE

$$S_M = 84.15 \text{ IN}^3 \times 2 = 168.3 > 124.0 \text{ IN}^3 \text{ OK}$$

12 X 12 X 3/8" TUBE

$$S_M = 65.52 \text{ OR } 2 \text{ COLS} = 131 \text{ IN}^3 > 124 \text{ IN}^3 \text{ OK}$$

SHEAR

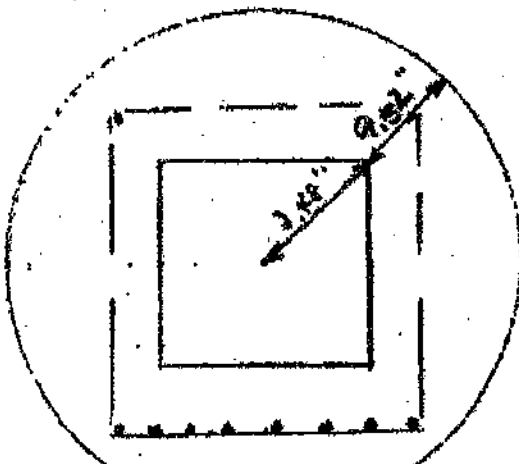
$$V = 14,989 \text{ LBS}$$

12 X 12 X 1/2" TUBE $f_s = \frac{14,989}{22.4} = 669 \text{ PSI} < 12,000 \text{ PSI} \text{ OK}$

12 X 12 X 3/8" TUBE $f_s = 877 \text{ PSI} < 12,000 \text{ PSI} \text{ OK}$

DUE TO MORE LOAD ON ONE COLUMN, RECOMMEND
12" X 12" X 1/2" TUBE FOR COLUMNS

FOOTING STEEL



SHEAR ON CONCRETE

$$\left(\frac{14,989}{2}\right) / 12 \times 9.52 = 65.60 \text{ PSI} < 75$$

USE 4000 PSI CONCRETE

BENDING IN FOOTING

$$M = \left(\frac{14,989}{2}\right)(13.78) = 103,274$$

$$A_s \text{ REQD} = \frac{103,274(12)}{24,000\left(\frac{7}{8}\right)(22)} = 2.99 \text{ IN}^2$$

#5 - 2.75 = 2 #5 USE 8 #5

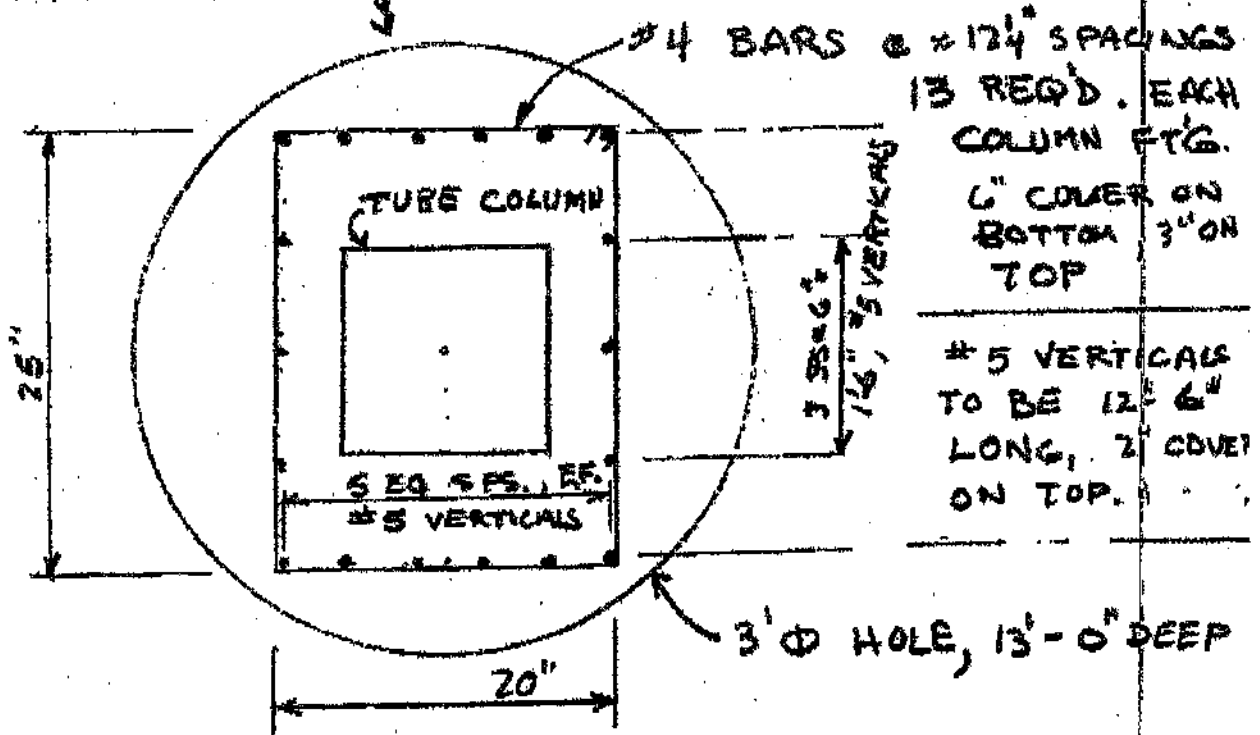
SHT 3 of 3 R

RAMSAY SIGN

K 6-2011

J.J. HILL

IF CAGE IS MADE 20" BY 26", NEED 6-#5 BARS IN MAIN FACES



PLAN OF FOOTING CAGES

1. ALL REBARS TO BE GRADE 60.
2. CONCRETE TO BE 4000 PSI STRENGTH
3. FOOTING HOLES TO BE 3'-0" IN DIAMETER, 13'-0" DEEP.

I CERTIFY THAT I HAVE MADE THIS DESIGN AND DRAWINGS, AND A DULY REGISTERED ENGINEER IN MINNESOTA

James J. Hill

REG # 7395