Form C-104
Rev. 10/07

VALUE ENGINEERING CHANGE PROPOSAL
MISSOURI DEPARTMENT OF TRANSPORTATION

Date 08-18-08

Contract ID Little Blue Parkway (39th St to R.D Mize) Job No. DP 3379-(418)

County Jackson Route

Original Bid Cost 19495881.79

Contractor Radmacher Brothers Excavating Co. Inc.

By Ed Andres

Designed By Harrington & Courtelyou

Phone 816-540-3614

VECP # 10-55

VECP ☐ or VECP/PDU ☐

1. Description of existing requirements and proposed change(s). Advantages/Disadvantages

Eliminating pile casings at end bents of bridges adding additional H piles and monitoring settlement. The advantage will decrease contract amount and may save construction time.

2. Estimate of reduction in construction costs. 200,049.90

3. Prediction of any effects the proposed change(s) will have on other department costs, such as maintenance and operations.

It will have no impact

4. Anticipated date for submittal of detailed change(s) of items required by Section 104.6 of the Specifications.

08-01-08
(date)

5. Deadline for issuing a change order to obtain maximum cost reduction, noting the effect of contract completion time or delivery schedule.

08-15-08 (date) Increase in cost of piles (effect)

6. Dates of any previous or concurrent submission of the same proposal.

None
(date and/or dates)

RECEIVED
MAY 06 2010
D4 CONSTRUCTION AND MATERIALS

MEMORANDUM

Missouri Department of Transportation
Construction
District 4

TO: Dennis Bryant-cm

FROM: Mike Thomas MT
District Construction Liaison

DATE: May 14, 2010

SUBJECT: Value Engineering Change Proposal
Project No. DP-3379 (418)
Little Blue Parkway Phase 4
Independence, Missouri

Attached for your review and approval is a Value Engineering Change Proposal from Radmacher Brothers Excavating Co., Inc. and the City of Independence, Missouri.

This VECP will eliminate the pile casings at the end bents and adding additional H Pile and Settlement Monitoring of the KCS Railway Bridge, Northbound Crackerneck Creek Bridge and Southbound Crackerneck Creek Bridge. The proposal will decrease the contract costs by $200,049.90

Although this VECP was proposed by the contractor and approved by the City of Independence in August of 2008, we just became aware of it recently. We have examined the proposal and documents as presented to the City of Independence and have requested and received additional documentation to justify the acceptance of this proposal. We have concluded that this VECP is valid and justifiable and would recommend approval of this VECP.

Please contact me at 816-622-6527 if you have any questions.

MRT
J:\bentlj\thomam1\Correspondence\Independence\DP-3379 (418)\VECP
Attachments

OK
DGD

Additional Comments:

***** Portion Below This Line To Be Filled Out by MoDOT *****

Comments: The City of Independence agrees with the proposed changes in the attached VECP and recommend approval.

John Powell — 5-6-10

Submitted By ~~Resident Engineer~~ City Of Independence — Date

Comments: I have reviewed and evaluated the attached VECP and have found it valid and justifiable. I recommend it's approval

Michael Thomas, D4 DCE, 5/14/10

I CONCUR WITH THE RECOMMENDATION OF THE DCE

☑ **Approval Recommended**

☐ **Rejection Recommended**

Elizabeth A. Hunt (PW) — 5/14/10

District Engineer — Date

Comments:

☒ **Approval**

☐ **Rejection**

David D. Goodwin by SG — 6-2-10

State Construction and Materials Engineer — Date

Distribution: Resident Engineer, Project Manager, District Operations Engineer, State Construction and Materials Engineer
*Value Engineering Administrator – *MoDOT, P.O. Box 270, Jefferson City, MO 65102

Value Engineering Proposal. dot

RECEIVED
MAY 06 2010
D4 CONSTRUCTION AND MATERIALS

Radmacher Brothers
Excavating Company, Inc.

2201 N. 7 Highway, Suite B * Pleasant Hill, MO 64080 * 816 540-3614 * 816 540-4444 fax

August 15, 2008

Shar Dalmighani
City of Independence, Missouri
Public Works Department
111 East Maple Street
Independence, Missouri 64050

RE: Little Blue Parkway VE Proposal

Dear Shar

As discussed in today's meeting, we are revising our pricing to reflect one unit price for the end bent piles and one unit price for the end bent pre bore. In addition, Radmacher Brothers agrees to limit our portion of the VE cost savings to a maximum of $100,000.00. This is due to the potential underrun of the piles.

We have also enclosed Harrington and Corteyou's Certificate of Liability Insurance, letter stating the method they intend the piles be tested to assure bearing, and their assurance that they will monitor Geotechnology's testing if Burns and McDonald declines.

If you have any questions please call.

Sincerely

Radmacher Brothers Excavating

Ed Andres

VALUE ENGINEERING COSTS

Line	Bid Item	Description	Unit	Original Quantity	VE Quantity	Unit Price	Cost Total
VE1	131.	Structural Steel Piles (12 in)	LF	3112	0	38.30	-119,189.60
VE1	131A.	End Bents Structural Steel Piles	LF	0	3,536	51.30	181,396.80
VE2	134.	Pre-Bore for Piling	LF	2686	0	19.00	-51,034.00
VE2	134A.	Pre-Bore for Piling (End Bents no Casings)	LF	0	1,106	26.80	29,640.80
VE3	135.	Rigid Pipe Pile Casings	LF	2686	0	55.70	-149,610.20
VE4	137.	Pile Point Reinforcement	EA	0	5	100.00	500.00
VE5	160.	Structural Steel Piles (12 in)	LF	2149	0	38.30	-82,306.70
VE5	160A.	End Bents Structural Steel Piles	LF	0	2,506	51.30	128,557.80
VE6	163.	Pre-Bore for Piling	LF	1872	0	19.00	-35,568.00
VE6	163A.	Pre-Bore for Piling (End Bents no Casings)	LF	0	392	26.80	10,505.60
VE7	164.	Rigid Pipe Pile Casings	LF	1872	0	55.70	-104,270.40
VE8	165.	Pile Point Reinforcement	EA	0	4	100.00	400.00
VE9	185.	Structural Steel Piles (12 in)	LF	1725	0	38.30	-66,067.50
VE9	185A.	End Bents Structural Steel Piles	LF	0	2,160	51.30	110,808.00
VE10	188.	Pre-Bore for Piling	LF	1655	0	19.00	-31,445.00
VE10	188A.	Pre-Bore for Piling (End Bents no Casings)	LF	0	370	26.80	9,916.00
VE11	189.	Rigid Pipe Pile Casings	LF	1655	0	55.70	-92,183.50
VE12	190.	Pile Point Reinforcement	EA	0	5	100.00	500.00
VE13	Add	Engineering, Pre Bore Mobs, Sand	LS	0	1	59,400.00	59,400.00
TOTAL PROJECTED COST SAVINGS							**-200,049.90**

"Sheldon Hannah"
<SHannah@indepmo.org>
05/04/2010 11:06 AM

To <Michael.Thomas@modot.mo.gov>
cc
bcc
Subject Fwd: RE: Re: VE unit price changes STP-3379(418)

1 attachment

DOC050310.pdf

Requested data.

>>> Ed Andres <eandres@radbroex.com> 5/4/2010 8:48 AM >>>
Sheldon and Mike

Item 1 pertaining to the ramps and spoil removal, The original method had the auger mounted on a crane that would sit 75' away from the casings. Ramps would not be needed. The spoils would be wasted on the slopes as the auger would fill up the crane would lift the auger and turn toward the slopes and waste the spoils. The traditional method has a truck mounted auger that would waste the spoils at the hole. We had several of our own workers constantly with the subcontractor while the operation is underway.

Item 2 we have included the invoices for the piles. The slight difference in pile price is to rent an offsite storage yard, Load and unload the piles at that site and haul them to the actual job. Bond costs, overhead costs and profit have to be accounted for also.

Ed Andres
Vice President
Radmacher Brothers Excavating Company Inc.
2201 North State Route 7 Suite B
Pleasant Hill, Missouri 64080
Office: 816-540-3614 Fax: 816-540-4444 Mobile: 816-215-8353

From: Sheldon Hannah [mailto:SHannah@indepmo.org]
Sent: Monday, May 03, 2010 2:17 PM
To: Ed Andres
Subject: Fwd: Re: VE unit price changes STP-3379(418)

Ed,

please provide data requested

Sheldon

>>> <Michael.Thomas@modot.mo.gov> 5/3/2010 1:21 PM >>>
Sheldon,

I am needing some additional justification on a couple of the items in the attachment you sent last week. In Radmacher's breakdown of increased costs, they indicated that additional costs would be incurred in the Pre-Bore due to building and removing ramps and for removing spoils created by Hayes. In our way of thinking, the ramps would have had to be built and removed with the original method as well. The same with spoil removal. Can you have Radmacher provide us a reason why these additional charges would have been incurred by them?

One other thing.., about the additional pile cutoff of approx. 10' per pile, it would appear that the invoice cost of the piles is $27.75 per foot. We have no way of knowing what their costs were unless they supply an invoice from the supplier for those piles. If the $27.75 is more than the invoice cost, they would need to provide us a reason why they are proposing a cost that is greater than the invoice price.

Once we receive this information, we will continue to evaluate the VE Proposal.

Let me know if you have any questions.

Thanks,
Mike Thomas
District Construction Liaison
816.622.6527 Office
816.769.8393 Cell
michael.thomas@modot.mo.gov

"Sheldon Hannah"
<SHannah@indepmo.org>

04/28/2010 04:31 PM

To <Michael.Thomas@modot.mo.gov>
cc "John Powell" <JPOWELL@indepmo.org>, "Shar Dilmaghani" <SDILMAGHANI@indepmo.org>
Subje Re: VE unit price changes STP-3379(418)
ct

Radmacher Brothers
Excavating Company, Inc.

2201 N. 7 Highway, Suite B * Pleasant Hill, MO 64080 * 816 540-3614 * 816 540-4444 fax

April 28, 2008

Sheldon Hannah
City of Independence, Missouri
Public Works Department
111 East Maple Street
Independence, Missouri 64050

RE: Little Blue Parkway VE Proposal

Dear Sheldon

As previously discussed, it was determined that two new bid items would be established that would eliminate 3 bid items for the unit costs for the piles. The original pre bore price was for a self performed continuous boring operation that was inside the pipe casing. The new pre bore price is a subcontracted price that uses the conventional boring machine that is for less than 30% the quantity that included numerous mobilizations for the subcontractor.

The original pile price had the pile welded on the ground and dropped into the pipe casing to top of rock, then driven to refusal. Exact lengths of piles could be determined thus reducing the amount of cutoff. The new pile price had to be driven between 72' and 105' through existing material, and then driven to refusal. In addition, the pile had to be welded in the vertical position and extra length had to be incorporated due to the possible variance in shale elevation.

This value engineering proposal saved the city well over $200,000.00.

Breakdown Follows.

If you have any questions please call.

Sincerely

Radmacher Brothers Excavating

Ed Andres

Pre Boring Price						
			1,868	LF	22.00	41,096.00
Build six ramps for hayes access		Operator	18	Hours	53.00	954.00
3 Hours per Ramp	Remove & Replace	Equipment	18	Hours	80.00	1,440.00
Remove Spoils	6 Bents 8 Hours Each	Operator	48	Hours	53.00	2,544.00
1 Day Per Bent	6 Bents 8 Hours Each	Equipment	48	Hours	80.00	3,840.00
	Total Cost					49,874.00
	Bid		1,868	LF	26.80	50,062.40
Added Cost for Piles VE BID Price $51.30 less Contract Bid Price 38.30						
Weld Piles in the air instead of shop weld		Additional costs				
1 Hours per Weld		Welder	89	Hours	60.00	5,340.00
89 Piles		Crane Operator	89	Hours	53.00	4,717.00
		Laborer	89	Hours	49.00	4,361.00
		Crane	89	Hours	210.00	18,690.00
		Welding Machine	89	Hours	20.00	1,780.00
Additional Pile Cutoff 10' per pile (Approx. 10% Loss)			890	LF	27.75	24,697.50
Compared to knowing exact lengths Because of pile casing.						
Additional Time to Drive pile						
Instead of dropping into hole 45 Minutes per Pile						
	89 Piles 45 Minutes per pile 2 Operators	Operators	134	Hours	53.00	7,102.00
	89 Piles 45 Minutes per pile 3 Laborers	Laborers	201	Hours	49.00	9,849.00
	89 Piles 45 Minutes per pile 2 Carpenters	Carpenters	134	Hours	60.00	8,040.00
	89 Piles 45 Minutes per pile 1 Crane	Crane	67	Hours	210.00	14,070.00
	89 Piles 45 Minutes per pile 2 Pile Driver	Pile Driver	67	Hours	40.00	2,680.00
	89 Piles 45 Minutes per pile 1 Backhoe	330 Backhoe	67	Hours	80.00	5,360.00
						106,686.50
Added Cost for Piles $51.30 less 38.30			8,202	LF	13.00	106,626.00

Radmacher Brothers Excavating
501 South 7 Highway, Pleasant Hill, MO 64080 Phone: 540-3614 FAX: 540-4444

SUBCONTRACT PAYMENT ESTIMATE

Project: Little Blue Parkway

Owner's Est. #: 17

Subcontractor: *Hayes Drilling, Inc.*
15525 South Mahaffie
Olathe, KS 66062

Pay Period: March 31, 2010
Date: April 20, 2010
State Project Number:
Radmacher Project #: #801
Radmacher Cost Code:

Date of Award: June 16, 2008

Date to Proceed: July 7, 2008

Contract Completion: 540 Calendar Days

Completion Date: December 31, 2009

Time Extension: None to Date

Days to Date: 9

LINE ITEM #	ITEM NUMBER	DESCRIPTION OF WORK	Original Quantity	$ UNIT PRICE	UNIT	QUANT. THIS APP.	QUANT. TO DATE	% DONE TO DATE	$ TOTAL COMPLETE & STORED TO DATE
253C	253C	Pre Drill for Piling KCSRR Bridge	1,106	22.00	LF	67.4	1,067.4	97%	$23,482.80
255C	255C	Pre Drill for Piling NB Crackerneck	392	22.00	LF	0.0	368.3	94%	$8,102.60
257C	257C	Pre Drill for Piling SB Crackerneck	370	22.00	LF	0.0	884.3	104%	$8,464.60
	Add	Drill Bit for obstacle	1	1,500.00	LS	0	1	100%	$1,500.00
	Add	Hourly Rate for obstacle	3	375.00	Hr	0	3	100%	$1,125.00

Original Contract Amount		41,096.00
Change Orders to Date (thru C.O.#___)		0.00
Current Contract Amount		41,096.00
Total Amount of Work to Date		42,665.00
Materials Stored		0.00
Net Amount of Work to Date		42,665.00
Less 5% to be Retained	1,868	2,133.25
Net Amount of this Estimate		40,531.75
Total Previous Payments to Contractor		39,123.09
BALANCE DUE CONTRACTOR		1,408.66

Approved by the Contractor:

By: Ed Andres Vice President

Date: April 20, 2010

Michael R Thomas/D4/MODOT
05/03/2010 01:21 PM

To "Sheldon Hannah" <SHannah@indepmo.org>
cc "John Powell" <JPOWELL@indepmo.org>, "Shar Dilmaghani" <SDILMAGHANI@indepmo.org>
bcc
Subject Re: VE unit price changes STP-3379(418)

Sheldon,

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Let me know if you have any questions.

Thanks,
Mike Thomas
District Construction Liaison
816.622.6527 Office
816.769.8393 Cell
michael.thomas@modot.mo.gov

"Sheldon Hannah" Mike 04/28/2010 04:32:08 PM

"Sheldon Hannah" <SHannah@indepmo.org>
04/28/2010 04:31 PM

To <Michael.Thomas@modot.mo.gov>
cc "John Powell" <JPOWELL@indepmo.org>, "Shar Dilmaghani" <SDILMAGHANI@indepmo.org>
Subject Re: VE unit price changes STP-3379(418)

Mike,

Attached is the data you requested;

Sheldon

>>> <Michael.Thomas@modot.mo.gov> 4/27/2010 1:23 PM >>>
Sheldon,

I have found out that I will need additional information from the contractor in order to satisfy the requirements for a VE proposal. We will need to get a copy of the computations from Radmacher that justified that an increase in price for the 12" Str. Steel piles was necessary. In addition to that , we will need to see the actual contract between Radmacher whoever the subcontractor is that is performing the pre-boring operations for them. Once we have these documents and comp. sheets, we will be able to make a determination on the VE proposal.

Let me know if you have any questions.

Thanks,
Mike Thomas
District Construction Liaison
816.622.6527 Office
816.769.8393 Cell
michael.thomas@modot.mo.gov

"Sheldon Hannah"
<SHannah@indepmo.org>

04/27/2010 06:46 AM

To <Michael.Thomas@modot.mo.gov>
cc "John Powell" <JPOWELL@indepmo.org>, "Shar Dilmaghani" <SDILMAGHANI@indepmo.org>
Subject VE unit price changes STP-3379(418)

Mike,

Attached is justification from the contractor as to why the unit prices for 12" Structural Steel Piles and Pre-bore for piling increased from the original contract unit prices.

When this was negotiated the contractor's reasoning was found to be fair and reasonable by the city.

Let me know if you need any think else or how I can be of help.

Sheldon drilling back up data

esteel I

oad, Parsippany, NJ 07054
0 Fax: (973) 428-8093
244-9576 / Tax ID. #22-2198913

- Structurals
- H Piles
- Sheet Piling
- Pipe Piling

REMIT TO: SKYLINE STEEL, LLC
P.O. Box 8500-9055, Philadelphia, PA 19178-9055

INVOICE NO.: B86938
~~DATE: 06/05/08~~

ACCOUNT NO.: ILRAD2

BILL TO:

RADMACHER BROTHERS EXCAVATING
2201 N. Y HIGHWAY
SUITE B
PLEASANT HILL, MO 64080

SHIP TO:

RADMACHER BROTHERS EXCAVATING
LITTLE BLUE PARKWAY
INDEPENDENCE, MO

ORDER DATE: 04/04/08
SALESMAN : 00JM
CUST. PO : LITTLE BLUE PARKWAY-ED
SHIP DATE : 06/05/08
SALES ORD : B86938

F.O.B. : Ship Pt Frt Allowed
SHIP VIA: TRUCK
TERMS : PREBILL NET 30 DAYS

34

NO.	QUANTITY	UOM	PART	DESCRIPTION	WEIGHT	PRICE	UOM	EXT PRICE
1	153	PCS	HP12053D.50	H-PILE 12 X 53# X 50' DOMESTIC A-572 GRADE 50	405450.00	50.4000	CWT	204,346.80
2	90	PCS	HP12053D.55	H-PILE 12 X 53# X 55' DOMESTIC A-572 GRADE 50	262350.00	50.8900	CWT	133,509.92
3	24	PCS	HP12053D.40	H-PILE 12 X 53# X 40' DOMESTIC A-572 GRADE 50	50880.00	50.4000	CWT	25,643.52
4	108	PCS	HP12053D.42	H-PILE 12 X 53# X 42' DOMESTIC A-572 GRADE 50	240408.00	50.7000	CWT	121,886.86
5	72	PCS	HP12053D.48	H-PILE 12 X 53# X 48' DOMESTIC A-572 GRADE 50	183168.00	50.7000	CWT	92,866.18
6	378	PCS	PPPAR12	PILE POINTS FOR 12" H-PILE PAR T		75.2000	EA	28,425.60
				TOTAL WT	1142256.00	SUB TOTAL		606,678.88
						AMOUNT DUE		606,678.88

801
6205 Hold for 30 days

RBON STEEL WARNING! *PARTICULATES MAY BE HARMFUL TO LUNGS* - REFER TO M.S.D.S.

606,678.88
- 28,425.60
578,253.28

578,253.28 / 1,142,256.00 = $0.506 / lb

0.506 × 53 = $26.82 / ft.

Charging $27.75 / ft.

CONTINGENT ITEM PRICE CHECK

Contract ID STP-3379 (418) Job No.

Route Little Blue Parkway, Ph. 4 County Jackson

Item Description Pile Point Reinforcement

Item Code 7027000 Proposed Price/Unit 100.00

Line Number 137, 165, 190 Units To Be Constructed 14

MoDOT Unit Bid Price Book Comparison:

Year 2009 Statewide Average Price 125.85 District 4 Average Price 171.27

Comparison With Prices On Other Area Projects:

Route County Job No. Price

Remarks: Proposed price is lower than the statewide and district average price for identical item of work. This is partial justification of the VE proposal by Radmacher Brothers.

Other Analysis/Considerations:
There is no cost increase in the Pile Point Reinforcements. The pile points included in the contract are $100 EA.

Is the proposed price approved? Yes By whom? Michael Thomas

Date approved/rejected 04/26/10 Contractor notified? NA

Responsible Person:	Michael Thomas
Date:	04/26/10

"Sheldon Hannah"
<SHannah@indepmo.org>
04/27/2010 06:46 AM

To <Michael.Thomas@modot.mo.gov>
cc "John Powell" <JPOWELL@indepmo.org>, "Shar Dilmaghani" <SDILMAGHANI@indepmo.org>
bcc
Subject VE unit price changes STP-3379(418)

1 attachment

VE unit cost change.doc

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When this was negotiated the contractor's reasoning was found to be fair and reasonable by the city.

Let me know if you need any think else or how I can be of help.

Sheldon

Radmacher Brothers
Excavating Company, Inc.

2201 N. 7 Highway, Suite B * Pleasant Hill, MO 64080 * 816 540-3614 * 816 540-4444 fax

April 26, 2008

Sheldon Hannah
City of Independence, Missouri
Public Works Department
111 East Maple Street
Independence, Missouri 64050

RE: Little Blue Parkway VE Proposal

Dear Sheldon

As previously discussed, it was determined that two new bid items would be established that would eliminate 3 bid items for the unit costs for the piles. The original pre bore price was for a self performed continuous boring operation that was inside the pipe casing. The new pre bore price is a subcontracted price that uses the conventional boring machine that is for less than 30% the quantity that included numerous mobilizations for the subcontractor.

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If you have any questions please call.

Sincerely

Radmacher Brothers Excavating

Ed Andres

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

City of Independence
Jackson County, Missouri

Little Blue Parkway – 39th Street to R.D. Mize Road

- Bridge over KCSRR and Selsa Road
- Northbound Bridge over Crackerneck Creek
- Southbound Bridge over Crackerneck Creek

The end bents for the three project bridges are founded on steel H-pile installed in steel pipe casing. The pipe casings protect the bearing H-pile from downdrag forces as the new embankment and the underlying soils settle.

The geotechnical report for the project states the maximum theoretical downdrag can be computed by applying 750 psf along the girth of the pile. The report also states that this force can be reduced to 75 psf after 90% of the settlement has occurred. For a 100 ft. pile, using 75 psf, the downdrag force is 15 tons.

The attached calculations were developed to determine how many additional piles would be needed if the pipe casings were eliminated and the capacity of each pile reduced by 15 tons.

STATE OF MISSOURI
DOUGLAS M. WALTEMATH
NUMBER E-18270
REGISTERED PROFESSIONAL ENGINEER

7/18/08

July 18, 2008

Ed Andres said they will prebore thru the new embankment. Check Ewell's number of piles, using the reduced downdrag. Prebore depths were estimated by scaling the contract plans.

KRSRR/Selsa Road: EB1: Reduced downdrag (RD) = 22(.075)4 = 6.6

$$\#Piles = \frac{.95(2800)}{110+6.6} = 22.8$$

Use 23 ∴ +3 piles

EB2: RD = 30(.075)4 = 9.0 K/pile

$$\#Piles = \frac{.95(2540)}{110+9.0} = 20.1$$

Use 20 ∴ +2 piles

NB-Bracker-neck: EB1: RD = 20(.075)4 = 6.0 K/pile

$$\#Pile = \frac{.95(1680)}{110+6.0} = 13.8$$

Use 14 ∴ +2 Piles

EB2: RD = 8(.075)4 = 2.4 K/pile

$$\#Pile = \frac{.95(1680)}{110+2.4} = 14.2$$

Use 14 ∴ +2 Piles (1.4% o.s.)

SB-Crackerneck: EB1: RD = 20(.075)4 = 6.0 K/pile

$$\#Pile = \frac{1400}{110+6.0} = 12.06$$

Use 12 ∴ +2 Pile

EB2: RD = 10(.075)4 = 3.0 K/pile

$$\#Pile = \frac{1400}{110+3} = 12.4$$

Use 13 ∴ +3 pile

MADE: DMM DATE: 9/08 CHECKED: _____ DATE: _____	HARRINGTON & CORTELYOU, INC. Consulting Engineers	JOB NO: 1038-09 SECTION: _____ PAGE NO.: 1
Little Blue Parkway VE Study	Prebore	

Calculate Service Loads to End Bent Piles.

4- Span Type IV PS girder Bridge.

Spans along ℄ Little Blue Pkwy:
90.75' - 92.0' - 92.0' - 76.0'
Radius along ℄ " " " "
1833.00'
Left ahead skew (Varies)
Berts are parallel.

98'-8" out to out of deck:
2 - 33'-6" clear roadways.
10' wide median w/ 6" curbs
(11'-0 wide btwl)
1'-2" wide solid barrier
with form liner (canal style)
6' wide left sidewalk
10' wide right sidewalk.
Hand rails on all barriers.
8½" slab. Pedestrian fence
3 girder spaces @ 7'-2"
2'-6" (Con average) overhangs

HS 25 loading
35 psf FWS
24" Water line (D.I.P.) between girders 13 & 14.

Calculate total reaction to end bents.

Non-Comp Dead Loads -

Slab -
.7083 (98.67) (.150) = 10.480 k/ℓ

Haunches -
Total width = 14(2) = 28'
Avg depth = 1½" (say)
.150 (.125) (28) = 0.525 k/ℓ

Girders - (4 no. 165 #/ℓ each)
14 (.67) = 9.380 k/ℓ

Say that the D.I.P. 24" of water line full of water is a non-comp load. Full water-line weighs 350 lbs/ft.
Say supports weigh 560 lbs ea. spaced at 10'
.560/10 = .056
Total weight on support = .406 k

Total Non-Comp. DL = 20.785

Composite Dead Loads

FWS -
1 (53.5) (.035) = 1.345 k/ℓ

Rdwy Barrier -
(2) (2.667) (1.167) (.150) = .934 k/ℓ

Sidewalk Barriers -
(2) (3.0) (1.167) (.150) = 1.050 k/ℓ

Median & Curbs (6.5" avg depth)
(11) (.541?) (.150) = .894 k/ℓ

Railings (25 plf)
4 (.025) = 0.100 k/ℓ

5.323 k/ℓ

Made: EWK Date: 6/08	HARRINGTON & CORTELYOU, INC. Consulting Engineers	Job no: 1038-09	
Checked: BEF Date: 07/17/08		Section:	
Roßmocher Bros. Value Engr. Little Blue Pkwy over KC Southern / Sefsa Road.		Page no. 12	

Total Superstructure Dead Loads –

Bent 1 –

Composite unit load reaction = 35.7 k

20.785 (90.75)/2 = 943.1 k
5.323 (35.7) = 190.0
1133.1 k

Bent 5 –

Composite Unit load reaction = 28.5 k

20.785 (76.00)/2 = 789.8 k
5.323 (28.5) = 151.7
941.5 k

Live Loads –

Say don't load median strip. Two 33'-6" roadway lanes. Use 6 loaded lanes total. 85 psf for multi-lane and 60 psf for sidewalk

Bent 1 –

One Lane Reaction for HS20 w/ out Impact = 62.7

6 (0.75) (62.7) (1.25) = 352.8 k

Unit Reaction for Sidewalk loading = 40.6 k

[6 (.060) + 10 (.085)] (40.6) = 249.7 k

Bent 5 –

One Lane Reaction for HS20 w/ out impact = 61.2 k

6 (0.75) (61.2) (1.25) = 344.3 k

Unit Reaction for Sidewalk loading = 35.0 k

[6 (.060) + 10 (.085)] (35.0) = 42.4 k

Total Superstructure Loads

Bent 1 –

1133.1 k + 352.8 + 49.1 = 1535.0

Bent 5 –

941.5 + 344.3 + 42.4 = 1328.2

MADE: EWN DATE: 6/08 CHECKED: BEF DATE: 07/17/08	HARRINGTON & CORTELYOU, INC. Consulting. Engineers	JOB NO: 1038-09 SECTION: PAGE NO. 3
Rodmacher Bros. Value Engr. Little Blue Pky.		

Weight of Rail Railing –

6'-6" panel length (min.)

Post –

2½ x 2" x 3/16" Tube (5.5 plf)

3.0(5.5)/6.5 = 2.54 plf

Top Rail –

1½ x 1½ x 3/16" Tubes

4.30 plf

Bottom Rail –

Same as top 4.30 plf

Vertical Tubes spa @ 8"

1½ x 1 x 3/16 (3.6 plf)

(1.6667)(3.6)(9)/6.5 = 8.31 plf

Vertical Bars @ 8" ctrs.

x 1½" (1.7 plf)

(1.667)(1.7)(10)/6.5 = 4.36 plf

23.81

Say use 25 plf

MADE: EWN DATE: 6/08 CHECKED: BER DATE: 02/17/08	HARRINGTON & CORTELYOU, INC. Consulting Engineers	JOB NO: 1038-09 SECTION: PAGE NO. 4
Little Blue Pkwy VE Study (Radmacher)		

20 piles (18 piles)

End Bent Self Weights —

Bent 1 —

Bry. Beam —
(3.6)(3.5)(126.97)(.15) = 240.0 k
Diaphragm —
(3.6)(5.5)(126.97)(.15) = 370.4 k
Wings —
(1.67)(9.0)(17)(2)(.15) = 76.7 k
Fillets —
(1.5)²(9)(.15) = 3.1 k
Barrier on Wings —
1.050(18.75)(2) = 39.4
Fence on Wings —
.025(18.75)(2) = 0.9
Appr. Slab (1/2 Span)
(1.0)(103)(25/2)(.15) = 193.1
Barriers on Appr Slab —
(.934)(2)(25/2) = 23.4
Median on Appr. Slab
(.894)(25/2) = 11.2

958.2 k

Bent 5 —

Bry. Beam —
(3.5)(3.5)(111.76)(.15) = 205.4 k
Diaphragm
(3.5)(5.5)(111.76)(.15) = 322.7 k
Wings —
76.7 k
Fillets
3.1
39.4
0.9
Appr. Slab (1/2 Span)
(1.0)(89)(.15)(25/2) = 166.9
23.4
11.2

849.7 k

Bent 1 Totals
Super 1535.0 k
Sub 958.2
2493.2 k

Bent 5 Total
Super 1328.2
Sub 849.7
2177.9 k

Capacity of Piles —
20(140) = 2800 kips
2493.2/2800 = 0.890
say use 95%
Pile cap = 70 − 15 = 55 Tons
.95(2800)/110 = 24.2
→ use 24 piles

Capacity of Piles —
18(140) = 2520 k.
2177.9/2520 = .864
say use 95%
Pile Cap = 70 − 15 = 55 Tons
.95(2520)/110 = 21.2 piles
→ say use 22 piles

MADE: EWN DATE: 6/08 CHECKED: BEF DATE: 07/17/08	HARRINGTON & CORTELYOU, INC. Consulting Engineers	JOB NO. 1038-09 SECTION: PAGE NO. 5

Little Blue Pky. V.E. Study Radmacher Bros.

CONTINUOUS BEAM DESIGN PROGRAM
Radmacher Bros

UNIT LOADS
DATE 06-08-00

ID.NO. 000-00
USER INT. KSJ

* * I N P U T D A T A * *

LINE NO.	CARD TYPE	COL. 6-13	COL.14-23	COL.24-33	COL.34-43	COL.44-53	COL.54-63
1	1	4 0 3 1	0 0 0 0 0	0 0 0 0	1 0 0	1.	29.000
2	2	1.000	90.750	1.000	.000	.000	.000
3	6	90.750	1.000	.000	.000	.000	.000
10	7	1.000	.000	.000	.000	.000	.000
11	2	2.000	92.000	1.000	.000	.000	.000
12	6	92.000	1.000	.000	.000	.000	.000
13	7	1.000	.000	.000	.000	.000	.000
21	2	3.000	92.000	1.000	.000	.000	.000
22	6	92.000	1.000	.000	.000	.000	.000
23	7	1.000	.000	.000	.000	.000	.000
31	2	4.000	76.000	1.000	.000	.000	.000
32	6	76.000	1.000	.000	.000	.000	.000
33	7	1.000	.000	.000	.000	.000	.000
58	9	4.000	1.000	.000	.000	.000	.000
59	10	999.000	1.000	.000	.000	.000	.000

---INPUT DATA ACCEPTED ---

CONTINUOUS BEAM DESIGN PROGRAM
Radmacher Bros

UNIT LOADS
DATE 06-08-00

ID.NO. 000-00
USER INT. KSJ

* * * MAXIMUM SERVICE LOAD MOMENT SUMMARY * * *

(NON-COMPOSITE SECTION)

SPAN 1 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	TRUCK (HS20) POS.	TRUCK (HS20) NEG.	IMPACT INCLUDED LANE (HS20) POS.	IMPACT INCLUDED LANE (HS20) NEG.
.1	283.	327.	-44.	601.	-61.	434.	-52.
.2	484.	572.	-88.	1009.	-122.	752.	-104.
.3	602.	734.	-132.	1237.	-182.	957.	-156.
.4	638.	814.	-176.	1332.	-243.	1053.	-208.
.5	591.	812.	-220.	1299.	-304.	1042.	-260.
.6	462.	727.	-264.	1158.	-365.	932.	-312.
.7	251.	560.	-308.	896.	-426.	730.	-364.
.8	-42.	312.	-354.	545.	-486.	444.	-417.
.9	-418.	146.	-564.	171.	-547.	214.	-672.
1.0	-876.	111.	-987.	162.	-785.	131.	-1145.

* * * MAXIMUM SERVICE LOAD MOMENT SUMMARY * * *

(NON-COMPOSITE SECTION)

SPAN 2 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	TRUCK (HS20) POS.	TRUCK (HS20) NEG.	IMPACT INCLUDED LANE (HS20) POS.	IMPACT INCLUDED LANE (HS20) NEG.
.1	-473.	114.	-588.	198.	-686.	199.	-695.
.2	-155.	253.	-408.	587.	-586.	407.	-475.
.3	79.	472.	-393.	880.	-486.	658.	-459.
.4	228.	607.	-379.	1054.	-387.	814.	-443.
.5	292.	657.	-365.	1096.	-287.	869.	-427.
.6	272.	623.	-351.	1042.	-322.	823.	-411.
.7	167.	504.	-337.	857.	-402.	677.	-395.
.8	-22.	309.	-332.	555.	-483.	445.	-391.
.9	-296.	211.	-507.	185.	-564.	269.	-612.
1.0	-655.	241.	-896.	210.	-660.	245.	-1052.

* * * MAXIMUM SERVICE LOAD MOMENT SUMMARY * * *

(NON-COMPOSITE SECTION)

SPAN 3 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	TRUCK (HS20) POS.	TRUCK (HS20) NEG.	IMPACT INCLUDED LANE (HS20) POS.	IMPACT INCLUDED LANE (HS20) NEG.
.1	-281.	230.	-511.	187.	-576.	285.	-615.
.2	8.	347.	-339.	559.	-492.	475.	-399.
.3	213.	533.	-321.	854.	-407.	700.	-379.
.4	333.	640.	-307.	1032.	-323.	834.	-366.
.5	368.	662.	-294.	1077.	-241.	868.	-356.
.6	319.	600.	-281.	1027.	-293.	801.	-343.
.7	185.	452.	-267.	844.	-369.	633.	-330.
.8	-33.	233.	-267.	546.	-444.	382.	-332.
.9	-337.	116.	-453.	181.	-520.	194.	-563.
1.0	-724.	124.	-849.	181.	-671.	146.	-1011.

CONTINUOUS BEAM DESIGN PROGRAM
Radmacher Bros

UNIT LOADS
DATE 06-08-00

ID.NO. 000-00
USER INT. KSJ

* * * MAXIMUM SERVICE LOAD MOMENT SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 4 POINT	A D.L.	B D.L. + SDK. LL POS.	NEG.	TRUCK (HS20) POS.	NEG.	LANE (HS20) POS.	NEG.
.1	-392.	150.	-542.	156.	-604.	209.	-648.
.2	-117.	280.	-398.	477.	-537.	401.	-471.
.3	99.	448.	-348.	764.	-470.	612.	-412.
.4	259.	557.	-298.	975.	-403.	759.	-353.
.5	360.	608.	-249.	1081.	-336.	835.	-294.
.6	403.	602.	-199.	1104.	-268.	835.	-235.
.7	389.	538.	-149.	1020.	-201.	755.	-176.
.8	317.	417.	-99.	834.	-134.	590.	-118.
.9	187.	237.	-50.	498.	-67.	339.	-59.
1.0	0.	0.	0.	0.	0.	0.	0.

* * * MAXIMUM SERVICE LOAD SHEAR SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 1 POINT	A D.L.	B D.L. + SDK. LL POS.	NEG.	L.L. (HS20) POS.	NEG.	DESIGN
.0	35.7	40.6	-4.9	77.3	-3.8	153.5
.1	26.6	32.1	-5.4	66.3	-8.3	125.0
.2	17.6	24.7	-7.1	55.6	-13.7	97.9
.3	8.5	18.5	-10.0	45.3	-21.9	72.3
.4	-.6	13.3	-13.9	35.6	-32.5	48.3
.5	-9.7	9.2	-18.8	26.6	-42.8	-71.3
.6	-18.7	6.0	-24.7	18.5	-52.6	-96.0
.7	-27.8	3.7	-31.5	11.4	-61.6	-120.9
.8	-36.9	2.3	-39.1	5.7	-69.8	-145.8
.9	-46.0	1.5	-47.4	2.9	-77.0	-170.3
1.0	-55.0	1.2	-56.3	-2.9	-83.0	-194.3

* * * MAXIMUM SERVICE LOAD SHEAR SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 2 POINT	A D.L.	B D.L. + SDK. LL POS.	NEG.	L.L. (HS20) POS.	NEG.	DESIGN
.0	48.4	54.4	-6.0	80.9	-4.7	183.7
.1	39.2	45.5	-6.3	72.8	-7.5	157.6
.2	30.0	37.5	-7.5	63.7	-11.3	131.1
.3	20.8	30.3	-9.5	53.8	-16.3	104.9
.4	11.6	24.2	-12.6	43.6	-24.7	79.4
.5	2.4	19.1	-16.7	33.5	-34.6	55.0
.6	-6.8	15.1	-21.9	23.9	-44.7	-73.5
.7	-16.0	12.2	-28.2	18.1	-54.9	-99.0
.8	-25.2	10.2	-35.4	13.2	-64.6	-125.2
.9	-34.4	9.1	-43.5	9.5	-73.5	-151.5
1.0	-43.6	8.8	-52.4	6.9	-81.3	-177.3

CONTINUOUS BEAM DESIGN PROGRAM
Radmacher Bros

UNIT LOADS
DATE 06-08-00

ID.NO. 000-00
USER INT. KSJ

* * * MAXIMUM SERVICE LOAD SHEAR SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 3 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	L.L. (HS20) POS.	L.L. (HS20) NEG.	DESIGN
.0	45.2	52.1	-6.9	81.1	-5.4	178.5
.1	36.0	43.3	-7.2	73.2	-8.1	152.5
.2	26.8	35.1	-8.3	64.1	-11.9	126.1
.3	17.6	28.0	-10.3	54.2	-16.8	99.8
.4	8.4	21.8	-13.3	43.9	-24.3	74.2
.5	-.8	16.7	-17.4	33.7	-34.2	-52.3
.6	-10.0	12.6	-22.6	23.9	-44.4	-76.9
.7	-19.2	9.7	-28.8	16.1	-54.6	-102.6
.8	-28.4	7.7	-36.0	11.3	-64.5	-128.9
.9	-37.6	6.6	-44.2	7.5	-73.5	-155.2
1.0	-46.8	6.3	-53.0	5.0	-81.3	-181.1

* * * MAXIMUM SERVICE LOAD SHEAR SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 4 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	L.L. (HS20) POS.	L.L. (HS20) NEG.	DESIGN
.0	47.5	49.2	-1.6	82.4	3.9	179.1
.1	39.9	41.8	-1.9	75.9	-3.4	157.6
.2	32.3	34.9	-2.6	68.3	-6.3	135.5
.3	24.7	28.6	-3.9	59.8	-11.0	113.1
.4	17.1	23.0	-5.8	50.5	-18.1	90.6
.5	9.5	18.1	-8.5	40.7	-26.2	68.3
.6	1.9	14.0	-12.1	30.3	-35.1	46.2
.7	-5.7	10.8	-16.4	20.5	-44.7	-66.8
.8	-13.3	8.4	-21.7	14.7	-54.9	-89.9
.9	-20.9	7.0	-27.9	9.6	-65.5	-114.2
1.0	-28.5	6.5	-35.0	5.2	-76.4	-139.8

MAX.LL REACTIONS (HS20)

PIER	BEAM REACTION (LL+I) LANE	BEAM REACTION (LL+I) TRUCK	ONE LANE REACTION (LL) LANE	ONE LANE REACTION (LL) TRUCK
1	64.0	77.3	52.0	62.7
2	119.2	87.5	96.8	71.1
3	114.3	86.4	92.9	70.2
4	113.3	86.9	91.4	70.1
5	60.5	76.4	48.4	61.2

Calculate Service Loads to End Bent Piles –

3 span Type III P/S girder bridge –

Spans along Pg.:
110' – 111' – 110'

Radius to P_1 = 1820.61'

Girders are straight, so no curvature effects will be considered.

Bents appear to be parallel.

49'-4" out to out of deck

36'-0" clr. rdwy. (8½" Slab)

14" wide rdwy barrier with form liner (conrad style)

10'-6" wide Sidewalk

Hand rail on barrier next to sidewalk.

Fence at edg of sidewalk.

7 girder lines spa @ 7'-4" ↓ @ 6'-10"

overhangs vary

HS 25 loading

35 psf FWS

24" ⌀ DIP waterline btwn girders 6 & 7

Calculate Total Reaction to end bents.

Non-Comp Dead Loads –

Slab –

.7083(49.3333)(.150) = 5.241 k/ft

Haunches –

Total width = 7(3.5) = 24.5'

Avg Depth (Say) = 3"

.150(.25)(24.5) = 0.919 k/ft

Girders – (820 plf each)

7(.82) = 5.740 k/ft

Waterline with supports = 0.406 k/ft

12.306 k/ft

Composite Dead Loads –

FWS –

36(.035) = 1.260 k/ft

Rdwy Barrier –

2(2.6667)(1.1667)(.15) = 0.934 k/ft

Railing (.25 plf) 0.025 k/ft

Fence – (Say 13 plf 0.075 k/ft

2.294 k/ft

Made: EWN Date: 6/08	HARRINGTON & CORTELYOU, INC. Consulting Engineers	Job No: 1038-09	
Checked: BEF Date: 07/17/08		Section:	
Little Blue Pky VE Study	N.B. Bridge over Cruckerneck	Page No. 10	

12 HP12x53 @ 70 Lbs 140 k each

Total Superstructure Dead Loads —

Bent 1 & 4 —

Composite Unit Reaction
= 43.9 k

12 306 (1.10)/2 = 676.8 k
2.294 (43.9) = 100.7
777.5 k

Live Loads —
One 36' roadway.
Use 3 loaded lanes —
Use 85 psf on multi use pathway.

Bent 1 & 4 — Reaction
One lane for HS20 w/ out impact = 64.3 k

3 (0.9) (64.3) (1.25) = 217.0 k

Unit Reaction for Sidewalk Skip loading = 49.5 k

10.5 (.085) (49.5) = 44.2 k

Total Superstructure Loads —

Bents 1 & 4 —
777.5 + 217.0 + 44.2 = 1038.7 k

Down Drag Cap. = 70 - 15 = 55 Tons

End Bent Self Weights —

Bents 1 & 4 —

Brg. Beam —
(3.5) (3.5) (57.35) (.15) = 105.4 k
Diaphragm —
(3.5) (7.167) (57.35) (.15) = 215.8 k
Wings —
(1.67) (10.25) (16.5) (2) (.15) = 84.7 k
Fillets —
(1.5)² (9.67) (.15) = 3.3 k
Barrier on Wing —
(0.934) (16.5) = 15.4 k
Fence on Wing —
(.075) (16.5) = 1.2 k
Appr. Slab (1/2 Span)
(1.0) (38) (25/2) (.150) = 71.3 k
497.1

Bents 1 & 4 Totals —
Super. — 1038.7 k
Sub. — 497.1
1,535.7 k

Capacity of Piles —

12 (140) = 1,680 k
1535.8/1680 = 91% say .95

.95 (1680)/110 = 14.5 piles
use 15 piles.

(1982)

MADE: EWN DATE: 6/08 CHECKED: BEF DATE: 07/17/08	HARRINGTON & CORTELYOU, INC. Consulting Engineers	JOB NO: 1038-09 SECTION: PAGE NO. 11
Little Blue Pky VE Study.	NB Bridge over Crackerneck	

CONTINUOUS BEAM DESIGN PROGRAM
Radmacher Bros

UNIT LOADS
DATE 06-08-00

ID.NO. 000-00
USER INT. KSJ

* * I N P U T D A T A * *

LINE NO.	CARD TYPE	COL. 6-13	COL.14-23	COL.24-33	COL.34-43	COL.44-53	COL.54-63
1	1	3 0 3 1	0 0 0 0 0	0 0 0 0	1 0 0	1.	29.000
2	2	1.000	110.000	1.000	.000	.000	.000
3	6	110.000	1.000	.000	.000	.000	.000
10	7	1.000	.000	.000	.000	.000	.000
11	2	2.000	111.000	1.000	.000	.000	.000
12	6	111.000	1.000	.000	.000	.000	.000
13	7	1.000	.000	.000	.000	.000	.000
21	2	3.000	110.000	1.000	.000	.000	.000
22	6	110.000	1.000	.000	.000	.000	.000
23	7	1.000	.000	.000	.000	.000	.000
58	9	4.000	1.000	.000	.000	.000	.000
59	10	999.000	1.000	.000	.000	.000	.000

---INPUT DATA ACCEPTED ---

CONTINUOUS BEAM DESIGN PROGRAM — UNIT LOADS — ID.NO. 000-00
Radmacher Bros — DATE 06-08-00 — USER INT. KSJ

* * * MAXIMUM SERVICE LOAD MOMENT SUMMARY * * *

(NON-COMPOSITE SECTION) — IMPACT INCLUDED

SPAN 1 POINT	A D.L.	B D.L. + SDK. LL		TRUCK (HS20)		LANE (HS20)	
		POS.	NEG.	POS.	NEG.	POS.	NEG.
.1	423.	484.	-62.	739.	-75.	586.	-67.
.2	725.	848.	-123.	1244.	-149.	1018.	-135.
.3	905.	1090.	-185.	1533.	-224.	1298.	-202.
.4	965.	1212.	-247.	1653.	-298.	1431.	-269.
.5	904.	1212.	-308.	1614.	-373.	1422.	-337.
.6	722.	1092.	-370.	1438.	-447.	1277.	-404.
.7	419.	850.	-432.	1119.	-522.	1005.	-471.
.8	-6.	490.	-496.	696.	-596.	618.	-543.
.9	-551.	249.	-800.	213.	-671.	311.	-893.
1.0	-1217.	201.	-1418.	238.	-947.	218.	-1540.

* * * MAXIMUM SERVICE LOAD MOMENT SUMMARY * * *

(NON-COMPOSITE SECTION) — IMPACT INCLUDED

SPAN 2 POINT	A D.L.	B D.L. + SDK. LL		TRUCK (HS20)		LANE (HS20)	
		POS.	NEG.	POS.	NEG.	POS.	NEG.
.1	-663.	186.	-848.	269.	-829.	273.	-936.
.2	-231.	370.	-601.	739.	-710.	534.	-650.
.3	77.	677.	-600.	1100.	-592.	867.	-649.
.4	262.	862.	-600.	1320.	-473.	1071.	-649.
.5	323.	923.	-600.	1380.	-355.	1139.	-649.
.6	262.	862.	-600.	1320.	-473.	1071.	-649.
.7	77.	677.	-600.	1100.	-592.	867.	-649.
.8	-231.	370.	-601.	739.	-710.	534.	-650.
.9	-663.	186.	-848.	269.	-829.	273.	-936.
1.0	-1217.	201.	-1418.	238.	-947.	218.	-1540.

* * * MAXIMUM SERVICE LOAD MOMENT SUMMARY * * *

(NON-COMPOSITE SECTION) — IMPACT INCLUDED

SPAN 3 POINT	A D.L.	B D.L. + SDK. LL		TRUCK (HS20)		LANE (HS20)	
		POS.	NEG.	POS.	NEG.	POS.	NEG.
.1	-551.	249.	-800.	213.	-671.	311.	-893.
.2	-6.	490.	-496.	696.	-596.	618.	-543.
.3	419.	850.	-432.	1119.	-522.	1005.	-471.
.4	722.	1092.	-370.	1438.	-447.	1277.	-404.
.5	904.	1212.	-308.	1614.	-373.	1422.	-337.
.6	965.	1212.	-247.	1653.	-298.	1431.	-269.
.7	905.	1090.	-185.	1533.	-224.	1298.	-202.
.8	725.	848.	-123.	1244.	-149.	1018.	-135.
.9	423.	484.	-62.	739.	-75.	586.	-67.
1.0	0.	0.	0.	0.	0.	0.	0.

CONTINUOUS BEAM DESIGN PROGRAM
Radmacher Bros

UNIT LOADS
DATE 06-08-00

ID.NO. 000-00
USER INT. KSJ

* * * MAXIMUM SERVICE LOAD SHEAR SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 1 POINT	A D.L.	B D.L. + SDK. LL POS.	NEG.	L.L. (HS20) POS.	NEG.	DESIGN
.0	43.9	49.5	-5.6	78.0	-4.4	171.5
.1	32.9	39.2	-6.3	67.1	-8.9	139.3
.2	21.9	30.3	-8.4	56.5	-14.4	108.8
.3	10.9	22.7	-11.8	46.3	-23.4	80.0
.4	-.1	16.5	-16.6	36.6	-33.9	53.1
.5	-11.1	11.5	-22.5	27.6	-44.0	-77.6
.6	-22.1	7.6	-29.7	19.4	-53.5	-105.3
.7	-33.1	4.9	-38.0	12.2	-62.3	-133.3
.8	-44.1	3.1	-47.2	6.3	-70.2	-161.4
.9	-55.1	2.1	-57.2	3.4	-77.1	-189.4
1.0	-66.1	1.8	-67.9	-2.5	-84.2	-218.2

* * * MAXIMUM SERVICE LOAD SHEAR SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 2 POINT	A D.L.	B D.L. + SDK. LL POS.	NEG.	L.L. (HS20) POS.	NEG.	DESIGN
.0	55.5	64.5	-9.0	81.6	-7.0	201.6
.1	44.4	53.8	-9.4	73.6	-9.7	171.8
.2	33.3	44.1	-10.8	64.8	-13.7	142.2
.3	22.2	35.4	-13.2	55.2	-18.8	112.8
.4	11.1	28.0	-16.9	45.2	-25.5	84.3
.5	.0	21.8	-21.8	35.2	-35.2	-57.0
.6	-11.1	16.9	-28.0	25.5	-45.2	-84.3
.7	-22.2	13.2	-35.4	18.8	-55.2	-112.8
.8	-33.3	10.8	-44.1	13.7	-64.8	-142.2
.9	-44.4	9.4	-53.8	9.7	-73.6	-171.8
1.0	-55.5	9.0	-64.5	7.0	-81.6	-201.6

* * * MAXIMUM SERVICE LOAD SHEAR SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 3 POINT	A D.L.	B D.L. + SDK. LL POS.	NEG.	L.L. (HS20) POS.	NEG.	DESIGN
.0	66.1	67.9	-1.8	84.2	2.5	218.2
.1	55.1	57.2	-2.1	77.1	-3.4	189.4
.2	44.1	47.2	-3.1	70.2	-6.3	161.4
.3	33.1	38.0	-4.9	62.3	-12.2	133.3
.4	22.1	29.7	-7.6	53.5	-19.4	105.3
.5	11.1	22.5	-11.5	44.0	-27.6	77.6
.6	.1	16.6	-16.5	33.9	-36.6	-53.1
.7	-10.9	11.8	-22.7	23.4	-46.3	-80.0
.8	-21.9	8.4	-30.3	14.4	-56.5	-108.8
.9	-32.9	6.3	-39.2	8.9	-67.1	-139.3
1.0	-43.9	5.6	-49.5	4.4	-78.0	-171.5

CONTINUOUS BEAM DESIGN PROGRAM
Radmacher Bros

UNIT LOADS
DATE 06-08-00

ID.NO. 000-00
USER INT. KSJ

MAX.LL REACTIONS (HS20)

PIER	BEAM REACTION (LL+I) LANE	BEAM REACTION (LL+I) TRUCK	ONE LANE REACTION (LL) LANE	ONE LANE REACTION (LL) TRUCK
1	70.0	78.0	57.7	64.3
2	134.3	86.6	110.8	71.4
3	134.3	86.6	110.8	71.4
4	70.0	78.0	57.7	64.3

Calculate Service Loads to End Bent Piles —

3 Span Type VII P/S girder bridge.

Span along PG:
106' - 107' - 106'
Radius to PG = 1,848.70'
Girders are straight, so no curvature effects will be considered.
Bents appear to be parallel.

45'-4" out to out of deck.
36'-0" clr. rdwy. (8½" slab)
14" wide rdwy barriers w/ form liner (corral style)
6'-0" wide sidewalk
Hand rail on barrier adj. to sidewalk.
Fence at edge of sidewalk.
6 Girder Lines spa. @ 7'-8"
Overhangs vary.

HS25 loading
35 psf FWS
No Water Line

Calculate total reaction to end bents.

Non-Comp. Dead Loads —

Slab —
.7083(45.3333)(.150) = 4.816 k

Haunches —
Total Width = 6(3.5) = 21'
Avg. Depth = 3" (say)

.150(.25)(21) = 0.788 k

Girders — (820 plf each)
6(.82) = 4.920 klf

Total = 10.524 klf

Composite Dead Loads —

FWS —
36(.035) = 1.260 klf

Rdwy. Barriers —
2(2.6667)(1.1667)(.15) = 0.934 klf

Railing (say 25 plf) —
0.025 klf

Fence (say 75 plf) —
0.075 klf

Total = 2.294 klf

MADE: EWN DATE: 6/08 CHECKED: BEF DATE: 07/17/08	HARRINGTON & CORTELYOU, INC. Consulting Engineers	JOB NO: 1038-07 SECTION: PAGE NO. 16
Little Blue Pkwy VE Study	SB Bridge over Crackerneck	

Total Superstructure Dead Loads —

Bent 1 & 4 —
Composite Unit Reaction
= 42.4

10.524(106)/2 = 557.8^k
2.294(42.4) = 97.3
655.1^k

Live Loads —
One 36' roadway
Use 3 loaded lanes —
Use 85 psf on multiuse pathway.

Bent 1 & 4 —
One lane HS20 w/ out impact = 64.0^k

HS25 factor

3(0.9)(64.0)(1.25) = 216.0^k

Unit Reaction for Sidewalk skip loading = 47.8^k

6(.085)(47.8) = 24.4^k

Total Superstructure Loads —

Bents 1 & 4 —
655.1 + 216.0 + 24.4 = 895.5^k

End Bent Self Weights —

Bents 1 & 4 —

Brg. Beam —
(3.5)(3.5)(50)(.15) = 91.9
Diaphragm —
(3.5)(7.1667)(50)(.15) = 188.1^k
Wings —
(1.67)(10.25)(16.5)(2)(.15) = 84.7^k
Fillets —
(1.5)^2(9.67)(.15) = 3.3^k
Barrier on Wing —
(.934)(16.5) = 15.4^k
Fence on Wing
(.075)(16.5) = 1.2^k
Appr. Slab (1/2 Span)
(1.0)(38)(25/2)(.150) = 71.3^k

Total = 455.9^k

Bents 1 & 4 Totals —
Super — 895.5^k
Sub. — 455.9^k
1,351.4^k

Capacity of Piles —

10(140) = 1400^k
1351.4/1400 = 0.965 say 100%

Down Drag Cap. = 70 − 15 = 55 Ton

1400/110 = 12.7 piles
use 13 piles

MADE: EWN DATE: 6/08 CHECKED: BEF DATE: 07/17/08	HARRINGTON & CORTELYOU, INC. Consulting Engineers	JOB NO: 1038-09 SECTION: PAGE NO. 17
Little Blue Pkwy - VE Study	JB Bridge over Crackerneck	

CONTINUOUS BEAM DESIGN PROGRAM
Radmacher Bros

UNIT LOADS
DATE 06-08-00

ID.NO. 000-00
USER INT. KSJ

* * I N P U T D A T A * *

LINE NO.	CARD TYPE	COL. 6-13	COL.14-23	COL.24-33	COL.34-43	COL.44-53	COL.54-63
1	1	3 0 3 1	0 0 0 0 0	0 0 0 0	1 0 0	1.	29.000
2	2	1.000	106.100	1.000	.000	.000	.000
3	6	106.100	1.000	.000	.000	.000	.000
10	7	1.000	.000	.000	.000	.000	.000
11	2	2.000	107.000	1.000	.000	.000	.000
12	6	107.000	1.000	.000	.000	.000	.000
13	7	1.000	.000	.000	.000	.000	.000
21	2	3.000	106.000	1.000	.000	.000	.000
22	6	106.000	1.000	.000	.000	.000	.000
23	7	1.000	.000	.000	.000	.000	.000
58	9	4.000	1.000	.000	.000	.000	.000
59	10	999.000	1.000	.000	.000	.000	.000

---INPUT DATA ACCEPTED ---

CONTINUOUS BEAM DESIGN PROGRAM — UNIT LOADS — ID.NO. 000-00
Radmacher Bros — DATE 06-08-00 — USER INT. KSJ

* * * MAXIMUM SERVICE LOAD MOMENT SUMMARY * * *

(NON-COMPOSITE SECTION) — IMPACT INCLUDED

SPAN 1 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	TRUCK (HS20) POS.	TRUCK (HS20) NEG.	LANE (HS20) POS.	LANE (HS20) NEG.
.1	393.	451.	-57.	711.	-72.	554.	-63.
.2	674.	789.	-115.	1196.	-144.	962.	-127.
.3	842.	1014.	-172.	1474.	-215.	1227.	-190.
.4	898.	1127.	-229.	1589.	-287.	1352.	-254.
.5	841.	1128.	-286.	1551.	-359.	1343.	-317.
.6	672.	1015.	-344.	1382.	-431.	1206.	-380.
.7	390.	791.	-401.	1075.	-503.	949.	-444.
.8	-5.	455.	-460.	666.	-574.	584.	-511.
.9	-512.	231.	-743.	205.	-646.	294.	-842.
1.0	-1132.	187.	-1319.	229.	-914.	205.	-1451.

* * * MAXIMUM SERVICE LOAD MOMENT SUMMARY * * *

(NON-COMPOSITE SECTION) — IMPACT INCLUDED

SPAN 2 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	TRUCK (HS20) POS.	TRUCK (HS20) NEG.	LANE (HS20) POS.	LANE (HS20) NEG.
.1	-617.	173.	-789.	253.	-800.	259.	-883.
.2	-216.	344.	-559.	707.	-685.	507.	-613.
.3	71.	629.	-558.	1055.	-571.	820.	-612.
.4	243.	801.	-558.	1267.	-457.	1012.	-612.
.5	300.	858.	-558.	1324.	-342.	1077.	-612.
.6	243.	801.	-558.	1267.	-456.	1012.	-611.
.7	72.	629.	-557.	1055.	-570.	820.	-611.
.8	-214.	343.	-558.	707.	-684.	506.	-612.
.9	-615.	173.	-788.	253.	-799.	259.	-882.
1.0	-1130.	187.	-1317.	230.	-913.	205.	-1450.

* * * MAXIMUM SERVICE LOAD MOMENT SUMMARY * * *

(NON-COMPOSITE SECTION) — IMPACT INCLUDED

SPAN 3 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	TRUCK (HS20) POS.	TRUCK (HS20) NEG.	LANE (HS20) POS.	LANE (HS20) NEG.
.1	-511.	231.	-743.	205.	-647.	294.	-842.
.2	-5.	455.	-461.	665.	-575.	584.	-512.
.3	389.	790.	-401.	1074.	-503.	948.	-444.
.4	670.	1014.	-344.	1381.	-431.	1205.	-381.
.5	839.	1126.	-287.	1549.	-359.	1341.	-317.
.6	896.	1126.	-229.	1587.	-287.	1351.	-254.
.7	841.	1013.	-172.	1472.	-216.	1225.	-190.
.8	673.	788.	-115.	1195.	-144.	961.	-127.
.9	393.	450.	-57.	710.	-72.	553.	-63.
1.0	0.	0.	0.	0.	0.	0.	0.

CONTINUOUS BEAM DESIGN PROGRAM — UNIT LOADS — ID.NO. 000-00
Radmacher Bros — DATE 06-08-00 — USER INT. KSJ

* * * MAXIMUM SERVICE LOAD SHEAR SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 1 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	L.L. (HS20) POS.	L.L. (HS20) NEG.	DESIGN
.0	42.4	47.8	-5.4	77.9	-4.2	168.1
.1	31.8	37.8	-6.1	67.0	-8.7	136.6
.2	21.2	29.2	-8.1	56.4	-14.2	106.8
.3	10.6	21.9	-11.4	46.2	-23.2	78.6
.4	-.1	15.9	-16.0	36.5	-33.7	52.3
.5	-10.7	11.1	-21.7	27.5	-43.8	-76.2
.6	-21.3	7.4	-28.7	19.3	-53.4	-103.3
.7	-31.9	4.7	-36.6	12.1	-62.2	-130.7
.8	-42.5	3.0	-45.5	6.2	-70.1	-158.1
.9	-53.1	2.0	-55.1	3.3	-77.1	-185.4
1.0	-63.7	1.8	-65.5	-2.6	-82.9	-212.1

* * * MAXIMUM SERVICE LOAD SHEAR SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 2 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	L.L. (HS20) POS.	L.L. (HS20) NEG.	DESIGN
.0	53.5	62.2	-8.7	81.3	-6.8	197.0
.1	42.8	51.9	-9.1	73.5	-9.5	168.2
.2	32.1	42.5	-10.4	64.7	-13.4	139.3
.3	21.4	34.2	-12.7	55.1	-18.5	110.6
.4	10.7	27.0	-16.2	45.1	-25.3	82.7
.5	.0	21.0	-21.0	35.0	-35.0	56.0
.6	-10.7	16.3	-26.9	25.3	-45.1	-82.7
.7	-21.4	12.8	-34.1	18.5	-55.1	-110.6
.8	-32.1	10.4	-42.5	13.4	-64.7	-139.2
.9	-42.8	9.1	-51.9	9.5	-73.5	-168.2
1.0	-53.5	8.7	-62.2	6.8	-81.3	-196.9

* * * MAXIMUM SERVICE LOAD SHEAR SUMMARY * * *

(NON-COMPOSITE SECTION) IMPACT INCLUDED

SPAN 3 POINT	A D.L.	B D.L. + SDK. LL POS.	B D.L. + SDK. LL NEG.	L.L. (HS20) POS.	L.L. (HS20) NEG.	DESIGN
.0	63.7	65.4	-1.8	82.9	2.6	212.0
.1	53.1	55.1	-2.0	77.1	-3.3	185.3
.2	42.5	45.4	-3.0	70.1	-6.2	158.0
.3	31.9	36.6	-4.7	62.2	-12.1	130.6
.4	21.3	28.6	-7.4	53.3	-19.3	103.2
.5	10.7	21.7	-11.1	43.8	-27.5	76.2
.6	.1	16.0	-15.9	33.7	-36.5	-52.3
.7	-10.5	11.4	-21.9	23.2	-46.2	-78.6
.8	-21.1	8.1	-29.2	14.2	-56.4	-106.7
.9	-31.7	6.1	-37.8	8.7	-67.0	-136.6
1.0	-42.3	5.4	-47.7	4.2	-77.9	-168.0

CONTINUOUS BEAM DESIGN PROGRAM — UNIT LOADS — ID.NO. 000-00
Radmacher Bros — DATE 06-08-00 — USER INT. KSJ

MAX.LL REACTIONS (HS20)

PIER	BEAM REACTION (LL+I) LANE	BEAM REACTION (LL+I) TRUCK	ONE LANE REACTION (LL) LANE	ONE LANE REACTION (LL) TRUCK
1	68.8	77.9	56.6	64.0
2	131.0	86.8	107.7	71.4
3	130.9	86.8	107.7	71.4
4	68.8	77.9	56.6	64.0

Last Page

21

VALUE ENGINEERING CHECK SHEET

TYPE OF WORK

(Check one that applies)

- X Bridge/Structure/Footings
- ☐ Drainage Structures (RCP, RCB, CMP's, ect.)
- ☐ TCP/MOT
- ☐ Paving (PCCP, ect.)
- ☐ Grading/MSE Walls
- ☐ Signal/Lighting/ITS
- ☐ Misc. _____

SUMMARY OF PROPOSAL

(If needed, condense summary to a couple of lines)

____Increase piling and settlement monitoring to eliminate pile casings at end bents (LPA Project)

SCANNING OF DOCUMENT

If the proposal is large, please mark or make note, which pages need to be scanned into the database. If there are special instructions, make note of them here.

____Scan proposal only.