

Engineering Statement
prepared for
Gray Television Licensee, LLC
KSNB-TV Facility ID 21161
Ch. 24 York, NE

This engineering statement has been prepared on behalf of *Gray Television Licensee, LLC* (“Gray”), licensee of KSNB-TV (Facility ID 21161, Superior, NE) in support of a *Petition for Rulemaking* to amend §73.622(i) by changing KSNB-TV’s digital television channel assignment and principal community. KSNB-TV is licensed to operate on Channel 4 at Superior NE (BLCDT-20121001AOP). As described herein, *Gray* requests substitution of Channel 24 at York, NE in lieu of Channel 4 at Superior, NE. This statement provides revised engineering parameters and analysis to amend *Gray’s* original *Petition for Rulemaking*, LMS file number 0000118815.

The substitution would allow KSNB-TV to utilize a shared transmitting location with *Gray’s* full-service television station KOLN, Facility ID 7890, Channel 10, Lincoln NE). The KOLN tower site is located 23.5 km from the licensed KSNB-TV site.

The tower structure supporting the KOLN antenna collapsed on January 18, 2020 during an ice storm and KOLN is presently silent (file# 0000098791). *Gray* intends on rebuilding the KOLN tower structure at Beaver Crossing, NE, the location of the tower collapse. The KOLN tower structure corresponds to FCC Antenna Structure Registration (“ASR”) number 1041796, having an overall height above ground level (“AGL”) of 1500 feet (457.2 meters). The proposed KOLN replacement tower will be built to match the original tower’s height AGL.¹ *Gray* is contemporaneously submitting an amended minor change application (file# 0000118570) for a Construction Permit to authorize KOLN to increase its effective radiated power (“ERP”) while

¹As described in the original KOLN minor modification application, *Gray* had proposed to build a replacement tower that increases the height by 150 feet (45.7 meters) to an overall height AGL of 1650 feet (483.7 meters), an increase of 10 percent. The FAA was notified of the proposed height increase (2020-ACE-5172-OE, submitted July 17, 2020) and issued a Notice of Presumed Hazard on September 29, 2020. Rather than pressing the FAA for further study and public circularization of the height increase, and to expedite the process, *Gray* now seeks to rebuild the KOLN tower to its original height of 1500 feet AGL (457.2 meters) corresponding to the existing ASR number 1041796. The original KSNB-TV *Petition for Rulemaking* (file# 0000118815) incorporated the former KOLN proposal for increased tower height.

maintaining its licensed antenna HAAT, thus expanding the KOLN noise limited service contour (“NLSC”) area.

The replacement KOLN tower is being designed to support additional appurtenances, including a side-mounted antenna for KSNB-TV. The existing KSNB-TV Channel 4 operation is in the Low-Band VHF spectrum and has proven to be ineffective for satisfactory viewer reception as discussed herein and elsewhere in the petition. The use of Channel 24 would place KSNB-TV in the UHF spectrum which is known to provide robust signal levels for home reception. In addition to moving to the more effective UHF spectrum, the proposed Channel 24 operation would allow *Gray* to consolidate these full-service facilities to a shared tower structure.

Gray has determined that many viewers experience significant difficulty in receiving KSNB-TV’s signal. Problems with digital Low-Band VHF reception by stations in many markets were widely publicized since the 2009 digital transition date. It has been established that indoor reception is difficult for digital Low-Band VHF stations such as KSNB-TV due to the longer wavelength signal’s inability to readily pass through buildings (the windows are smaller than the wavelength size), the ineffectiveness of many indoor antennas many of which were designed to emphasize the shorter wavelengths for UHF reception, and high levels of manmade and environmental noise.

A summary of the licensed Channel 4 and proposed Channel 24 technical parameters is provided in the following.

Licensed Channel 4 Parameters (BLCDT-20121001AOP)

Facility ID	State and City		DTV								
			Chan	ERP (kW)	HAAT (m)	Antenna ID	Latitude (DDMMSS) NAD-83	Longitude (DDMMSS) NAD-83	Area (sq km)	Population (2010)	% Interf. Received
21161	NE	SUPERIOR	4	23.5	271	NON-D	40-45-07	97-27-05	40,289.1	656,650	0.00

Antenna C/R AMSL: 751.4 meters

Proposed Channel 24 Parameters

Facility ID	State and City		DTV								
			Chan	ERP (kW)	HAAT (m)	Antenna ID	Latitude (DDMMSS) NAD-83	Longitude (DDMMSS) NAD-83	Area (sq km)	Population (2010)	% Interf. Received
21161	NE	YORK	24	260	430	NON-D	40-48-11	97-10-53	30,247.9	660,737	0.30

Antenna C/R AMSL: 935.9 meters

A map is supplied as Figure 1, which depicts the standard predicted coverage contours. This map includes the boundaries of York, NE. As demonstrated thereon, the proposed facility complies with §73.625(a)(1) as the entire community of York will be encompassed by the 48 dBμ contour.

The concurrent change in principal community to York is necessary because the proposed transmitting location (a relocation of 23.5 km) cannot provide adequate principal community service to the existing community of Superior. According to 2010 US Census data, Superior has a population of 1,957 persons and an area of 4.9 square kilometers, while York's population is 7,766 persons over an area of 14.9 sq km.

Interference study per FCC OET Bulletin 69² shows that the proposal complies with the 0.5 percent limit of new interference caused to pertinent nearby full service and Class A television stations and reassignments as required by §73.616. The interference study output report is provided as Table 1.

Service Gain and Loss

Due to the change in transmitter site location the proposed channel change will result in a shift in the KSNB-TV service contour area. Figure 2 supplies a coverage contour comparison map to depict KSNB-TV licensed and proposed NLSC along with the areas of gain and loss. This map considers KOLN as presently licensed. The table below, from Figure 2, summarizes the area and population in those gain and loss areas.

²FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 ("OET-69"). This analysis employed the FCC's current "TVStudy" software with the default application processing template settings, 2 km cell size, and 1 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCC's implementation of TVStudy show excellent correlation.

KNSB-TV NLSC Gain - Loss Population Detail

Proposed: KNSB-TV as Ch-24 side at Beaver Crossing			
41 dBu Total Population 604,121			
Existing: KNSB-TV Ch-4 Licensed			
28 dBu Total Population 661,418			
Gain Area Total Population: 62,472			
Loss Area Total Population: 119,769			
Common Area Total Population: 541,649			
Net Gain in Total Population: -57,297			
Number of Services	Gain	Loss	Net Gain
-----	----	----	-----
0	0	353	-353
1	0	6,180	-6,180
2	0	1,386	-1,386
3	0	2,848	-2,848
4	0	10,210	-10,210
5 or more	62,472	98,792	-36,320

Gray's companion minor change proposal to expand KOLN will provide replacement television service over much of the KNSB-TV loss area. Figure 3 and the table below provide the resulting population and area summary for the net changes proposed for the composite of KNSB-TV and KOLN's NLSC areas.

KNSB-TV and KOLN Composite NLSC Gain - Loss Population Detail

Proposed: KNSB-TV Ch-24 and KOLN-Ch-10			
Composite NLSC Total Population: 1,416,446			
Existing: KNSB-TV Ch-4 Lic and KOLN-Ch-10 Lic			
Composite NLSC Total Population 1,222,712			
Gain Area Total Population: 202,654			
Loss Area Total Population: 8,920			
Common Area Total Population: 1,213,792			
Net Gain in Total Population: 193,734			
Number of Services	Gain	Loss	Net Gain
-----	----	----	-----
0	150	14	136
1	4,816	523	4,293
2	5,860	18	5,842
3	219	99	120
4	112	3,086	-2,974
5 or more	191,497	5,180	186,317

The composite gain-loss analysis for changes to both stations shows that the loss area involves 8,920 persons, 14 of which would have no alternate service and 523 persons with one other service. Most of the loss area has 4 or more other services, where 3,086 persons would have 4 other services and 5,180 persons would have 5 or more services. These minor losses are offset by the population in the gain areas, where there would be a net gain of 136 persons receiving their

first television service (having no other service), 4,293 persons receiving their second service (having only one other service), and 5,842 persons receiving their third service (having only two other services).

Mutual Exclusivity and Available Remaining Channels

Gray is requesting waiver of §1.420(i) regarding mutual exclusivity regarding the proposed change in channel and principal community. The distance between the community reference points for Superior NE and York NE is 102.2 km, which does not exceed the 103 km maximum service area radius for UHF stations as described in §73.626(c). KOLN's principal community of Lincoln NE is located 77.4 km from York and 146.6 km from Superior. All three communities are within the Lincoln & Hastings-Kearney DMA.

The changes proposed for KSNB-TV would not foreclose opportunity to allot additional TV channels to any of the three communities involved (Superior NE, York NE, and Lincoln NE). Pursuant to §73.623(d), future petitions to add new digital television allotments must comply with minimum distance spacing requirements. Considering the proposed KSNB-TV changes, geographic spacing analysis of existing television allotments and interference protection to Class A stations in the region shows that 18 television channels would be available for Superior, NE as summarized in Table 2. There would be 14 television channels available for York, NE and 9 television channels available for Lincoln, NE as summarized in Tables 3 and 4, respectively.

Conclusion

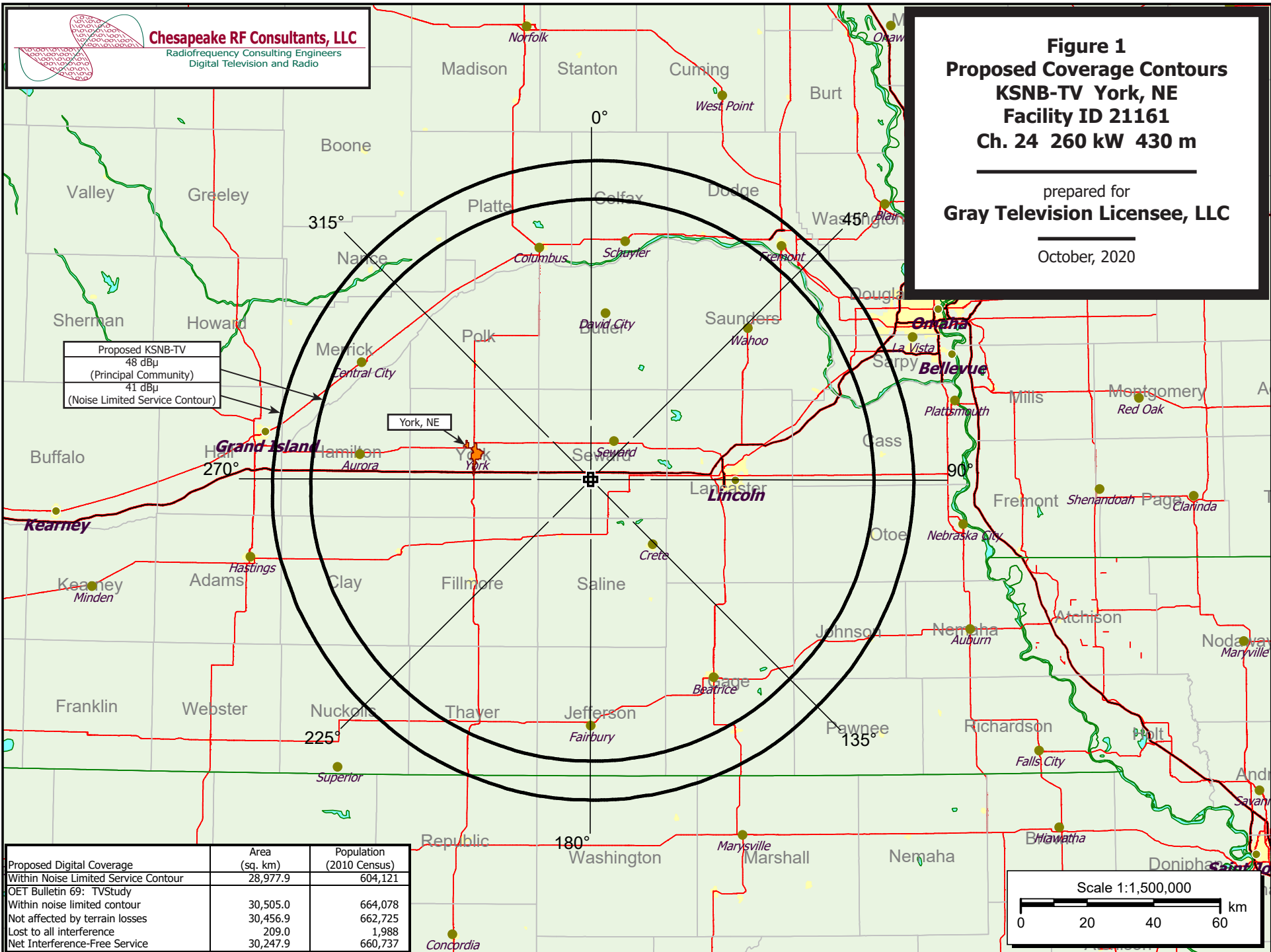
The proposed channel substitution and principal community change complies with the FCC's principal community coverage requirements of §73.625 and the interference protection requirements of §73.616. The changes would not preclude the future allotment of new television channels in the region.

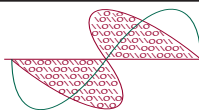
List of Attachments

Figure 1	Proposed Coverage Contours
Figure 2	Gain and Loss Areas – With KOLN as Licensed
Figure 3	Gain and Loss Areas – With KOLN Expansion
Table 1	TVStudy Analysis of Proposal
Table 2	Available Channels – Superior, NE
Table 3	Available Channels – York, NE
Table 4	Available Channels – Lincoln, NE

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Radiofrequency Consulting Engineers
Digital Television and Radio

Figure 2
Gain-Loss Analysis
With KOLN as Licensed Only
FCC Coverage Contours
KSNB-TV Ch. 24 York, NE
Facility ID 21161

prepared for
Gray Television Licensee, LLC

October, 2020

Licensed KSNB-TV
Ch. 4 Superior, NE
BLCDT-20121001AOP
28 dBu Contour (NLSC)
Area: 40,376.7 sq km
Population: 661,418

Proposed KSNB-TV
Ch. 24 York, NE
At KOLN Rebuilt Tower
260 kW ERP 430 m HAAT
41 dBu Contour (NLSC)
Area: 28,977.9 sq km
Population: 604,121

Loss
Area

Common Coverage
Area (No Change)

Lic KSNB-TV Site

KOLN Site

Gain
Area

Alternative Services Depicted
Authorized Post-Repack Facilities
Noise Limited Service Contours

Call Sign	Ch.	Community
KNHL	5	Hastings, NE
KLKN	8	Lincoln, NE
KCAU-TV	9	Sioux City, IA
KOLN	10	Lincoln, NE
KGIN	11	Grand Island, NE
KUON-TV	12	Lincoln, NE
KHGI-TV CP	13	Kearney, NE
WIBW-TV	13	Topeka, KS
KTIV	14	Sioux City, IA
KFXL-TV	15	Lincoln, NE
KYNE-TV CP	17	Omaha, NE
KXNE-TV CP	19	Norfolk, NE
KETV	20	Omaha, NE
WOWT	22	Omaha, NE
KLNE-TV CP	26	Lexington, NE
KPTM	26	Omaha, NE
KHNE-TV	28	Hastings, NE
KSIN-TV	28	Sioux City, IA
KXVO	29	Omaha, NE
KPTH	30	Sioux City, IA
KMTV-TV	31	Omaha, NE
KMEG	32	Sioux City, IA
KBIN-TV	33	Council Bluffs, IA
KHIN	35	Red Oak, IA

Service Gain/Loss Population Report
Population Database: 2010 US Census (PL)
Full Power Television NLSC Areas

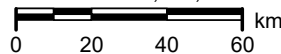
Proposed: KSNB-TV as Ch-24 site at Beaver Crossing
41 dBu Total Population 604,121

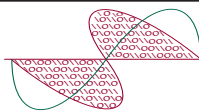
Existing: KSNB-TV Ch-4 Licensed
28 dBu Total Population 661,418

Gain Area Total Population: 62,472
Loss Area Total Population: 119,769
Common Area Total Population: 541,649
Net Gain in Total Population: -57,297

Number of Services	Gain	Loss	Net Gain
0	0	353	-353
1	0	6,180	-6,180
2	0	1,386	-1,386
3	0	2,848	-2,848
4	0	10,210	-10,210
5 or more	62,472	98,792	-36,320

Scale 1:2,000,000





Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio

Figure 3
Composite Gain-Loss Analysis
With KOLN Expansion
FCC Coverage Contours
KSNB-TV Ch. 24 York, NE
Facility ID 21161

prepared for
Gray Television Licensee, LLC

October, 2020

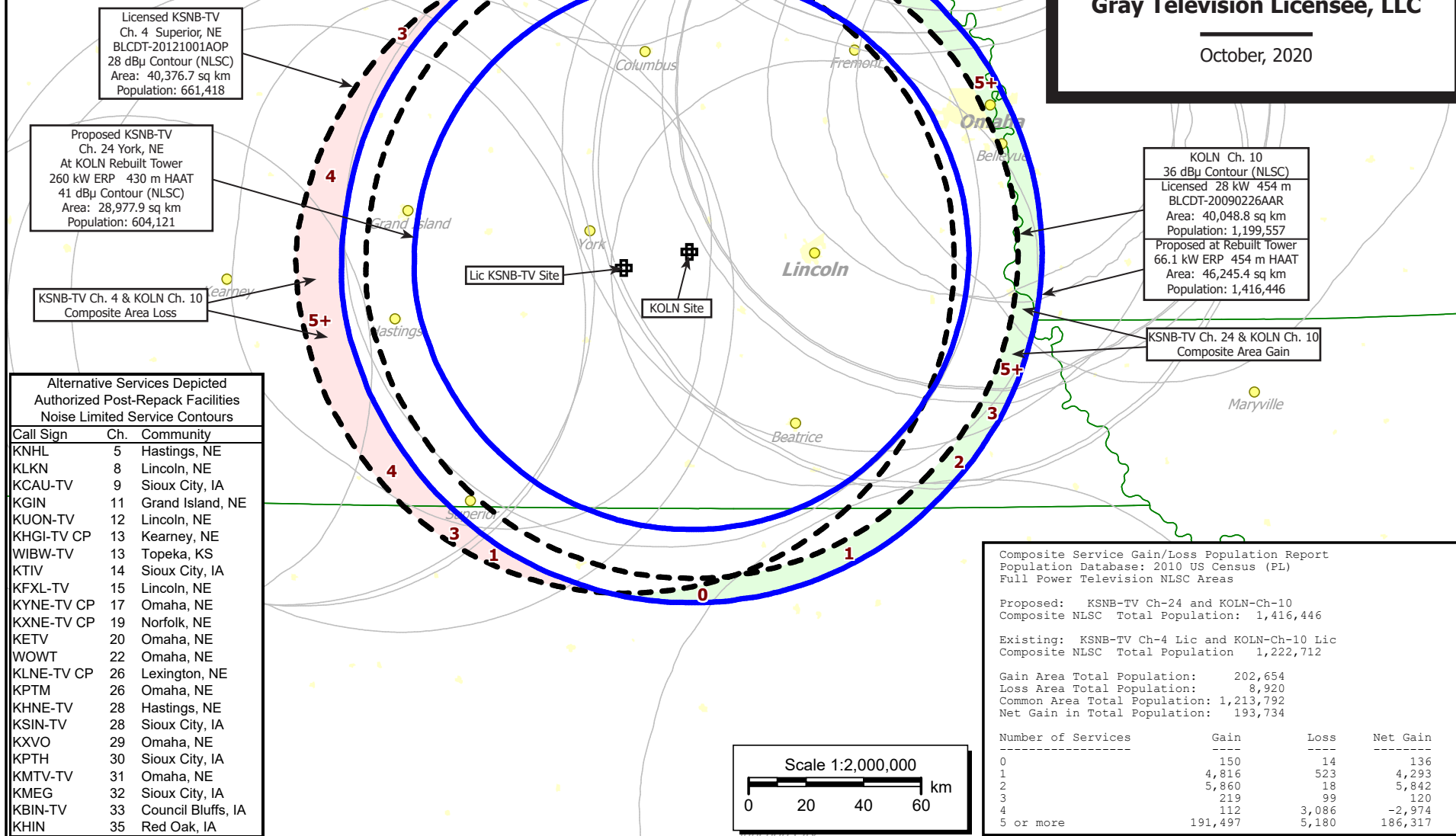


Table 1 KSNB-TV TVStudy Analysis of Proposal
(page 1 of 2)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: KSNB-TV amend Ch-24, Model: Longley-Rice
Start: 2020.10.05 16:08:02

Study created: 2020.10.05 16:08:02

Study build station data: LMS TV 2020-10-05

Proposal: KSNB-TV D24 DT APP York, NE
File number: KSNB-TV amend Ch-24
Facility ID: 21161
Station data: User record
Record ID: 3232
Country: U.S.
Zone: II

Search options:
Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	KIMT	D24	DT	LIC	MASON CITY, IA	BLANK0000067292	473.3 km
No	KGPT-CD	D24	DC	LIC	WICHITA, KS	BLDTA20130404ABI	335.1
No	KGPT-CD	D24	DC	CP	WICHITA, KS	BDCCDTL20111228ACD	335.1
Yes	KCTV	D24	DT	LIC	KANSAS CITY, MO	BLCDT20110405ABD	293.5
Yes	KCSD-TV	D24	DT	LIC	SIOUX FALLS, SD	BLEDT20081121AKM	311.1

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D24
Latitude: 40 48 11.00 N (NAD83)
Longitude: 97 10 53.00 W
Height AMSL: 888.7 m
HAAT: 429.7 m
Peak ERP: 260 kW
Antenna: Omnidirectional
Elev Pattern: Generic
Elec Tilt: 1.00

39.8 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	260 kW	425.9 m	98.3 km
45.0	260	437.3	99.1
90.0	260	443.3	99.6
135.0	260	433.2	98.8
180.0	260	433.5	98.8
225.0	260	428.8	98.5
270.0	260	423.2	98.1
315.0	260	412.2	97.3

Distance to Canadian border: 898.0 km

Distance to Mexican border: 1283.7 km

Conditions at FCC monitoring station: Grand Island NE
Bearing: 277.6 degrees Distance: 105.7 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 266.6 degrees Distance: 683.7 km

Study cell size: 2.00 km
Profile point spacing: 1.00 km

Maximum new IX to full-service and Class A: 0.50%
Maximum new IX to LPTV: 2.00%

Table 1 KSNB-TV TVStudy Analysis of Proposal
(page 2 of 2)



Interference to BLCDT20110405ABD LIC scenario 1

Desired:	Call KCTV	Chan D24	Svc DT	Status LIC	City, State KANSAS CITY, MO	File Number BLCDT20110405ABD	Distance		
Undesireds:	KSNB-TV	D24	DT	APP	York, NE	KSNB-TV amend Ch-24	293.5 km		
	KGPT-CD	D24	DC	LIC	WICHITA, KS	BLDTA20130404ABI	292.5		
	KMOV	D24	DT	LIC	ST. LOUIS, MO	BLCDT20090626ACG	375.8		
	KMCI-TV	D25	DT	LIC	LAWRENCE, KS	BLANK0000074650	11.1		
Service area		Terrain-limited			IX-free, before		IX-free, after	Percent New IX	
33968.5	2,547,456	33628.4	2,545,645		33347.9	2,537,289	33224.0	2,533,221	0.37 0.16
Undesired				Total IX		Unique IX, before		Unique IX, after	
KSNB-TV	D24	DT	APP	127.9	4,072		123.9	4,068	
KMOV	D24	DT	LIC	32.0	85		28.0	78	
KMCI-TV	D25	DT	LIC	252.5	8,278		244.5	8,267	

Interference to BLEDT20081121AKM LIC scenario 1

Desired:	Call KCSD-TV	Chan D24	Svc DT	Status LIC	City, State SIOUX FALLS, SD	File Number BLEDT20081121AKM	Distance		
Undesireds:	KSNB-TV	D24	DT	APP	York, NE	KSNB-TV amend Ch-24	311.1 km		
	KSAX	D24	DT	LIC	ALEXANDRIA, MN	BLANK0000074900	263.6		
Service area		Terrain-limited			IX-free, before		IX-free, after	Percent New IX	
11038.9	273,553	11002.8	273,447		10998.8	273,445	10990.8	273,410	0.07 0.01
Undesired				Total IX	Unique IX, before		Unique IX, after		
KSNB-TV	D24	DT	APP	8.0	35		8.0	35	
KSAX	D24	DT	LIC	4.0	2	4.0 2	4.0	2	

Interference to proposal scenario 1

Desired:	Call KSNB-TV	Chan D24	Svc DT	Status APP	City, State York, NE	File Number KSNB-TV amend Ch-24	Distance
Undesireds:	KGPT-CD	D24	DC	LIC	WICHITA, KS	BLDTA20130404ABI	335.1 km
	KCTV	D24	DT	LIC	KANSAS CITY, MO	BLCDT20110405ABD	293.5
Service area		Terrain-limited			IX-free	Percent IX	
30505.0	664,078	30456.9		662,725	30247.9	660,737	0.69 0.30
Undesired				Total IX		Unique IX	Prct Unique IX
KCTV D24 DT LIC		208.9		1,988	208.9	1,988	0.69 0.30

Table 2

Available Channels – Superior, NE

prepared for

Gray Television Licensee, LLC (KSNB-TV)

Available TV Channels that comply with §73.623(d) for Superior, NE
Minimum distance spacing requirements for petitions to add new DTV allotments
Community Reference Point 40° 01' 22.7" N-Lat, 98° 03' 58.5" W-Lon

Channel	Fully-Spaced Allotment Point and Site Restriction, if any
2	OK with 14 km site restriction to East Allotment Point at 40° 00' 17" N-Lat, 97° 54' 15" W-Lon
3	OK at Community Reference Point
4	OK at Community Reference Point (assumes KSNB-TV is changed to Channel 24 at York, NE)
6	OK with 38 km site restriction to Southeast Allotment Point at 39° 46' 52" N-Lat, 97° 44' 57" W-Lon
9	OK at Community Reference Point
18	OK at Community Reference Point
19	OK with 5 km site restriction to North Allotment Point at 40° 04' 05" N-Lat, 98° 04' 13" W-Lon
20	OK at Community Reference Point
21	OK at Community Reference Point
23	OK at Community Reference Point (considers that KSNB-TV is changed to Channel 24 at York, NE)
25	OK at Community Reference Point (considers that KSNB-TV is changed to Channel 24 at York, NE)
30	OK at Community Reference Point
31	OK at Community Reference Point
32	OK at Community Reference Point
33	OK at Community Reference Point
34	OK at Community Reference Point
35	OK at Community Reference Point
36	OK at Community Reference Point

18 TV channels total available for Superior, NE

Table 3

Available Channels – York, NE

prepared for

Gray Television Licensee, LLC (KSNB-TV)

Available TV Channels that comply with §73.623(d) for York, NE
Minimum distance spacing requirements for petitions to add new DTV allotments
Community Reference Point 40° 52' 09.8" N-Lat, 97° 35' 33.9" W-Lon

Channel	Fully-Spaced Allotment Point and Site Restriction, if any
2	OK with 8 km site restriction to East Allotment Point at 40° 52' 05" N-Lat, 97° 29' 53" W-Lon
3	OK at Community Reference Point
4	OK at Community Reference Point (assumes KSNB-TV is changed to Channel 24 at York, NE)
6	OK with 40 km site restriction to East Allotment Point at 40° 57' 21" N-Lat, 97° 08' 03" W-Lon
14	OK with 26 km site restriction to West Allotment Point at 40° 53' 38" N-Lat, 97° 54' 02" W-Lon
16	OK with 26 km site restriction to West Allotment Point at 40° 53' 38" N-Lat, 97° 54' 02" W-Lon
18	OK at Community Reference Point
21	OK at Community Reference Point
23	OK with 12 km site restriction to East Allotment Point at 40° 51' 06" N-Lat, 97° 27' 13" W-Lon (considers that KSNB-TV is changed to Channel 24 at York, NE)
30	OK with 2 km site restriction to South Allotment Point at 40° 51' 08" N-Lat, 97° 35' 33" W-Lon
32	OK with 2 km site restriction to South Allotment Point at 40° 51' 08" N-Lat, 97° 35' 33" W-Lon
34	OK at Community Reference Point
35	OK with 22 km site restriction to West Allotment Point at 40° 52' 12" N-Lat, 97° 50' 53" W-Lon
36	OK at Community Reference Point

14 TV channels total available for York, NE

Table 4

Available Channels – Lincoln, NE

prepared for

Gray Television Licensee, LLC (KSNB-TV)



Available TV Channels that comply with §73.623(d) for Lincoln, NE
Minimum distance spacing requirements for petitions to add new DTV allotments
Community Reference Point 40° 48' 32.2" N-Lat, 96° 40' 44.2" W-Lon

Channel	Fully-Spaced Allotment Point and Site Restriction, if any
2	OK at Community Reference Point
3	OK at Community Reference Point
4	OK at Community Reference Point (assumes KSNB-TV is changed to Channel 24 at York, NE)
6	OK at Community Reference Point
18	OK with 33 km site restriction to Southwest Allotment Point at 40° 38' 32" N-Lat, 96° 59' 50" W-Lon
21	OK with 33 km site restriction to Southwest Allotment Point at 40° 38' 32" N-Lat, 96° 59' 50" W-Lon
23	OK with 33 km site restriction to Southwest Allotment Point at 40° 38' 32" N-Lat, 96° 59' 50" W-Lon (considers that KSNB-TV is changed to Channel 24 at York, NE)
32	OK with 33 km site restriction to Southwest Allotment Point at 40° 38' 32" N-Lat, 96° 59' 50" W-Lon
36	OK at Community Reference Point

9 TV channels total available for Lincoln, NE