



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 8, 2023 – 04:37 AM EDT

PDB ID : 1NJM  
Title : The crystal structure of the 50S Large ribosomal subunit from *Deinococcus radiodurans* complexed with a tRNA acceptor stem mimic (ASM) and the antibiotic sparsomycin  
Authors : Bashan, A.; Agmon, I.; Zarivatch, R.; Schluenzen, F.; Harms, J.M.; Berisio, R.; Bartels, H.; Hansen, H.A.; Yonath, A.  
Deposited on : 2003-01-02  
Resolution : 3.60 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35



## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 60271 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a RNA chain called 23S ribosomal RNA.

| Mol | Chain | Residues | Atoms |       |       |       |      | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-------|-------|-------|------|---------|---------|-------|
|     |       |          | Total | C     | N     | O     | P    |         |         |       |
| 1   | 0     | 2766     | 59359 | 26479 | 10949 | 19166 | 2765 | 0       | 0       | 0     |

- Molecule 2 is a RNA chain called tRNA acceptor stem mimic.

| Mol | Chain | Residues | Atoms |     |    |     |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-----|----|-----|----|---------|---------|-------|
|     |       |          | Total | C   | N  | O   | P  |         |         |       |
| 2   | 5     | 25       | 543   | 249 | 97 | 173 | 24 | 0       | 0       | 0     |

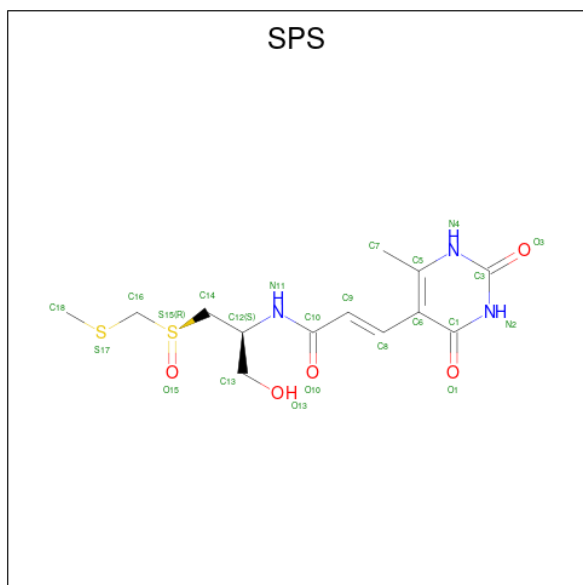
- Molecule 3 is a protein called 50S ribosomal protein L16.

| Mol | Chain | Residues | Atoms |     | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-----|---------|---------|-------|
|     |       |          | Total | C   |         |         |       |
| 3   | K     | 124      | 124   | 124 | 0       | 0       | 124   |

- Molecule 4 is a protein called GENERAL STRESS PROTEIN CTC.

| Mol | Chain | Residues | Atoms |     | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-----|---------|---------|-------|
|     |       |          | Total | C   |         |         |       |
| 4   | T     | 223      | 223   | 223 | 0       | 0       | 223   |

- Molecule 5 is SPARSOMYCIN (three-letter code: SPS) (formula: C<sub>13</sub>H<sub>19</sub>N<sub>3</sub>O<sub>5</sub>S<sub>2</sub>).



| Mol | Chain | Residues | Atoms |    |   |   |   | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|---|---|---|---------|---------|
|     |       |          | Total | C  | N | O | S |         |         |
| 5   | 0     | 1        | 22    | 13 | 3 | 4 | 2 | 0       | 0       |



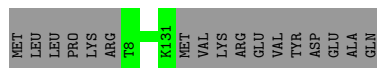
|       |       |       |       |       |       |       |       |       |       |      |      |      |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|
| G1818 | G1737 | A1858 | A1586 | G1508 | A1441 | G1359 | A1289 | G1045 | U978  | C    | U840 | G778 |
| U1819 | G1742 | G1659 | A1587 | A1509 | C1442 | U1365 | A1290 | U1046 | A979  | A911 | G841 | U719 |
| A1820 | C1743 | G1660 | U1510 | A1511 | C1443 | A1366 | G1291 | G1047 | G980  | U916 | A842 | U780 |
| C1822 | A1821 | C1661 | U1591 | A1512 | C1444 | A1367 | A1292 | C1053 | C981  | U917 | G843 | G781 |
| C1825 | C1745 | C1662 | C1592 | U1513 | U1445 | A1368 | A1293 | C1054 | U884  | A918 | G844 | U782 |
| U1826 | A1746 | G1664 | U1594 | C1514 | U1446 | G1369 | G1288 | C1052 | A984  | U919 | U845 | G783 |
| U1829 | G1747 | G1665 | A1595 | C1515 | U1447 | U1370 | G1288 | C1052 | G985  | G920 | A846 | U784 |
| C1829 | U1748 | G1666 | A1596 | A1516 | A1448 | G1371 | U1301 | A1055 | A986  | A922 | U852 | U786 |
| C1830 | G1749 | A1667 | A1597 | C1517 | G1450 | A1372 | U1307 | A1056 | G987  | U925 | G853 | A787 |
| G1831 | A1750 | C1668 | C1598 | C1518 | C1451 | A1373 | U1307 | A1057 | G988  | A922 | G854 | G788 |
| C1835 | G1754 | G1670 | U1600 | G1520 | U1452 | G1377 | G1308 | A1058 | A991  | U925 | G855 | G789 |
| C1836 | G1755 | U1521 | U1601 | U1521 | C1455 | U1377 | C1309 | A1059 | A994  | C927 | G856 | A790 |
| G1837 | G1760 | C1522 | G1602 | C1522 | C1456 | C1380 | C1310 | A1060 | A994  | C927 | A856 | G791 |
| G1838 | G1761 | A1523 | A1603 | A1523 | A1457 | G1381 | G1311 | A1162 | A995  | G928 | U857 | U792 |
| A1839 | C1762 | C1524 | A1604 | C1524 | U1458 | G1382 | C1312 | C1163 | A996  | A929 | G858 | G793 |
| A1840 | G1763 | U1606 | A1605 | U1606 | A1459 | A1386 | A1313 | C1069 | C997  | A930 | U859 | A794 |
| G1841 | A1764 | G1697 | C1606 | G1527 | U1460 | G1387 | A1314 | G1070 | C998  | G931 | U860 | A795 |
| C1850 | C1765 | A1697 | A1607 | C1528 | A1463 | G1388 | G1315 | G1073 | A999  | G932 | G861 | A796 |
| A1851 | G1766 | U1608 | U1608 | C1529 | A1464 | C1389 | G1316 | G1074 | G1000 | G933 | C864 | A797 |
| G1855 | U1770 | A1681 | G1613 | U1530 | A1465 | G1389 | G1317 | G1075 | A1001 | G934 | C864 | A798 |
| U1856 | A1774 | G1682 | G1614 | C1531 | G1466 | A1390 | G1318 | C1076 | C1002 | C935 | A865 | U800 |
| C1857 | A1775 | C1683 | C1615 | C1531 | C1467 | A1391 | C1319 | U1076 | C1003 | A936 | G866 | C803 |
| C1858 | A1776 | G1684 | U1611 | C1532 | U1468 | A1392 | A1320 | U1081 | C939  | G940 | C870 | C804 |
| A1859 | A1777 | U1685 | G1612 | G1533 | U1469 | G1393 | A1320 | A1082 | U1005 | G940 | C871 | G805 |
| A1860 | U1778 | C1686 | G1613 | U1539 | G1470 | A1397 | G1323 | A1083 | A1007 | U941 | U871 | A806 |
| G1861 | C1779 | C1687 | C1614 | C1540 | G1471 | G1398 | U1324 | G1084 | A1008 | U942 | G872 | A807 |
| C1862 | A1780 | G1688 | U1619 | C1543 | C1472 | C1399 | U1326 | C1086 | C1009 | U943 | U873 | C808 |
| C1865 | A1785 | C1689 | G1620 | G1544 | U1474 | G1402 | C1327 | C1087 | A944  | U944 | A874 | C809 |
| U1866 | C1786 | G1704 | G1621 | U1545 | U1475 | U1403 | U1329 | C1088 | G945  | U945 | G875 | C809 |
| G1871 | U1787 | C1708 | C1622 | C1552 | U1478 | G1407 | U1330 | C1090 | C948  | C948 | G877 | U810 |
| G1880 | C1788 | U1709 | A1626 | G1557 | G1479 | U1410 | G1331 | C1091 | G949  | G949 | C878 | G812 |
| U1881 | U1789 | U1710 | U1627 | C1558 | G1480 | C1411 | G1332 | U1092 | G950  | G950 | C879 | G812 |
| G1882 | C1790 | G1712 | C1628 | U1561 | U1481 | G1414 | G1333 | U1093 | G814  | G814 | A815 | A815 |
| A1883 | C1792 | G1713 | G1629 | A1562 | U1482 | C1415 | A1334 | G1098 | A1021 | G953 | U816 | U816 |
| C1884 | A1793 | A1714 | A1632 | G1566 | A1486 | C1416 | G1337 | A1099 | G887  | U954 | G888 | A817 |
| C1885 | A1794 | U1715 | C1633 | A1567 | G1487 | C1418 | C1340 | A1099 | G888  | U954 | G889 | G818 |
| G1886 | U1799 | G1716 | A1634 | A1568 | A1489 | G1419 | U1342 | A1099 | G889  | U954 | C889 | G819 |
| C1887 | A1800 | A1717 | G1635 | G1571 | A1492 | U1424 | C1344 | A1099 | U890  | U955 | U890 | C819 |
| C1888 | C1801 | G1723 | U1643 | C1572 | G1493 | G1425 | G1345 | G1100 | A956  | G955 | A891 | U820 |
| G1889 | U1723 | U1723 | A1643 | G1573 | G1494 | U1426 | C1346 | A1114 | A1025 | G957 | G891 | U821 |
| G1890 | C1724 | C1724 | G1644 | A1574 | G1495 | G1427 | C1347 | A1114 | U1026 | G958 | G    | G822 |
| A1895 | G1806 | C1724 | U1644 | C1575 | G1496 | G1428 | U1348 | C1120 | G     | G    | G    | U823 |
| A1896 | A1807 | C1727 | U1648 | G1576 | C1497 | A1429 | A1349 | G1121 | G     | G    | G    | U824 |
| C1898 | C1808 | U1728 | U1651 | G1577 | G1498 | G1430 | G1350 | A1122 | U1029 | U960 | G    | C825 |
| U1900 | G1809 | C1729 | G1652 | U1578 | A1499 | U1431 | G1351 | G1127 | A1032 | A964 | G    | C826 |
| A1810 | C1730 | G1730 | C1653 | G1579 | U1500 | G1432 | G1352 | G1128 | A1032 | A964 | C    | C827 |
| A1811 | C1731 | C1731 | A1654 | C1580 | C1501 | U1433 | A1353 | G1129 | A1032 | A964 | C    | C828 |
| U1812 | U1812 | U1732 | C1655 | C1581 | G1502 | U1434 | A1354 | A1129 | G1033 | A966 | U    | C829 |
| C1907 | C1907 | U1733 | U1656 | A1582 | G1503 | G1435 | A1355 | U1130 | G967  | G967 | A    | C830 |
| C1908 | U1814 | U1733 | U1655 | G1583 | G1504 | G1436 | A1356 | G1131 | U1035 | U969 | C    | C831 |
| U1909 | C1736 | C1736 | A1657 | U1585 | U1505 | A1437 | C1358 | G1132 | G1036 | C    | C    | G832 |
|       |       |       |       |       |       |       |       | G1133 | U1037 | A970 | A    | A832 |
|       |       |       |       |       |       |       |       | G1133 | U1038 | A971 | C    | A833 |
|       |       |       |       |       |       |       |       | A1137 | A1039 | C972 | C    | A834 |
|       |       |       |       |       |       |       |       | A1138 | A1040 | U973 | U    | U837 |
|       |       |       |       |       |       |       |       | A1139 | G1041 | U974 | U    | A838 |
|       |       |       |       |       |       |       |       | A1140 | C975  | C975 | A    | U839 |
|       |       |       |       |       |       |       |       | U1141 | U1044 |      | C    |      |





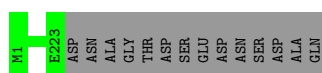
- Molecule 3: 50S ribosomal protein L16

Chain K: 88% 12%



- Molecule 4: GENERAL STRESS PROTEIN CTC

Chain T: 94% 6%





## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

| Property   | Value   | Source    |
|--|---|-----------|
| Space group  | I 2 2 2   | Depositor |
| Cell constants<br>a, b, c, $\alpha$ , $\beta$ , $\gamma$ | 169.60Å 409.40Å 695.10Å<br>90.00° 90.00° 90.00° | Depositor |
| Resolution (Å)   | 15.00 – 3.60                                    | Depositor |
| % Data completeness<br>(in resolution range)             | (Not available) (15.00-3.60)                    | Depositor |
| $R_{merge}$  | (Not available)                                 | Depositor |
| $R_{sym}$  | 0.17  | Depositor |
| Refinement program                                       | CNS   | Depositor |
| R, $R_{free}$  | 0.284 , 0.308                                   | Depositor |
| Estimated twinning fraction                              | No twinning to report.                          | Xtrriage  |
| Total number of atoms                                    | 60271   | wwPDB-VP  |
| Average B, all atoms (Å <sup>2</sup> )                   | 74.0  | wwPDB-VP  |

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SPS, PPU

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Chain | Bond lengths |         | Bond angles |          |
|-----|-------|--------------|---------|-------------|----------|
|     |       | RMSZ         | # Z  >5 | RMSZ        | # Z  >5  |
| 1   | 0     | 0.14         | 0/66467 | 0.63        | 0/103673 |
| 2   | 5     | 0.16         | 0/563   | 0.63        | 0/873    |
| All | All   | 0.14         | 0/67030 | 0.63        | 0/104546 |

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

| Mol | Chain | #Chirality outliers | #Planarity outliers |
|-----|-------|---------------------|---------------------|
| 1   | 0     | 0                   | 1                   |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group     |
|-----|-------|-----|------|-----------|
| 1   | 0     | 873 | U    | Sidechain |

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1   | 0     | 59359 | 0        | 29917    | 1742    | 0            |
| 2   | 5     | 543   | 0        | 290      | 16      | 0            |
| 3   | K     | 124   | 0        | 0        | 0       | 0            |
| 4   | T     | 223   | 0        | 0        | 0       | 0            |
| 5   | 0     | 22    | 0        | 19       | 0       | 0            |
| All | All   | 60271 | 0        | 30226    | 1754    | 0            |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 19.

All (1754) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:940:G:H3'   | 1:0:941:U:H5''  | 1.22                     | 1.14              |
| 1:0:1141:U:H3   | 1:0:2008:C:H5'' | 1.20                     | 1.05              |
| 1:0:1073:G:H2'  | 1:0:1074:G:H4'  | 1.40                     | 1.00              |
| 1:0:2548:G:H2'  | 1:0:2549:G:H5'' | 1.44                     | 1.00              |
| 1:0:2769:C:H2'  | 1:0:2867:G:H22  | 1.22                     | 0.98              |
| 1:0:58:C:H3'    | 1:0:59:G:H5''   | 1.42                     | 0.97              |
| 1:0:688:A:H62   | 1:0:816:U:H3    | 1.09                     | 0.97              |
| 1:0:2668:U:H4'  | 1:0:2669:C:H5'  | 1.46                     | 0.97              |
| 1:0:1252:C:H2'  | 1:0:1253:C:H5'' | 1.47                     | 0.97              |
| 1:0:2636:A:H62  | 1:0:2643:G:H21  | 1.12                     | 0.96              |
| 1:0:1086:C:H2'  | 1:0:1087:C:H5'' | 1.49                     | 0.95              |
| 1:0:1182:U:H2'  | 1:0:1183:C:H5'' | 1.47                     | 0.95              |
| 1:0:1496:G:H1   | 1:0:1527:G:H1   | 1.14                     | 0.94              |
| 1:0:471:A:H62   | 1:0:480:G:H21   | 1.12                     | 0.94              |
| 1:0:221:A:H62   | 1:0:231:G:H21   | 1.14                     | 0.94              |
| 1:0:1572:C:H2'  | 1:0:1573:G:H5'' | 1.48                     | 0.94              |
| 1:0:1747:G:H4'  | 1:0:1749:G:H1'  | 1.48                     | 0.94              |
| 1:0:2579:A:H2'  | 1:0:2580:C:H5'' | 1.49                     | 0.94              |
| 1:0:225:G:H3'   | 1:0:226:C:H5'   | 1.48                     | 0.93              |
| 1:0:1953:A:H1'  | 1:0:1955:G:H1'  | 1.52                     | 0.92              |
| 1:0:1312:G:H5'' | 1:0:1313:U:H5'  | 1.53                     | 0.91              |
| 1:0:847:C:H41   | 1:0:955:G:H21   | 1.18                     | 0.91              |
| 1:0:166:G:H21   | 1:0:184:A:H62   | 1.12                     | 0.91              |
| 1:0:929:A:H3'   | 1:0:930:A:H5''  | 1.52                     | 0.90              |
| 1:0:1223:G:H21  | 1:0:1225:G:H21  | 0.92                     | 0.90              |
| 2:5:31:C:H3'    | 2:5:32:A:H5''   | 1.54                     | 0.90              |
| 1:0:1199:U:H3'  | 1:0:1200:G:H5'' | 1.52                     | 0.90              |
| 1:0:831:G:H21   | 1:0:1203:A:H62  | 1.17                     | 0.89              |
| 1:0:1915:A:H62  | 1:0:1951:G:H21  | 1.19                     | 0.89              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:789:G:H21   | 1:0:806:A:H62   | 1.14                     | 0.89              |
| 1:0:1656:U:H2'  | 1:0:1657:A:H5'' | 1.56                     | 0.88              |
| 1:0:104:C:H2'   | 1:0:105:G:H5''  | 1.56                     | 0.88              |
| 1:0:2633:A:H4'  | 1:0:2634:G:H4'  | 1.56                     | 0.87              |
| 1:0:2059:U:H5   | 1:0:2575:U:H3   | 1.23                     | 0.87              |
| 1:0:367:G:H2'   | 1:0:368:A:H5''  | 1.55                     | 0.87              |
| 1:0:403:A:H4'   | 1:0:425:A:H5'   | 1.57                     | 0.86              |
| 1:0:128:C:H2'   | 1:0:129:A:H5''  | 1.58                     | 0.86              |
| 1:0:1223:G:H21  | 1:0:1225:G:N2   | 1.74                     | 0.86              |
| 1:0:1964:A:H3'  | 1:0:1965:U:H5'  | 1.60                     | 0.84              |
| 1:0:1034:U:H1'  | 1:0:1133:G:H5'' | 1.59                     | 0.84              |
| 1:0:2047:C:H42  | 1:0:2425:G:H1   | 1.24                     | 0.83              |
| 1:0:1436:G:H1'  | 1:0:1508:G:H21  | 1.41                     | 0.83              |
| 1:0:2607:C:H3'  | 1:0:2608:A:H5'  | 1.58                     | 0.82              |
| 1:0:2794:G:H3'  | 1:0:2796:A:H62  | 1.43                     | 0.82              |
| 1:0:109:A:H3'   | 1:0:110:U:H5''  | 1.61                     | 0.81              |
| 1:0:2081:U:H2'  | 1:0:2082:C:H5'' | 1.62                     | 0.81              |
| 1:0:2806:G:H1'  | 1:0:2858:A:H2'  | 1.63                     | 0.81              |
| 1:0:2198:U:H3'  | 1:0:2199:C:H5'' | 1.62                     | 0.81              |
| 1:0:88:G:H3'    | 1:0:89:A:H5''   | 1.61                     | 0.81              |
| 1:0:940:G:H3'   | 1:0:941:U:C5'   | 2.09                     | 0.81              |
| 1:0:26:G:H21    | 1:0:524:A:H62   | 1.25                     | 0.81              |
| 1:0:2491:C:H2'  | 1:0:2492:G:H5'' | 1.63                     | 0.81              |
| 1:0:2522:G:H21  | 1:0:2625:U:H5'' | 1.45                     | 0.80              |
| 1:0:2700:U:H3   | 1:0:2848:A:N6   | 1.79                     | 0.80              |
| 1:0:9:U:H3      | 1:0:2608:A:H62  | 1.29                     | 0.80              |
| 1:0:2426:G:H5'  | 1:0:2480:C:H41  | 1.47                     | 0.80              |
| 1:0:1223:G:N2   | 1:0:1225:G:H21  | 1.76                     | 0.79              |
| 1:0:542:A:H2'   | 1:0:543:G:H5'   | 1.65                     | 0.79              |
| 1:0:460:U:H3    | 1:0:592:G:H1'   | 1.46                     | 0.79              |
| 1:0:1141:U:N3   | 1:0:2008:C:H5'' | 1.97                     | 0.79              |
| 1:0:2769:C:H2'  | 1:0:2867:G:N2   | 1.97                     | 0.79              |
| 1:0:2548:G:C2'  | 1:0:2549:G:H5'' | 2.10                     | 0.79              |
| 1:0:918:A:H2'   | 1:0:919:U:H5''  | 1.64                     | 0.79              |
| 1:0:176:A:H1'   | 1:0:2221:G:H21  | 1.48                     | 0.78              |
| 1:0:2227:C:H2'  | 1:0:2228:U:H5'  | 1.66                     | 0.78              |
| 1:0:2564:U:H5'' | 1:0:2565:C:H5'  | 1.65                     | 0.78              |
| 2:5:3:G:H1      | 2:5:29:U:H3     | 1.32                     | 0.78              |
| 1:0:1811:A:O2'  | 1:0:1812:U:H5'' | 1.83                     | 0.78              |
| 1:0:70:A:O3'    | 1:0:71:A:H3'    | 1.84                     | 0.78              |
| 1:0:689:A:H61   | 1:0:815:A:H61   | 1.30                     | 0.77              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:26:G:N2    | 1:0:524:A:H62   | 1.83                     | 0.77              |
| 1:0:1432:G:H21 | 1:0:1596:A:H62  | 1.28                     | 0.77              |
| 1:0:1188:A:H62 | 1:0:1189:G:H21  | 1.31                     | 0.77              |
| 1:0:59:G:H1'   | 1:0:73:A:N1     | 2.01                     | 0.76              |
| 1:0:181:A:H5'' | 1:0:182:G:OP1   | 1.84                     | 0.76              |
| 1:0:652:C:H42  | 1:0:657:A:H61   | 1.31                     | 0.76              |
| 1:0:2261:G:H4' | 1:0:2262:C:OP2  | 1.86                     | 0.76              |
| 1:0:2770:A:H5' | 1:0:2867:G:H22  | 1.50                     | 0.76              |
| 1:0:2624:G:H4' | 1:0:2712:G:H2'  | 1.69                     | 0.75              |
| 1:0:2096:U:H2' | 1:0:2097:A:H5'' | 1.69                     | 0.75              |
| 1:0:688:A:N6   | 1:0:816:U:H3    | 1.85                     | 0.75              |
| 1:0:2503:G:H3' | 1:0:2504:G:H5'' | 1.69                     | 0.74              |
| 1:0:2700:U:H3  | 1:0:2848:A:H62  | 1.35                     | 0.74              |
| 1:0:616:U:H2'  | 1:0:617:U:H5''  | 1.69                     | 0.74              |
| 1:0:1252:C:C2' | 1:0:1253:C:H5'' | 2.18                     | 0.74              |
| 1:0:1473:U:H4' | 1:0:1474:A:C8   | 2.23                     | 0.73              |
| 1:0:218:A:O2'  | 1:0:219:G:H4'   | 1.87                     | 0.73              |
| 1:0:67:G:N2    | 1:0:72:A:H2'    | 2.04                     | 0.73              |
| 1:0:1182:U:C2' | 1:0:1183:C:H5'' | 2.17                     | 0.73              |
| 1:0:109:A:C3'  | 1:0:110:U:H5''  | 2.19                     | 0.72              |
| 1:0:2241:U:H1' | 1:0:2307:A:H1'  | 1.70                     | 0.72              |
| 1:0:471:A:H62  | 1:0:480:G:N2    | 1.86                     | 0.72              |
| 1:0:1882:G:H21 | 1:0:1885:C:N4   | 1.86                     | 0.72              |
| 1:0:1572:C:C2' | 1:0:1573:G:H5'' | 2.18                     | 0.72              |
| 1:0:878:C:H42  | 1:0:921:A:H62   | 1.36                     | 0.72              |
| 1:0:1021:A:H1' | 1:0:1164:C:H1'  | 1.71                     | 0.72              |
| 1:0:2721:A:H62 | 1:0:2743:G:H21  | 1.37                     | 0.72              |
| 1:0:1199:U:H3' | 1:0:1200:G:C5'  | 2.20                     | 0.72              |
| 1:0:202:A:H2'  | 1:0:203:G:O4'   | 1.88                     | 0.71              |
| 1:0:795:A:H4'  | 1:0:796:A:N7    | 2.04                     | 0.71              |
| 1:0:1908:C:H2' | 1:0:1909:U:H4'  | 1.72                     | 0.71              |
| 1:0:1479:G:N2  | 1:0:1543:G:H21  | 1.87                     | 0.71              |
| 1:0:1528:C:H2' | 1:0:1529:C:H5'' | 1.71                     | 0.71              |
| 1:0:1196:G:H2' | 1:0:1197:U:O4'  | 1.91                     | 0.71              |
| 1:0:2691:C:H3' | 1:0:2692:A:H5'' | 1.73                     | 0.71              |
| 1:0:58:C:H3'   | 1:0:59:G:C5'    | 2.19                     | 0.71              |
| 1:0:2503:G:C3' | 1:0:2504:G:H5'' | 2.21                     | 0.71              |
| 1:0:33:C:H42   | 1:0:466:A:H61   | 1.38                     | 0.71              |
| 1:0:1001:A:H62 | 1:0:1200:G:H1'  | 1.55                     | 0.71              |
| 1:0:1807:A:O2' | 1:0:1808:C:H4'  | 1.90                     | 0.71              |
| 1:0:65:C:H2'   | 1:0:66:U:H5'    | 1.73                     | 0.71              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:319:G:H21  | 1:0:340:G:H21   | 1.39                     | 0.71              |
| 1:0:1047:G:H1  | 1:0:1130:U:H3   | 1.37                     | 0.71              |
| 1:0:1923:U:H4' | 1:0:1948:C:H41  | 1.55                     | 0.71              |
| 1:0:2380:U:H2' | 1:0:2381:A:H5'  | 1.72                     | 0.71              |
| 1:0:515:A:H2'  | 1:0:516:G:H5'   | 1.72                     | 0.70              |
| 1:0:1373:G:H22 | 1:0:2192:U:H3   | 1.37                     | 0.70              |
| 1:0:514:G:N3   | 1:0:514:G:H2'   | 2.06                     | 0.70              |
| 1:0:1139:A:H1' | 1:0:2496:C:H5'  | 1.72                     | 0.70              |
| 1:0:1621:C:H4' | 1:0:1626:A:H61  | 1.56                     | 0.70              |
| 1:0:1809:G:H2' | 1:0:1810:U:O4'  | 1.91                     | 0.70              |
| 1:0:181:A:H4'  | 1:0:182:G:H4'   | 1.74                     | 0.70              |
| 1:0:1529:C:H2' | 1:0:1530:U:O4'  | 1.92                     | 0.70              |
| 1:0:2759:U:H4' | 1:0:2760:G:OP2  | 1.90                     | 0.70              |
| 1:0:1023:U:H1' | 1:0:1154:A:N7   | 2.06                     | 0.69              |
| 1:0:2522:G:N2  | 1:0:2625:U:H5'' | 2.06                     | 0.69              |
| 1:0:2510:A:H61 | 1:0:2641:A:H61  | 1.40                     | 0.69              |
| 1:0:2510:A:H61 | 1:0:2641:A:N6   | 1.90                     | 0.69              |
| 1:0:2808:U:H3' | 1:0:2809:A:H5'  | 1.74                     | 0.69              |
| 1:0:800:U:H3'  | 1:0:804:C:N4    | 2.08                     | 0.69              |
| 1:0:951:G:H2'  | 1:0:952:A:H5''  | 1.73                     | 0.69              |
| 1:0:1838:G:H2' | 1:0:1839:A:H5'  | 1.75                     | 0.69              |
| 1:0:65:C:C2'   | 1:0:66:U:H5'    | 2.23                     | 0.69              |
| 1:0:2727:G:H1  | 1:0:2735:C:H5'' | 1.58                     | 0.68              |
| 1:0:1188:A:N6  | 1:0:1189:G:H21  | 1.90                     | 0.68              |
| 1:0:584:A:H4'  | 1:0:2479:U:H5'  | 1.74                     | 0.68              |
| 1:0:653:G:H2'  | 1:0:654:A:H4'   | 1.75                     | 0.68              |
| 1:0:2607:C:H1' | 1:0:2761:A:H2'  | 1.76                     | 0.68              |
| 1:0:1978:U:H3' | 1:0:1979:C:H5'' | 1.74                     | 0.68              |
| 1:0:576:A:H2   | 1:0:580:A:H62   | 1.42                     | 0.68              |
| 1:0:1955:G:H2' | 1:0:1956:G:H5'  | 1.75                     | 0.68              |
| 1:0:941:U:H2'  | 1:0:942:U:O4'   | 1.94                     | 0.68              |
| 1:0:1791:C:O2' | 1:0:1793:A:H5'  | 1.94                     | 0.67              |
| 1:0:2095:G:H2' | 1:0:2096:U:H5'' | 1.74                     | 0.67              |
| 1:0:2495:G:H2' | 1:0:2496:C:C6   | 2.30                     | 0.67              |
| 1:0:583:C:N3   | 1:0:2016:A:H4'  | 2.09                     | 0.67              |
| 1:0:2491:C:C2' | 1:0:2492:G:H5'' | 2.24                     | 0.67              |
| 1:0:367:G:C2'  | 1:0:368:A:H5''  | 2.24                     | 0.67              |
| 1:0:813:A:O2'  | 1:0:815:A:H5'   | 1.94                     | 0.67              |
| 1:0:1181:C:H2' | 1:0:1182:U:H5'' | 1.76                     | 0.67              |
| 1:0:588:G:H4'  | 1:0:2001:G:H5'' | 1.77                     | 0.67              |
| 1:0:1749:G:O6  | 1:0:2674:C:H4'  | 1.94                     | 0.67              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:1915:A:H62  | 1:0:1951:G:N2   | 1.91                     | 0.67              |
| 1:0:1953:A:H1'  | 1:0:1955:G:C1'  | 2.21                     | 0.67              |
| 1:0:2680:U:H3'  | 1:0:2681:A:H5'  | 1.76                     | 0.67              |
| 1:0:2768:C:H2'  | 1:0:2769:C:O4'  | 1.94                     | 0.67              |
| 1:0:1086:C:C2'  | 1:0:1087:C:H5'' | 2.23                     | 0.67              |
| 1:0:1500:U:H3   | 1:0:1520:G:H22  | 1.43                     | 0.67              |
| 1:0:225:G:H3'   | 1:0:226:C:C5'   | 2.25                     | 0.66              |
| 1:0:1191:G:H2'  | 1:0:1192:A:H8   | 1.60                     | 0.66              |
| 1:0:73:A:H4'    | 1:0:74:G:C1'    | 2.24                     | 0.66              |
| 1:0:1474:A:H2'  | 1:0:1475:U:H5'  | 1.77                     | 0.66              |
| 1:0:1685:A:H1'  | 1:0:1686:A:C5   | 2.30                     | 0.66              |
| 1:0:69:G:H4'    | 1:0:70:A:O5'    | 1.94                     | 0.66              |
| 1:0:665:A:H3'   | 1:0:666:U:H5''  | 1.77                     | 0.66              |
| 1:0:805:G:H5''  | 1:0:806:A:O5'   | 1.95                     | 0.66              |
| 1:0:1746:A:H2'  | 1:0:1747:G:H5'  | 1.77                     | 0.66              |
| 1:0:1923:U:H4'  | 1:0:1948:C:N4   | 2.11                     | 0.66              |
| 1:0:45:C:H5''   | 1:0:192:G:N7    | 2.10                     | 0.66              |
| 1:0:1774:A:H1'  | 1:0:2586:G:H21  | 1.61                     | 0.66              |
| 1:0:66:U:H2'    | 1:0:67:G:N7     | 2.11                     | 0.66              |
| 1:0:538:A:H2'   | 1:0:539:A:H5''  | 1.77                     | 0.66              |
| 1:0:1487:C:H2'  | 1:0:1488:G:H8   | 1.60                     | 0.66              |
| 1:0:652:C:H42   | 1:0:657:A:N6    | 1.94                     | 0.66              |
| 1:0:1312:G:H5'  | 1:0:1314:A:H1'  | 1.76                     | 0.66              |
| 1:0:1352:G:H2'  | 1:0:1353:A:H8   | 1.60                     | 0.66              |
| 1:0:1686:A:N3   | 1:0:1686:A:H2'  | 2.10                     | 0.66              |
| 1:0:651:C:H2'   | 1:0:652:C:H5''  | 1.77                     | 0.65              |
| 1:0:805:G:H4'   | 1:0:806:A:OP2   | 1.96                     | 0.65              |
| 1:0:1033:G:H22  | 1:0:1150:C:H2'  | 1.61                     | 0.65              |
| 1:0:1188:A:H62  | 1:0:1189:G:N2   | 1.93                     | 0.65              |
| 1:0:2324:G:H4'  | 1:0:2326:C:H5'' | 1.79                     | 0.65              |
| 1:0:1888:C:H5'' | 1:0:1889:G:H5'' | 1.79                     | 0.65              |
| 1:0:777:A:N6    | 1:0:1766:U:H3   | 1.93                     | 0.65              |
| 1:0:1900:U:O2'  | 1:0:1946:U:H5'  | 1.96                     | 0.65              |
| 1:0:175:C:H1'   | 1:0:2413:A:H61  | 1.62                     | 0.65              |
| 1:0:1679:U:C3'  | 1:0:1680:U:H5'' | 2.27                     | 0.65              |
| 1:0:1679:U:H3'  | 1:0:1680:U:H5'' | 1.76                     | 0.65              |
| 1:0:2499:C:H41  | 1:0:2521:A:H2   | 1.42                     | 0.65              |
| 1:0:13:A:H1'    | 1:0:536:A:N6    | 2.12                     | 0.65              |
| 1:0:727:U:H2'   | 1:0:728:G:H5''  | 1.79                     | 0.65              |
| 1:0:1195:U:H2'  | 1:0:1196:G:C8   | 2.32                     | 0.65              |
| 1:0:1938:U:O2'  | 1:0:1939:U:OP1  | 2.13                     | 0.65              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:2822:U:H2'  | 1:0:2823:G:O4'  | 1.97                     | 0.65              |
| 1:0:236:C:H1'   | 1:0:632:A:O2'   | 1.96                     | 0.65              |
| 1:0:104:C:C2'   | 1:0:105:G:H5''  | 2.27                     | 0.64              |
| 1:0:2312:A:H4'  | 1:0:2313:G:N7   | 2.12                     | 0.64              |
| 1:0:317:U:H2'   | 1:0:318:G:H5''  | 1.78                     | 0.64              |
| 1:0:1427:G:H2'  | 1:0:1428:G:H5'  | 1.80                     | 0.64              |
| 1:0:2198:U:C3'  | 1:0:2199:C:H5'' | 2.28                     | 0.64              |
| 1:0:2236:U:C3'  | 1:0:2237:C:H5'' | 2.27                     | 0.64              |
| 1:0:2426:G:H22  | 1:0:2430:A:H62  | 1.45                     | 0.64              |
| 1:0:2236:U:H2'  | 1:0:2237:C:H5'' | 1.77                     | 0.64              |
| 1:0:1341:G:H22  | 1:0:1664:G:H1   | 1.46                     | 0.64              |
| 1:0:2245:A:H4'  | 1:0:2246:A:C8   | 2.32                     | 0.64              |
| 1:0:2404:A:O2'  | 1:0:2405:A:OP2  | 2.15                     | 0.64              |
| 1:0:83:A:H4'    | 1:0:84:G:O4'    | 1.97                     | 0.64              |
| 1:0:1194:U:H2'  | 1:0:1195:U:C6   | 2.32                     | 0.64              |
| 1:0:2690:A:OP2  | 1:0:2694:G:H5'  | 1.97                     | 0.64              |
| 1:0:614:G:H2'   | 1:0:615:C:C6    | 2.32                     | 0.64              |
| 1:0:571:U:H2'   | 1:0:581:A:H1'   | 1.79                     | 0.64              |
| 1:0:2080:U:H2'  | 1:0:2081:U:C6   | 2.33                     | 0.64              |
| 1:0:1517:C:H2'  | 1:0:1518:C:C6   | 2.32                     | 0.64              |
| 1:0:1807:A:H5'  | 1:0:1809:G:C1'  | 2.28                     | 0.64              |
| 1:0:1580:C:H2'  | 1:0:1581:C:C6   | 2.32                     | 0.63              |
| 1:0:73:A:H4'    | 1:0:74:G:H1'    | 1.80                     | 0.63              |
| 1:0:974:U:H1'   | 1:0:2229:G:H21  | 1.60                     | 0.63              |
| 2:5:29:U:H2'    | 2:5:30:C:C6     | 2.33                     | 0.63              |
| 1:0:927:C:H2'   | 1:0:928:G:O4'   | 1.98                     | 0.63              |
| 1:0:1250:A:O2'  | 1:0:1251:G:H4'  | 1.98                     | 0.63              |
| 1:0:1715:A:H1'  | 1:0:1717:A:O4'  | 1.99                     | 0.63              |
| 1:0:952:A:O2'   | 1:0:1204:G:H4'  | 1.98                     | 0.63              |
| 1:0:55:A:H2'    | 1:0:56:C:C6     | 2.34                     | 0.63              |
| 1:0:128:C:C2'   | 1:0:129:A:H5''  | 2.27                     | 0.63              |
| 1:0:653:G:N2    | 1:0:655:A:H1'   | 2.14                     | 0.63              |
| 1:0:1428:G:H5'' | 1:0:1429:A:H5'  | 1.79                     | 0.63              |
| 1:0:221:A:H62   | 1:0:231:G:N2    | 1.91                     | 0.63              |
| 1:0:2261:G:H5'' | 1:0:2262:C:O5'  | 1.98                     | 0.63              |
| 1:0:167:A:H62   | 1:0:183:U:H3    | 1.47                     | 0.63              |
| 1:0:998:C:H2'   | 1:0:999:A:O4'   | 1.98                     | 0.62              |
| 1:0:2570:C:H2'  | 1:0:2571:G:C8   | 2.34                     | 0.62              |
| 1:0:1181:C:C3'  | 1:0:1182:U:H5'' | 2.29                     | 0.62              |
| 1:0:2508:G:H5'' | 1:0:2509:A:H5'' | 1.82                     | 0.62              |
| 1:0:2636:A:H62  | 1:0:2643:G:N2   | 1.90                     | 0.62              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:2422:C:H2'  | 1:0:2423:G:H8   | 1.64                     | 0.62              |
| 1:0:2617:G:H22  | 1:0:2755:A:H2'  | 1.65                     | 0.62              |
| 1:0:439:C:H2'   | 1:0:440:U:O4'   | 1.99                     | 0.62              |
| 1:0:542:A:C2'   | 1:0:543:G:H5'   | 2.29                     | 0.62              |
| 1:0:1085:G:H2'  | 1:0:1086:C:C6   | 2.35                     | 0.62              |
| 1:0:2015:G:O2'  | 1:0:2016:A:OP1  | 2.12                     | 0.62              |
| 1:0:2381:A:H4'  | 1:0:2382:C:C5   | 2.34                     | 0.62              |
| 1:0:323:G:H5'   | 1:0:342:G:C6    | 2.35                     | 0.62              |
| 1:0:831:G:H21   | 1:0:1203:A:N6   | 1.94                     | 0.62              |
| 1:0:1354:A:H62  | 1:0:1407:G:H22  | 1.47                     | 0.62              |
| 1:0:2755:A:O2'  | 1:0:2756:A:H5'  | 2.00                     | 0.62              |
| 1:0:121:G:O2'   | 1:0:1389:C:H4'  | 2.00                     | 0.62              |
| 1:0:362:C:H2'   | 1:0:363:G:H4'   | 1.81                     | 0.62              |
| 1:0:852:U:H3    | 1:0:950:G:H1    | 1.47                     | 0.62              |
| 1:0:942:U:H2'   | 1:0:943:U:O4'   | 2.00                     | 0.62              |
| 1:0:2440:C:H1'  | 1:0:2471:U:H3   | 1.64                     | 0.62              |
| 1:0:73:A:H3'    | 1:0:73:A:N3     | 2.14                     | 0.62              |
| 1:0:414:A:H2'   | 1:0:415:A:O4'   | 1.99                     | 0.62              |
| 1:0:2035:G:H2'  | 1:0:2036:G:H8   | 1.64                     | 0.62              |
| 1:0:2721:A:H62  | 1:0:2743:G:N2   | 1.98                     | 0.62              |
| 1:0:858:G:H5''  | 1:0:859:U:H5'   | 1.80                     | 0.62              |
| 1:0:1807:A:H5'  | 1:0:1809:G:O4'  | 2.00                     | 0.62              |
| 1:0:2268:G:H22  | 1:0:2323:U:H4'  | 1.65                     | 0.62              |
| 1:0:1656:U:C2'  | 1:0:1657:A:H5'' | 2.29                     | 0.62              |
| 1:0:2246:A:H2'  | 1:0:2246:A:N3   | 2.15                     | 0.62              |
| 1:0:2472:U:H5'' | 2:5:33:C:O2'    | 2.00                     | 0.62              |
| 1:0:81:C:H2'    | 1:0:82:G:O4'    | 2.00                     | 0.61              |
| 1:0:878:C:H42   | 1:0:921:A:N6    | 1.97                     | 0.61              |
| 1:0:814:G:H3'   | 1:0:815:A:H5'   | 1.82                     | 0.61              |
| 1:0:940:G:C3'   | 1:0:941:U:H5''  | 2.14                     | 0.61              |
| 1:0:974:U:H1'   | 1:0:2229:G:N2   | 2.15                     | 0.61              |
| 1:0:1333:G:N2   | 1:0:1344:C:H41  | 1.96                     | 0.61              |
| 1:0:1455:C:O2'  | 1:0:1644:G:H5'' | 2.00                     | 0.61              |
| 1:0:2418:A:H4'  | 1:0:2420:C:OP2  | 1.99                     | 0.61              |
| 1:0:2769:C:H2'  | 1:0:2770:A:H5'  | 1.83                     | 0.61              |
| 1:0:860:U:C2'   | 1:0:861:G:H5'   | 2.31                     | 0.61              |
| 1:0:1323:G:H2'  | 1:0:1324:G:H4'  | 1.82                     | 0.61              |
| 1:0:669:G:H2'   | 1:0:670:U:C6    | 2.36                     | 0.61              |
| 1:0:871:U:H1'   | 1:0:2248:A:H5'' | 1.83                     | 0.61              |
| 1:0:1976:U:H2'  | 1:0:1977:C:H5'  | 1.82                     | 0.61              |
| 1:0:1198:C:H5'' | 1:0:1199:U:H5'' | 1.82                     | 0.61              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:1286:U:H5'' | 1:0:1663:C:H42  | 1.65                     | 0.61              |
| 1:0:181:A:H4'   | 1:0:182:G:C5'   | 2.30                     | 0.61              |
| 1:0:742:G:H2'   | 1:0:742:G:N3    | 2.14                     | 0.61              |
| 1:0:1426:U:H2'  | 1:0:1427:G:O4'  | 2.00                     | 0.61              |
| 1:0:2045:A:H4'  | 1:0:2421:C:OP2  | 2.01                     | 0.61              |
| 1:0:455:A:H4'   | 1:0:1214:C:O2'  | 2.00                     | 0.61              |
| 1:0:800:U:H3'   | 1:0:804:C:H41   | 1.65                     | 0.61              |
| 1:0:1380:C:H2'  | 1:0:1381:G:H5'  | 1.81                     | 0.61              |
| 1:0:1188:A:H2'  | 1:0:1189:G:O4'  | 2.01                     | 0.61              |
| 1:0:2223:U:H2'  | 1:0:2224:U:O4'  | 2.00                     | 0.61              |
| 1:0:2549:G:H2'  | 1:0:2550:C:O4'  | 2.01                     | 0.61              |
| 1:0:1871:G:H2'  | 1:0:1871:G:N3   | 2.16                     | 0.61              |
| 1:0:2185:U:H2'  | 1:0:2186:G:C8   | 2.36                     | 0.61              |
| 1:0:2357:A:H2'  | 1:0:2358:C:O4'  | 2.01                     | 0.61              |
| 1:0:2544:A:H2'  | 1:0:2545:A:H4'  | 1.83                     | 0.61              |
| 1:0:1713:G:H2'  | 1:0:1714:A:O4'  | 2.00                     | 0.60              |
| 1:0:2012:A:N7   | 1:0:2014:A:H5'  | 2.16                     | 0.60              |
| 1:0:2242:C:N4   | 1:0:2257:A:H61  | 1.99                     | 0.60              |
| 1:0:2727:G:O2'  | 1:0:2728:A:H5'' | 2.02                     | 0.60              |
| 1:0:1066:G:H2'  | 1:0:1067:G:H4'  | 1.84                     | 0.60              |
| 1:0:2238:G:H2'  | 1:0:2239:C:C6   | 2.37                     | 0.60              |
| 1:0:1458:A:H3'  | 1:0:1459:U:C5'  | 2.32                     | 0.60              |
| 1:0:2322:U:O2'  | 1:0:2323:U:H5'  | 2.00                     | 0.60              |
| 1:0:471:A:N6    | 1:0:480:G:H21   | 1.93                     | 0.60              |
| 1:0:2058:U:H5'  | 1:0:2576:G:H1'  | 1.83                     | 0.60              |
| 1:0:2858:A:H3'  | 1:0:2859:U:H5'  | 1.84                     | 0.60              |
| 1:0:1625:A:H2'  | 1:0:1625:A:N3   | 2.16                     | 0.60              |
| 1:0:2009:U:H3   | 1:0:2020:G:H1   | 1.50                     | 0.60              |
| 1:0:2402:U:H5'  | 1:0:2404:A:C5   | 2.37                     | 0.60              |
| 1:0:191:G:O2'   | 1:0:192:G:H5'   | 2.02                     | 0.60              |
| 1:0:192:G:O2'   | 1:0:193:A:OP2   | 2.18                     | 0.60              |
| 1:0:1073:G:C2'  | 1:0:1074:G:H4'  | 2.26                     | 0.60              |
| 1:0:1289:A:O2'  | 1:0:1290:A:H5'  | 2.02                     | 0.60              |
| 1:0:357:A:H2'   | 1:0:358:C:H5'   | 1.84                     | 0.59              |
| 1:0:1088:A:H2'  | 1:0:1089:C:O4'  | 2.02                     | 0.59              |
| 1:0:2377:U:H2'  | 1:0:2378:G:C8   | 2.37                     | 0.59              |
| 1:0:2759:U:H5'' | 1:0:2760:G:O5'  | 2.02                     | 0.59              |
| 1:0:653:G:H4'   | 1:0:2328:G:H4'  | 1.83                     | 0.59              |
| 1:0:1260:A:N6   | 1:0:1262:U:H1'  | 2.17                     | 0.59              |
| 1:0:1298:G:N2   | 1:0:1341:G:H5'' | 2.17                     | 0.59              |
| 1:0:2426:G:C5'  | 1:0:2480:C:H41  | 2.14                     | 0.59              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:2491:C:C3'  | 1:0:2492:G:H5'' | 2.32                     | 0.59              |
| 1:0:2604:G:H2'  | 1:0:2605:C:C6   | 2.37                     | 0.59              |
| 1:0:69:G:H5''   | 1:0:70:A:OP1    | 2.02                     | 0.59              |
| 1:0:2081:U:C2'  | 1:0:2082:C:H5'' | 2.32                     | 0.59              |
| 1:0:2243:C:H2'  | 1:0:2244:C:O4'  | 2.02                     | 0.59              |
| 1:0:1811:A:H1'  | 1:0:1813:A:C5   | 2.37                     | 0.59              |
| 1:0:2770:A:H5'  | 1:0:2867:G:N2   | 2.17                     | 0.59              |
| 1:0:412:U:H2'   | 1:0:413:G:O4'   | 2.03                     | 0.59              |
| 1:0:804:C:O2'   | 1:0:806:A:H4'   | 2.03                     | 0.59              |
| 1:0:824:U:O2'   | 1:0:1264:C:H1'  | 2.02                     | 0.59              |
| 1:0:1140:A:H61  | 1:0:2470:U:H6   | 1.50                     | 0.59              |
| 1:0:1634:A:O2'  | 1:0:1635:G:OP1  | 2.16                     | 0.59              |
| 1:0:1683:G:H2'  | 1:0:1684:G:O4'  | 2.03                     | 0.59              |
| 1:0:2260:C:H4'  | 1:0:2368:G:H21  | 1.67                     | 0.59              |
| 1:0:1747:G:H1'  | 1:0:1749:G:N3   | 2.18                     | 0.59              |
| 1:0:2368:G:H5'' | 1:0:2369:U:O4'  | 2.02                     | 0.59              |
| 1:0:366:U:H2'   | 1:0:367:G:H8    | 1.67                     | 0.59              |
| 1:0:2547:C:H2'  | 1:0:2548:G:H8   | 1.68                     | 0.59              |
| 1:0:368:A:H2'   | 1:0:369:C:O4'   | 2.03                     | 0.59              |
| 1:0:459:A:H1'   | 1:0:466:A:N7    | 2.17                     | 0.59              |
| 1:0:1474:A:H3'  | 1:0:1474:A:N3   | 2.18                     | 0.59              |
| 1:0:2205:C:H2'  | 1:0:2206:C:C6   | 2.38                     | 0.59              |
| 1:0:1354:A:H62  | 1:0:1407:G:N2   | 2.01                     | 0.59              |
| 1:0:513:A:H4'   | 1:0:515:A:H5'   | 1.83                     | 0.59              |
| 1:0:552:C:H2'   | 1:0:553:C:H4'   | 1.85                     | 0.59              |
| 1:0:973:U:H2'   | 1:0:974:U:C6    | 2.37                     | 0.59              |
| 1:0:1472:C:H2'  | 1:0:1473:U:H5'  | 1.84                     | 0.59              |
| 1:0:17:G:H21    | 1:0:564:U:H5''  | 1.66                     | 0.58              |
| 1:0:242:A:O2'   | 1:0:243:G:P     | 2.61                     | 0.58              |
| 1:0:665:A:H3'   | 1:0:666:U:C5'   | 2.33                     | 0.58              |
| 1:0:2236:U:C2'  | 1:0:2237:C:H5'' | 2.33                     | 0.58              |
| 1:0:1181:C:C2'  | 1:0:1182:U:H5'' | 2.33                     | 0.58              |
| 1:0:1528:C:C2'  | 1:0:1529:C:H5'' | 2.33                     | 0.58              |
| 1:0:1664:G:O5'  | 1:0:1665:C:OP1  | 2.21                     | 0.58              |
| 1:0:1918:G:H4'  | 1:0:1920:A:N3   | 2.18                     | 0.58              |
| 1:0:1926:U:O2'  | 1:0:1928:G:H5'  | 2.03                     | 0.58              |
| 1:0:1354:A:O2'  | 1:0:1355:A:OP1  | 2.19                     | 0.58              |
| 1:0:1730:G:H2'  | 1:0:1731:C:C6   | 2.38                     | 0.58              |
| 1:0:2426:G:O6   | 1:0:2479:U:H2'  | 2.02                     | 0.58              |
| 1:0:242:A:O2'   | 1:0:243:G:O4'   | 2.21                     | 0.58              |
| 1:0:689:A:H2'   | 1:0:690:A:H5'   | 1.84                     | 0.58              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:1567:A:H2' | 1:0:1568:A:O4'  | 2.04                     | 0.58              |
| 1:0:1994:U:H2' | 1:0:1995:G:O4'  | 2.04                     | 0.58              |
| 1:0:2547:C:H2' | 1:0:2548:G:C8   | 2.38                     | 0.58              |
| 1:0:874:A:H62  | 1:0:928:G:H21   | 1.51                     | 0.58              |
| 1:0:931:G:N2   | 1:0:2247:A:H5'' | 2.18                     | 0.58              |
| 1:0:1251:G:H2' | 1:0:1252:C:C6   | 2.38                     | 0.58              |
| 1:0:404:A:H5'  | 1:0:425:A:H4'   | 1.85                     | 0.58              |
| 1:0:984:A:H2'  | 1:0:1200:G:H22  | 1.68                     | 0.58              |
| 1:0:1474:A:C2' | 1:0:1475:U:H5'  | 2.33                     | 0.58              |
| 1:0:2677:U:H2' | 1:0:2678:C:C6   | 2.39                     | 0.58              |
| 1:0:605:G:H4'  | 1:0:949:G:O2'   | 2.03                     | 0.58              |
| 1:0:929:A:H2'  | 1:0:930:A:H4'   | 1.85                     | 0.58              |
| 1:0:1180:A:H2' | 1:0:1181:C:C6   | 2.39                     | 0.58              |
| 1:0:2422:C:H2' | 1:0:2423:G:C8   | 2.39                     | 0.58              |
| 1:0:2579:A:C2' | 1:0:2580:C:H5'' | 2.27                     | 0.58              |
| 1:0:839:U:H2'  | 1:0:841:G:O4'   | 2.03                     | 0.58              |
| 1:0:2607:C:H3' | 1:0:2608:A:C5'  | 2.31                     | 0.58              |
| 1:0:490:A:O2'  | 1:0:491:A:H5'   | 2.03                     | 0.58              |
| 1:0:521:U:H4'  | 1:0:1248:G:O2'  | 2.04                     | 0.58              |
| 1:0:628:A:H2'  | 1:0:629:C:C6    | 2.39                     | 0.58              |
| 1:0:632:A:H2'  | 1:0:633:G:H5'   | 1.85                     | 0.58              |
| 1:0:766:A:H2'  | 1:0:767:G:C8    | 2.38                     | 0.58              |
| 1:0:1301:U:H3  | 1:0:1339:U:H3   | 1.51                     | 0.58              |
| 1:0:1779:C:H2' | 1:0:1780:A:O4'  | 2.04                     | 0.58              |
| 1:0:2274:C:H2' | 1:0:2275:U:H5'  | 1.86                     | 0.58              |
| 1:0:2691:C:H3' | 1:0:2692:A:C5'  | 2.33                     | 0.58              |
| 1:0:118:U:H1'  | 1:0:143:A:C8    | 2.39                     | 0.57              |
| 1:0:1615:C:H2' | 1:0:1616:C:C6   | 2.39                     | 0.57              |
| 1:0:67:G:H22   | 1:0:72:A:H2'    | 1.68                     | 0.57              |
| 1:0:1712:G:H2' | 1:0:1713:G:O4'  | 2.03                     | 0.57              |
| 1:0:1916:G:H2' | 1:0:1917:C:C6   | 2.39                     | 0.57              |
| 1:0:2560:G:H4' | 1:0:2561:G:N7   | 2.18                     | 0.57              |
| 1:0:2579:A:H2' | 1:0:2580:C:C5'  | 2.30                     | 0.57              |
| 1:0:2222:U:H2' | 1:0:2223:U:C6   | 2.38                     | 0.57              |
| 1:0:2794:G:H2' | 1:0:2796:A:N7   | 2.20                     | 0.57              |
| 1:0:873:U:P    | 1:0:928:G:H1    | 2.27                     | 0.57              |
| 1:0:925:U:H4'  | 1:0:926:C:C5    | 2.40                     | 0.57              |
| 1:0:1392:U:H2' | 1:0:1393:G:H5'  | 1.87                     | 0.57              |
| 1:0:2784:A:H3' | 1:0:2785:A:H8   | 1.70                     | 0.57              |
| 1:0:1514:C:H2' | 1:0:1515:U:O4'  | 2.04                     | 0.57              |
| 1:0:2236:U:H3' | 1:0:2237:C:H5'' | 1.85                     | 0.57              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:541:C:H2'   | 1:0:2002:A:N1   | 2.20                     | 0.57              |
| 1:0:1223:G:O2'  | 1:0:1224:A:OP2  | 2.21                     | 0.57              |
| 1:0:2581:A:H2'  | 1:0:2582:G:C5'  | 2.34                     | 0.57              |
| 1:0:618:A:H2'   | 1:0:619:A:O4'   | 2.05                     | 0.57              |
| 1:0:1971:C:H2'  | 1:0:1972:G:H8   | 1.70                     | 0.57              |
| 1:0:587:A:H2'   | 1:0:588:G:H5''  | 1.87                     | 0.57              |
| 1:0:1137:A:H5'' | 1:0:1138:A:H5'' | 1.86                     | 0.57              |
| 1:0:1464:A:H4'  | 1:0:1545:G:H4'  | 1.86                     | 0.57              |
| 1:0:2437:G:H2'  | 1:0:2469:G:N2   | 2.20                     | 0.57              |
| 1:0:319:G:H21   | 1:0:340:G:N2    | 2.03                     | 0.57              |
| 1:0:1200:G:OP1  | 1:0:1200:G:O4'  | 2.22                     | 0.57              |
| 1:0:687:G:O2'   | 1:0:688:A:H5'   | 2.04                     | 0.57              |
| 1:0:1087:C:H2'  | 1:0:1088:A:O4'  | 2.05                     | 0.57              |
| 1:0:1472:C:C2'  | 1:0:1473:U:H5'  | 2.34                     | 0.57              |
| 1:0:1947:G:H3'  | 1:0:1947:G:OP1  | 2.04                     | 0.57              |
| 1:0:1220:G:H2'  | 1:0:1221:C:C6   | 2.40                     | 0.56              |
| 1:0:2242:C:H42  | 1:0:2257:A:N6   | 2.03                     | 0.56              |
| 1:0:2459:C:H2'  | 1:0:2460:G:H5'  | 1.87                     | 0.56              |
| 1:0:73:A:H4'    | 1:0:74:G:O4'    | 2.05                     | 0.56              |
| 1:0:1431:U:H2'  | 1:0:1432:G:O4'  | 2.06                     | 0.56              |
| 1:0:2329:C:H2'  | 1:0:2330:G:H5'  | 1.87                     | 0.56              |
| 1:0:2426:G:O2'  | 1:0:2427:A:OP2  | 2.19                     | 0.56              |
| 1:0:2559:U:H2'  | 1:0:2560:G:H5'  | 1.88                     | 0.56              |
| 1:0:217:U:H5'   | 1:0:633:G:O2'   | 2.06                     | 0.56              |
| 1:0:369:C:H2'   | 1:0:370:U:O4'   | 2.05                     | 0.56              |
| 1:0:533:C:H2'   | 1:0:534:U:O4'   | 2.05                     | 0.56              |
| 1:0:874:A:N6    | 1:0:928:G:H21   | 2.03                     | 0.56              |
| 1:0:1981:A:H4'  | 1:0:2704:U:O2'  | 2.05                     | 0.56              |
| 1:0:2841:U:O2   | 1:0:2843:A:H1'  | 2.05                     | 0.56              |
| 1:0:2494:C:H2'  | 1:0:2495:G:C8   | 2.40                     | 0.56              |
| 1:0:2581:A:H2'  | 1:0:2582:G:H5'' | 1.86                     | 0.56              |
| 1:0:2636:A:N6   | 1:0:2643:G:H21  | 1.93                     | 0.56              |
| 1:0:197:G:N2    | 1:0:440:U:H2'   | 2.21                     | 0.56              |
| 1:0:804:C:O2    | 1:0:807:A:H5'   | 2.05                     | 0.56              |
| 1:0:1280:U:O2'  | 1:0:1281:A:H5'  | 2.06                     | 0.56              |
| 1:0:176:A:H5''  | 1:0:177:U:H5    | 1.71                     | 0.56              |
| 1:0:197:G:H22   | 1:0:440:U:H2'   | 1.70                     | 0.56              |
| 1:0:2437:G:N2   | 1:0:2469:G:H2'  | 2.21                     | 0.56              |
| 1:0:2552:C:H42  | 2:5:35:PPU:P    | 2.28                     | 0.56              |
| 1:0:2564:U:C5'  | 1:0:2565:C:H5'  | 2.34                     | 0.56              |
| 1:0:2641:A:H2'  | 1:0:2642:G:O4'  | 2.06                     | 0.56              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:2668:U:C4' | 1:0:2669:C:H5'  | 2.29                     | 0.56              |
| 1:0:103:U:H2'  | 1:0:104:C:C6    | 2.40                     | 0.56              |
| 1:0:784:U:H2'  | 1:0:785:U:C6    | 2.41                     | 0.56              |
| 1:0:876:A:H2'  | 1:0:877:G:C8    | 2.41                     | 0.56              |
| 1:0:758:G:O2'  | 1:0:761:G:H1'   | 2.06                     | 0.56              |
| 1:0:843:G:O2'  | 1:0:844:G:OP1   | 2.15                     | 0.56              |
| 1:0:930:A:H4'  | 1:0:930:A:OP1   | 2.03                     | 0.56              |
| 1:0:2492:G:H2' | 1:0:2493:U:O4'  | 2.05                     | 0.56              |
| 1:0:1191:G:H2' | 1:0:1192:A:C8   | 2.40                     | 0.56              |
| 1:0:1356:G:H1' | 1:0:1613:G:C2   | 2.40                     | 0.56              |
| 1:0:366:U:H2'  | 1:0:367:G:C8    | 2.41                     | 0.55              |
| 1:0:1337:G:H1' | 1:0:1632:A:N6   | 2.21                     | 0.55              |
| 1:0:1813:A:H2' | 1:0:1814:G:C8   | 2.41                     | 0.55              |
| 1:0:1923:U:H1' | 1:0:1947:G:H4'  | 1.88                     | 0.55              |
| 1:0:2018:G:H3' | 1:0:2019:C:C5'  | 2.36                     | 0.55              |
| 1:0:2270:U:H2' | 1:0:2271:C:C6   | 2.42                     | 0.55              |
| 1:0:2381:A:H4' | 1:0:2382:C:H5   | 1.69                     | 0.55              |
| 1:0:1258:G:H2' | 1:0:1259:A:C8   | 2.42                     | 0.55              |
| 1:0:1273:G:H2' | 1:0:1274:C:C6   | 2.42                     | 0.55              |
| 1:0:241:C:O2'  | 1:0:242:A:H5''  | 2.06                     | 0.55              |
| 1:0:630:G:H2'  | 1:0:631:G:H5'   | 1.89                     | 0.55              |
| 1:0:775:U:O2   | 1:0:1445:A:H5'' | 2.06                     | 0.55              |
| 1:0:1949:A:H1' | 1:0:2572:U:C4'  | 2.37                     | 0.55              |
| 1:0:2061:C:H1' | 1:0:2413:A:H1'  | 1.89                     | 0.55              |
| 1:0:2095:G:C2' | 1:0:2096:U:H5'' | 2.36                     | 0.55              |
| 1:0:515:A:C2'  | 1:0:516:G:H5'   | 2.37                     | 0.55              |
| 1:0:604:U:H2'  | 1:0:605:G:C8    | 2.41                     | 0.55              |
| 1:0:1920:A:N6  | 1:0:1923:U:H6   | 2.05                     | 0.55              |
| 1:0:2008:C:H2' | 1:0:2009:U:C6   | 2.41                     | 0.55              |
| 1:0:226:C:H4'  | 1:0:227:G:C8    | 2.41                     | 0.55              |
| 1:0:839:U:H5'' | 1:0:2408:G:OP2  | 2.06                     | 0.55              |
| 1:0:1669:A:H2' | 1:0:1670:G:H4'  | 1.88                     | 0.55              |
| 1:0:173:A:H2'  | 1:0:173:A:N3    | 2.22                     | 0.55              |
| 1:0:394:U:H2'  | 1:0:395:G:H8    | 1.71                     | 0.55              |
| 1:0:879:A:H2'  | 1:0:879:A:N3    | 2.22                     | 0.55              |
| 1:0:2162:C:H2' | 1:0:2163:U:C6   | 2.42                     | 0.55              |
| 1:0:2321:C:H2' | 1:0:2322:U:O4'  | 2.06                     | 0.55              |
| 1:0:162:C:H4'  | 1:0:195:A:O2'   | 2.07                     | 0.55              |
| 1:0:583:C:H41  | 1:0:2017:U:H5   | 1.53                     | 0.55              |
| 1:0:1181:C:H3' | 1:0:1182:U:H5'' | 1.89                     | 0.55              |
| 1:0:1429:A:H62 | 1:0:1601:U:H5'' | 1.72                     | 0.55              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:1459:U:H2'  | 1:0:1475:U:O2'  | 2.07                     | 0.55              |
| 1:0:1711:C:H4'  | 1:0:1712:G:C2   | 2.42                     | 0.55              |
| 1:0:2168:A:H2'  | 1:0:2169:A:H5'  | 1.89                     | 0.55              |
| 1:0:2379:G:H2'  | 1:0:2380:U:O4'  | 2.06                     | 0.55              |
| 1:0:33:C:N4     | 1:0:466:A:H61   | 2.05                     | 0.55              |
| 1:0:841:G:H3'   | 1:0:841:G:N3    | 2.21                     | 0.55              |
| 1:0:2204:A:O2'  | 1:0:2205:C:P    | 2.65                     | 0.55              |
| 1:0:114:C:O2'   | 1:0:124:A:H1'   | 2.07                     | 0.55              |
| 1:0:775:U:H4'   | 1:0:776:G:C8    | 2.42                     | 0.55              |
| 1:0:951:G:C2'   | 1:0:952:A:H5''  | 2.36                     | 0.55              |
| 1:0:1288:A:O2'  | 1:0:1289:A:H5'  | 2.07                     | 0.55              |
| 1:0:1789:U:C2'  | 1:0:1790:G:H5'  | 2.37                     | 0.55              |
| 1:0:1791:C:H1'  | 1:0:1793:A:O4'  | 2.06                     | 0.55              |
| 1:0:80:A:H2'    | 1:0:81:C:O4'    | 2.06                     | 0.54              |
| 1:0:782:U:H2'   | 1:0:783:G:C8    | 2.42                     | 0.54              |
| 1:0:831:G:N2    | 1:0:1203:A:H62  | 1.97                     | 0.54              |
| 1:0:1922:U:H1'  | 1:0:2570:C:O2'  | 2.06                     | 0.54              |
| 1:0:2571:G:H2'  | 1:0:2572:U:C6   | 2.42                     | 0.54              |
| 1:0:2783:U:OP1  | 1:0:2783:U:O4'  | 2.25                     | 0.54              |
| 1:0:67:G:H8     | 1:0:67:G:O5'    | 1.90                     | 0.54              |
| 1:0:1141:U:H5'  | 1:0:2549:G:N2   | 2.22                     | 0.54              |
| 1:0:1278:A:O2'  | 1:0:1279:G:P    | 2.65                     | 0.54              |
| 1:0:1289:A:H62  | 1:0:1662:G:H1   | 1.55                     | 0.54              |
| 1:0:166:G:H21   | 1:0:184:A:N6    | 1.93                     | 0.54              |
| 1:0:791:G:H2'   | 1:0:792:U:C6    | 2.42                     | 0.54              |
| 1:0:1982:C:H1'  | 1:0:2666:U:O2'  | 2.07                     | 0.54              |
| 1:0:2854:G:H3'  | 1:0:2854:G:N3   | 2.22                     | 0.54              |
| 1:0:1004:A:H2'  | 1:0:1005:U:H5'' | 1.88                     | 0.54              |
| 1:0:1829:C:H2'  | 1:0:1830:C:H5'  | 1.90                     | 0.54              |
| 1:0:1925:C:H5'' | 2:5:30:C:H4'    | 1.88                     | 0.54              |
| 1:0:558:G:H5''  | 1:0:559:C:C5    | 2.42                     | 0.54              |
| 1:0:646:C:H2'   | 1:0:647:G:O4'   | 2.07                     | 0.54              |
| 1:0:1279:G:C2'  | 1:0:1280:U:OP2  | 2.56                     | 0.54              |
| 1:0:1313:U:O2'  | 1:0:1314:A:P    | 2.66                     | 0.54              |
| 1:0:1746:A:C2'  | 1:0:1747:G:H5'  | 2.37                     | 0.54              |
| 1:0:1921:A:H2'  | 1:0:1922:U:H5'' | 1.90                     | 0.54              |
| 1:0:1955:G:C2'  | 1:0:1956:G:H5'  | 2.37                     | 0.54              |
| 1:0:2758:A:H5'' | 1:0:2759:U:H5   | 1.72                     | 0.54              |
| 1:0:69:G:H3'    | 1:0:111:G:O2'   | 2.08                     | 0.54              |
| 1:0:564:U:H2'   | 1:0:565:A:C8    | 2.42                     | 0.54              |
| 1:0:598:U:H2'   | 1:0:599:A:C8    | 2.42                     | 0.54              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:1210:C:H2' | 1:0:1211:G:O4'  | 2.08                     | 0.54              |
| 1:0:1818:G:H2' | 1:0:1819:U:C6   | 2.42                     | 0.54              |
| 1:0:2426:G:N2  | 1:0:2430:A:H62  | 2.04                     | 0.54              |
| 1:0:2516:U:H2' | 1:0:2517:C:C6   | 2.42                     | 0.54              |
| 1:0:177:U:H2'  | 1:0:178:C:C6    | 2.43                     | 0.54              |
| 1:0:798:G:O2'  | 1:0:1770:U:H4'  | 2.08                     | 0.54              |
| 1:0:1356:G:H5' | 1:0:1614:C:OP2  | 2.08                     | 0.54              |
| 1:0:1463:A:H2' | 1:0:1464:A:C8   | 2.42                     | 0.54              |
| 1:0:2249:U:H2' | 1:0:2250:G:O4'  | 2.08                     | 0.54              |
| 1:0:2466:G:H2' | 1:0:2467:A:C8   | 2.43                     | 0.54              |
| 1:0:2470:U:O2' | 1:0:2471:U:H5'  | 2.08                     | 0.54              |
| 1:0:67:G:N2    | 1:0:73:A:O5'    | 2.40                     | 0.54              |
| 1:0:468:A:H2'  | 1:0:469:G:H4'   | 1.90                     | 0.54              |
| 1:0:48:A:H4'   | 1:0:50:G:O4'    | 2.08                     | 0.54              |
| 1:0:484:G:O2'  | 1:0:485:G:H5'   | 2.07                     | 0.54              |
| 1:0:847:C:N4   | 1:0:955:G:H21   | 1.96                     | 0.54              |
| 1:0:942:U:O2'  | 1:0:943:U:H5'   | 2.08                     | 0.54              |
| 1:0:1664:G:H4' | 1:0:1665:C:O5'  | 2.07                     | 0.54              |
| 1:0:2319:G:H2' | 1:0:2320:G:C8   | 2.43                     | 0.54              |
| 1:0:2574:G:H1' | 1:0:2576:G:O6   | 2.07                     | 0.54              |
| 1:0:728:G:H2'  | 1:0:729:A:O4'   | 2.08                     | 0.54              |
| 1:0:929:A:H3'  | 1:0:930:A:C5'   | 2.33                     | 0.54              |
| 1:0:1789:U:O2' | 1:0:1790:G:H5'  | 2.07                     | 0.54              |
| 1:0:216:U:H2'  | 1:0:217:U:O4'   | 2.08                     | 0.53              |
| 1:0:242:A:O2'  | 1:0:243:G:O5'   | 2.26                     | 0.53              |
| 1:0:878:C:N4   | 1:0:921:A:H62   | 2.04                     | 0.53              |
| 1:0:1333:G:N2  | 1:0:1344:C:N4   | 2.55                     | 0.53              |
| 1:0:2437:G:H2' | 1:0:2469:G:C2   | 2.43                     | 0.53              |
| 1:0:2572:U:H2' | 1:0:2573:C:C6   | 2.43                     | 0.53              |
| 1:0:2780:A:O2' | 1:0:2781:G:H5'  | 2.08                     | 0.53              |
| 1:0:317:U:C3'  | 1:0:318:G:H5''  | 2.39                     | 0.53              |
| 1:0:597:U:H3   | 1:0:683:A:H2'   | 1.73                     | 0.53              |
| 1:0:857:U:H2'  | 1:0:858:G:H5'   | 1.90                     | 0.53              |
| 1:0:1763:G:H2' | 1:0:1764:A:H4'  | 1.89                     | 0.53              |
| 1:0:830:C:O2'  | 1:0:852:U:H5''  | 2.08                     | 0.53              |
| 1:0:1358:C:H2' | 1:0:1359:G:C5'  | 2.38                     | 0.53              |
| 1:0:1497:C:O2' | 1:0:1498:G:H5'  | 2.08                     | 0.53              |
| 1:0:1528:C:C3' | 1:0:1529:C:H5'' | 2.38                     | 0.53              |
| 1:0:126:C:H2'  | 1:0:127:C:C6    | 2.42                     | 0.53              |
| 1:0:341:A:H1'  | 1:0:1223:G:O6   | 2.08                     | 0.53              |
| 1:0:594:G:H21  | 1:0:1267:A:H62  | 1.57                     | 0.53              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:832:A:H2'   | 1:0:833:A:O4'   | 2.07                     | 0.53              |
| 1:0:917:U:H2'   | 1:0:918:A:O4'   | 2.08                     | 0.53              |
| 1:0:1414:G:H2'  | 1:0:1415:C:C6   | 2.43                     | 0.53              |
| 1:0:1900:U:H4'  | 1:0:1946:U:O4'  | 2.09                     | 0.53              |
| 1:0:1971:C:H2'  | 1:0:1972:G:C8   | 2.43                     | 0.53              |
| 1:0:2321:C:O2'  | 1:0:2353:G:H5'' | 2.09                     | 0.53              |
| 1:0:173:A:O2'   | 1:0:174:A:OP1   | 2.20                     | 0.53              |
| 1:0:393:U:H2'   | 1:0:394:U:C6    | 2.43                     | 0.53              |
| 1:0:638:A:O2'   | 1:0:639:G:H5'   | 2.08                     | 0.53              |
| 1:0:737:C:H2'   | 1:0:738:G:O4'   | 2.09                     | 0.53              |
| 1:0:918:A:C2'   | 1:0:919:U:H5''  | 2.36                     | 0.53              |
| 1:0:1301:U:H2'  | 1:0:1664:G:H21  | 1.73                     | 0.53              |
| 1:0:1825:C:C2'  | 1:0:1826:U:H5'  | 2.38                     | 0.53              |
| 1:0:1838:G:C2'  | 1:0:1839:A:H5'  | 2.39                     | 0.53              |
| 1:0:1974:U:H2'  | 1:0:1975:G:H5'' | 1.89                     | 0.53              |
| 1:0:2756:A:H1'  | 1:0:2758:A:N7   | 2.23                     | 0.53              |
| 1:0:665:A:OP2   | 1:0:666:U:H5'   | 2.09                     | 0.53              |
| 1:0:1976:U:C2'  | 1:0:1977:C:H5'  | 2.37                     | 0.53              |
| 1:0:26:G:H21    | 1:0:524:A:N6    | 2.03                     | 0.53              |
| 1:0:404:A:H2'   | 1:0:405:C:C6    | 2.43                     | 0.53              |
| 1:0:1029:C:H2'  | 1:0:1030:U:H5'' | 1.91                     | 0.53              |
| 1:0:1190:C:H2'  | 1:0:1191:G:C8   | 2.44                     | 0.53              |
| 1:0:1326:U:H2'  | 1:0:1327:C:H5'  | 1.90                     | 0.53              |
| 1:0:1576:G:H2'  | 1:0:1577:G:O4'  | 2.08                     | 0.53              |
| 1:0:2498:U:H5'' | 1:0:2499:C:OP1  | 2.09                     | 0.53              |
| 1:0:2700:U:N3   | 1:0:2848:A:N6   | 2.55                     | 0.53              |
| 1:0:757:U:O2'   | 1:0:758:G:H5'   | 2.09                     | 0.53              |
| 1:0:874:A:H62   | 1:0:928:G:N2    | 2.07                     | 0.53              |
| 1:0:939:C:H2'   | 1:0:940:G:C8    | 2.44                     | 0.53              |
| 1:0:1075:C:H2'  | 1:0:1076:U:O4'  | 2.09                     | 0.53              |
| 1:0:77:C:H2'    | 1:0:78:C:C6     | 2.44                     | 0.53              |
| 1:0:486:U:H4'   | 1:0:520:C:H5'   | 1.90                     | 0.53              |
| 1:0:658:G:H4'   | 1:0:2331:A:H5'  | 1.91                     | 0.53              |
| 1:0:960:U:H2'   | 1:0:961:G:C8    | 2.44                     | 0.53              |
| 1:0:1745:C:H2'  | 1:0:1746:A:O4'  | 2.09                     | 0.53              |
| 1:0:2312:A:H1'  | 1:0:2314:A:C8   | 2.44                     | 0.53              |
| 1:0:394:U:H2'   | 1:0:395:G:C8    | 2.44                     | 0.53              |
| 1:0:541:C:N4    | 1:0:572:G:O4'   | 2.42                     | 0.53              |
| 1:0:788:G:H5'   | 1:0:790:A:H1'   | 1.90                     | 0.53              |
| 1:0:807:A:H2'   | 1:0:808:C:C6    | 2.44                     | 0.53              |
| 1:0:843:G:O2'   | 1:0:844:G:H5'   | 2.09                     | 0.53              |

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| Atom-1          | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|----------------|--------------------------|-------------------|
| 1:0:1775:A:H4'  | 1:0:1776:A:C8  | 2.44                     | 0.53              |
| 1:0:2728:A:H2'  | 1:0:2729:A:O4' | 2.09                     | 0.53              |
| 1:0:201:G:H2'   | 1:0:202:A:C8   | 2.44                     | 0.52              |
| 1:0:1502:G:O2'  | 1:0:1503:G:H5' | 2.09                     | 0.52              |
| 1:0:2014:A:H62  | 1:0:2477:C:H1' | 1.74                     | 0.52              |
| 1:0:2229:G:H2'  | 1:0:2475:C:OP1 | 2.09                     | 0.52              |
| 1:0:2483:U:H1'  | 1:0:2551:A:H2  | 1.74                     | 0.52              |
| 1:0:55:A:H2'    | 1:0:56:C:H6    | 1.75                     | 0.52              |
| 1:0:127:C:H2'   | 1:0:128:C:C6   | 2.44                     | 0.52              |
| 1:0:1217:U:H2'  | 1:0:1218:C:C6  | 2.44                     | 0.52              |
| 1:0:1566:G:H4'  | 1:0:1733:U:O4  | 2.09                     | 0.52              |
| 1:0:1938:U:C2'  | 1:0:1939:U:H5' | 2.39                     | 0.52              |
| 2:5:31:C:H3'    | 2:5:32:A:C5'   | 2.34                     | 0.52              |
| 1:0:870:C:H2'   | 1:0:871:U:C6   | 2.43                     | 0.52              |
| 1:0:1365:U:H1'  | 1:0:1586:A:H2  | 1.74                     | 0.52              |
| 1:0:1964:A:H5'' | 1:0:1965:U:OP2 | 2.08                     | 0.52              |
| 1:0:167:A:H2'   | 1:0:168:A:C8   | 2.44                     | 0.52              |
| 1:0:181:A:H4'   | 1:0:182:G:C4'  | 2.39                     | 0.52              |
| 1:0:230:C:H2'   | 1:0:231:G:O4'  | 2.09                     | 0.52              |
| 1:0:597:U:H2'   | 1:0:598:U:C6   | 2.44                     | 0.52              |
| 1:0:599:A:H2'   | 1:0:600:G:C8   | 2.44                     | 0.52              |
| 1:0:688:A:O2'   | 1:0:2422:C:H4' | 2.09                     | 0.52              |
| 1:0:1286:U:H5'' | 1:0:1663:C:N4  | 2.24                     | 0.52              |
| 1:0:1313:U:O4   | 1:0:1651:U:H5' | 2.09                     | 0.52              |
| 1:0:1654:A:H2'  | 1:0:1655:C:C6  | 2.44                     | 0.52              |
| 1:0:2401:A:H2'  | 1:0:2403:C:C5  | 2.44                     | 0.52              |
| 1:0:2809:A:C2'  | 1:0:2810:A:H5' | 2.40                     | 0.52              |
| 1:0:9:U:H3      | 1:0:2608:A:N6  | 2.02                     | 0.52              |
| 1:0:212:U:H2'   | 1:0:213:C:C6   | 2.45                     | 0.52              |
| 1:0:225:G:N2    | 1:0:2410:U:H1' | 2.24                     | 0.52              |
| 1:0:689:A:H3'   | 1:0:689:A:N3   | 2.24                     | 0.52              |
| 1:0:1970:G:H2'  | 1:0:1971:C:C6  | 2.44                     | 0.52              |
| 1:0:2083:G:H2'  | 1:0:2084:G:O4' | 2.10                     | 0.52              |
| 1:0:38:G:H2'    | 1:0:39:C:C6    | 2.44                     | 0.52              |
| 1:0:446:C:H2'   | 1:0:447:U:C6   | 2.45                     | 0.52              |
| 1:0:1234:C:H2'  | 1:0:1235:C:C6  | 2.45                     | 0.52              |
| 1:0:1312:G:C5'  | 1:0:1313:U:H5' | 2.34                     | 0.52              |
| 1:0:2057:U:O2'  | 1:0:2576:G:H1' | 2.09                     | 0.52              |
| 1:0:616:U:C2'   | 1:0:617:U:H5'' | 2.37                     | 0.52              |
| 1:0:688:A:H1'   | 1:0:2423:G:H5' | 1.92                     | 0.52              |
| 1:0:1162:A:H2'  | 1:0:1163:C:C6  | 2.44                     | 0.52              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:1288:A:H2'  | 1:0:1289:A:O4'  | 2.09                     | 0.52              |
| 1:0:2059:U:H2'  | 1:0:2060:A:H5'' | 1.90                     | 0.52              |
| 1:0:2372:A:H2'  | 1:0:2373:C:C6   | 2.44                     | 0.52              |
| 1:0:2757:G:OP2  | 1:0:2761:A:H4'  | 2.10                     | 0.52              |
| 1:0:95:G:H2'    | 1:0:96:C:C6     | 2.45                     | 0.52              |
| 1:0:317:U:C2'   | 1:0:318:G:H5''  | 2.39                     | 0.52              |
| 1:0:476:G:H2'   | 1:0:477:A:C8    | 2.45                     | 0.52              |
| 1:0:776:G:H2'   | 1:0:776:G:N3    | 2.25                     | 0.52              |
| 1:0:795:A:H4'   | 1:0:796:A:C8    | 2.44                     | 0.52              |
| 1:0:1263:G:O2'  | 1:0:1264:C:OP1  | 2.27                     | 0.52              |
| 1:0:2272:A:H2'  | 1:0:2273:C:C6   | 2.45                     | 0.52              |
| 1:0:2440:C:H1'  | 1:0:2471:U:N3   | 2.25                     | 0.52              |
| 2:5:33:C:H3'    | 2:5:34:C:H5'    | 1.92                     | 0.52              |
| 1:0:45:C:H5''   | 1:0:192:G:C8    | 2.44                     | 0.52              |
| 1:0:168:A:H2'   | 1:0:169:C:C6    | 2.45                     | 0.52              |
| 1:0:215:G:O2'   | 1:0:617:U:H1'   | 2.09                     | 0.52              |
| 1:0:333:A:H1'   | 1:0:351:A:C4    | 2.44                     | 0.52              |
| 1:0:980:G:H2'   | 1:0:981:C:C6    | 2.45                     | 0.52              |
| 1:0:2504:G:H2'  | 1:0:2505:G:C8   | 2.45                     | 0.52              |
| 1:0:1597:A:H2'  | 1:0:1598:C:C6   | 2.45                     | 0.52              |
| 1:0:2320:G:H2'  | 1:0:2321:C:O4'  | 2.09                     | 0.52              |
| 1:0:2451:G:H2'  | 1:0:2508:G:N2   | 2.25                     | 0.52              |
| 1:0:129:A:H2'   | 1:0:130:C:C6    | 2.45                     | 0.51              |
| 1:0:2756:A:H4'  | 1:0:2758:A:OP1  | 2.09                     | 0.51              |
| 1:0:491:A:N3    | 1:0:491:A:H2'   | 2.26                     | 0.51              |
| 1:0:1677:C:H2'  | 1:0:1678:G:C8   | 2.45                     | 0.51              |
| 1:0:2536:G:H2'  | 1:0:2537:C:C6   | 2.45                     | 0.51              |
| 1:0:578:U:C1'   | 1:0:957:G:H21   | 2.22                     | 0.51              |
| 1:0:590:C:H2'   | 1:0:591:G:C8    | 2.45                     | 0.51              |
| 1:0:826:U:H2'   | 1:0:827:C:C6    | 2.46                     | 0.51              |
| 1:0:959:C:H5''  | 1:0:972:C:O2'   | 2.11                     | 0.51              |
| 1:0:1358:C:H2'  | 1:0:1359:G:H5'' | 1.92                     | 0.51              |
| 1:0:1788:C:H2'  | 1:0:1789:U:C6   | 2.46                     | 0.51              |
| 1:0:2160:C:H2'  | 1:0:2161:C:C6   | 2.46                     | 0.51              |
| 1:0:2623:A:H2'  | 1:0:2624:G:O4'  | 2.10                     | 0.51              |
| 1:0:170:U:H2'   | 1:0:171:G:H8    | 1.75                     | 0.51              |
| 1:0:1352:G:H2'  | 1:0:1353:A:C8   | 2.43                     | 0.51              |
| 1:0:1661:C:O2'  | 1:0:1662:G:H5'  | 2.10                     | 0.51              |
| 1:0:1819:U:H5'' | 1:0:1954:A:O3'  | 2.11                     | 0.51              |
| 1:0:2213:G:H2'  | 1:0:2214:G:C8   | 2.46                     | 0.51              |
| 1:0:2660:C:O2'  | 1:0:2661:G:H5'  | 2.11                     | 0.51              |

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| Atom-1          | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|----------------|--------------------------|-------------------|
| 1:0:223:C:H4'   | 1:0:398:C:H1'  | 1.92                     | 0.51              |
| 1:0:451:A:H2'   | 1:0:452:G:C8   | 2.45                     | 0.51              |
| 1:0:1018:C:H2'  | 1:0:1019:U:C5  | 2.45                     | 0.51              |
| 1:0:1860:A:H2'  | 1:0:1861:G:O4' | 2.11                     | 0.51              |
| 1:0:1865:C:H2'  | 1:0:1866:G:O4' | 2.10                     | 0.51              |
| 1:0:2426:G:O2'  | 1:0:2427:A:P   | 2.69                     | 0.51              |
| 1:0:2703:C:H2'  | 1:0:2704:U:C6  | 2.45                     | 0.51              |
| 1:0:18:U:H2'    | 1:0:19:C:C6    | 2.45                     | 0.51              |
| 1:0:512:A:H2'   | 1:0:513:A:H5'  | 1.93                     | 0.51              |
| 1:0:2242:C:N4   | 1:0:2257:A:N6  | 2.58                     | 0.51              |
| 1:0:2429:A:H5'' | 1:0:2476:A:C6  | 2.46                     | 0.51              |
| 1:0:422:C:H2'   | 1:0:423:G:H8   | 1.76                     | 0.51              |
| 1:0:742:G:H2'   | 1:0:1766:U:H1' | 1.93                     | 0.51              |
| 1:0:838:A:H2'   | 1:0:839:U:C6   | 2.46                     | 0.51              |
| 1:0:1377:G:H4'  | 1:0:1800:A:H5' | 1.93                     | 0.51              |
| 1:0:158:A:H2'   | 1:0:159:A:O4'  | 2.10                     | 0.51              |
| 1:0:868:U:H2'   | 1:0:869:C:C6   | 2.45                     | 0.51              |
| 1:0:1727:C:H4'  | 1:0:2833:C:O2  | 2.10                     | 0.51              |
| 1:0:1881:U:H2'  | 1:0:1882:G:H5' | 1.93                     | 0.51              |
| 1:0:1926:U:H1'  | 1:0:1928:G:H5' | 1.93                     | 0.51              |
| 1:0:210:A:N6    | 1:0:242:A:N7   | 2.59                     | 0.51              |
| 1:0:689:A:N6    | 1:0:815:A:H61  | 2.05                     | 0.51              |
| 1:0:703:A:H2'   | 1:0:704:G:H8   | 1.76                     | 0.51              |
| 1:0:824:U:H1'   | 1:0:1264:C:H1' | 1.92                     | 0.51              |
| 1:0:941:U:H4'   | 1:0:941:U:OP1  | 2.10                     | 0.51              |
| 1:0:1038:U:O2   | 1:0:2466:G:H4' | 2.10                     | 0.51              |
| 1:0:1067:G:H2'  | 1:0:1114:A:H61 | 1.76                     | 0.51              |
| 1:0:1068:A:H2'  | 1:0:1069:G:C8  | 2.45                     | 0.51              |
| 1:0:1092:U:H2'  | 1:0:1093:U:C6  | 2.45                     | 0.51              |
| 1:0:1127:C:H2'  | 1:0:1128:G:H8  | 1.76                     | 0.51              |
| 1:0:1611:U:H2'  | 1:0:1612:U:O4' | 2.11                     | 0.51              |
| 1:0:2574:G:N7   | 1:0:2578:G:N2  | 2.59                     | 0.51              |
| 1:0:2725:C:H2'  | 1:0:2726:U:C6  | 2.46                     | 0.51              |
| 1:0:114:C:H2'   | 1:0:115:G:O4'  | 2.11                     | 0.50              |
| 1:0:243:G:H2'   | 1:0:244:C:O4'  | 2.12                     | 0.50              |
| 1:0:457:C:H2'   | 1:0:458:G:O4'  | 2.11                     | 0.50              |
| 1:0:788:G:H5'   | 1:0:790:A:N3   | 2.26                     | 0.50              |
| 1:0:1052:C:H2'  | 1:0:1053:G:C8  | 2.45                     | 0.50              |
| 1:0:1057:A:H3'  | 1:0:1058:G:C5' | 2.41                     | 0.50              |
| 1:0:1279:G:H1'  | 1:0:1280:U:H5  | 1.76                     | 0.50              |
| 1:0:1626:A:OP2  | 1:0:1627:C:H5  | 1.95                     | 0.50              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:2177:U:H2' | 1:0:2178:U:C6   | 2.46                     | 0.50              |
| 1:0:14:A:H2    | 1:0:2604:G:HO2' | 1.59                     | 0.50              |
| 1:0:619:A:H2'  | 1:0:620:G:C8    | 2.46                     | 0.50              |
| 1:0:1424:U:H2' | 1:0:1425:G:C8   | 2.46                     | 0.50              |
| 1:0:1861:G:O2' | 1:0:1862:C:H5'  | 2.11                     | 0.50              |
| 1:0:2178:U:H2' | 1:0:2179:C:C6   | 2.46                     | 0.50              |
| 1:0:2397:A:H2' | 1:0:2398:U:O4'  | 2.11                     | 0.50              |
| 1:0:2771:C:H2' | 1:0:2772:U:C6   | 2.46                     | 0.50              |
| 1:0:2821:G:H2' | 1:0:2822:U:C6   | 2.46                     | 0.50              |
| 1:0:116:A:N3   | 1:0:155:G:H1'   | 2.26                     | 0.50              |
| 1:0:534:U:H4'  | 1:0:564:U:O2'   | 2.12                     | 0.50              |
| 1:0:1198:C:C5' | 1:0:1199:U:H5'' | 2.42                     | 0.50              |
| 1:0:2727:G:C2' | 1:0:2728:A:H5'' | 2.41                     | 0.50              |
| 1:0:332:C:H2'  | 1:0:333:A:H5'   | 1.94                     | 0.50              |
| 1:0:688:A:HO2' | 1:0:2422:C:H4'  | 1.76                     | 0.50              |
| 1:0:879:A:O2'  | 1:0:880:C:H5'   | 2.11                     | 0.50              |
| 1:0:964:A:H2'  | 1:0:965:G:C8    | 2.46                     | 0.50              |
| 1:0:1747:G:C4' | 1:0:1749:G:H1'  | 2.31                     | 0.50              |
| 1:0:1857:G:H2' | 1:0:1859:A:OP2  | 2.12                     | 0.50              |
| 1:0:2023:C:H2' | 1:0:2024:U:C6   | 2.46                     | 0.50              |
| 1:0:2238:G:H2' | 1:0:2239:C:H6   | 1.76                     | 0.50              |
| 1:0:2329:C:C2' | 1:0:2330:G:H5'  | 2.42                     | 0.50              |
| 1:0:2726:U:H2' | 1:0:2727:G:O4'  | 2.12                     | 0.50              |
| 1:0:1073:G:H2' | 1:0:1074:G:C4'  | 2.29                     | 0.50              |
| 1:0:2181:A:H2' | 1:0:2182:A:H5'  | 1.92                     | 0.50              |
| 1:0:216:U:H5'' | 1:0:601:A:N6    | 2.27                     | 0.50              |
| 1:0:316:C:H2'  | 1:0:317:U:C6    | 2.47                     | 0.50              |
| 1:0:841:G:N1   | 1:0:2226:A:H4'  | 2.27                     | 0.50              |
| 1:0:872:G:H2'  | 1:0:928:G:N1    | 2.27                     | 0.50              |
| 1:0:1029:C:OP1 | 1:0:1047:G:H4'  | 2.11                     | 0.50              |
| 1:0:1218:C:H2' | 1:0:1219:C:C6   | 2.46                     | 0.50              |
| 1:0:1683:G:C2' | 1:0:1684:G:H5'  | 2.42                     | 0.50              |
| 1:0:35:G:C1'   | 1:0:466:A:H1'   | 2.41                     | 0.50              |
| 1:0:158:A:H2'  | 1:0:159:A:C8    | 2.47                     | 0.50              |
| 1:0:1007:A:H2' | 1:0:1008:G:C8   | 2.47                     | 0.50              |
| 1:0:1164:C:H2' | 1:0:1165:G:O4'  | 2.11                     | 0.50              |
| 1:0:1194:U:O2' | 1:0:1195:U:P    | 2.70                     | 0.50              |
| 1:0:1259:A:H2' | 1:0:1260:A:C8   | 2.47                     | 0.50              |
| 1:0:1496:G:H5' | 1:0:1575:C:N4   | 2.26                     | 0.50              |
| 1:0:1667:A:H2' | 1:0:1668:G:H8   | 1.77                     | 0.50              |
| 1:0:2010:G:H2' | 1:0:2011:U:O4'  | 2.12                     | 0.50              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:2082:C:H2'  | 1:0:2083:G:O4'  | 2.11                     | 0.50              |
| 1:0:2446:C:H2'  | 1:0:2447:G:C8   | 2.47                     | 0.50              |
| 1:0:2754:C:H2'  | 1:0:2755:A:O4'  | 2.12                     | 0.50              |
| 1:0:236:C:O2    | 1:0:632:A:H1'   | 2.11                     | 0.50              |
| 1:0:1895:A:H2'  | 1:0:1896:A:O4'  | 2.12                     | 0.50              |
| 1:0:2435:C:H2'  | 1:0:2436:U:C6   | 2.47                     | 0.50              |
| 1:0:599:A:H2'   | 1:0:600:G:H8    | 1.76                     | 0.50              |
| 1:0:860:U:H2'   | 1:0:861:G:H5'   | 1.94                     | 0.50              |
| 1:0:2079:A:H2'  | 1:0:2080:U:C6   | 2.47                     | 0.50              |
| 1:0:2404:A:H5'' | 1:0:2405:A:H3'  | 1.94                     | 0.50              |
| 1:0:991:A:H61   | 1:0:2020:G:H21  | 1.59                     | 0.49              |
| 1:0:1016:C:H2'  | 1:0:1017:C:C6   | 2.47                     | 0.49              |
| 1:0:1029:C:C3'  | 1:0:1030:U:H5'' | 2.42                     | 0.49              |
| 1:0:1310:C:OP1  | 1:0:2689:C:H4'  | 2.12                     | 0.49              |
| 1:0:338:G:O2'   | 1:0:339:U:H5'   | 2.13                     | 0.49              |
| 1:0:597:U:N3    | 1:0:683:A:H2'   | 2.27                     | 0.49              |
| 1:0:689:A:C2'   | 1:0:690:A:H5'   | 2.42                     | 0.49              |
| 1:0:1055:A:N6   | 1:0:1122:A:H4'  | 2.27                     | 0.49              |
| 1:0:1380:C:N4   | 1:0:1799:A:N1   | 2.61                     | 0.49              |
| 1:0:1492:A:H2   | 1:0:1531:C:H41  | 1.58                     | 0.49              |
| 1:0:1791:C:H2'  | 1:0:1792:C:H5'' | 1.94                     | 0.49              |
| 1:0:190:A:H2'   | 1:0:191:G:C8    | 2.47                     | 0.49              |
| 1:0:460:U:N3    | 1:0:592:G:H1'   | 2.22                     | 0.49              |
| 1:0:538:A:C2'   | 1:0:539:A:H5''  | 2.41                     | 0.49              |
| 1:0:831:G:C2'   | 1:0:832:A:H5''  | 2.42                     | 0.49              |
| 1:0:1312:G:H2'  | 1:0:1643:A:N6   | 2.27                     | 0.49              |
| 1:0:1354:A:H3'  | 1:0:1410:U:O2   | 2.12                     | 0.49              |
| 1:0:1820:G:O2'  | 1:0:1821:A:P    | 2.70                     | 0.49              |
| 1:0:2313:G:H2'  | 1:0:2314:A:H5'  | 1.94                     | 0.49              |
| 1:0:165:G:H2'   | 1:0:166:G:O4'   | 2.12                     | 0.49              |
| 1:0:441:A:H2'   | 1:0:442:A:O4'   | 2.11                     | 0.49              |
| 1:0:579:G:H2'   | 1:0:2013:A:N6   | 2.27                     | 0.49              |
| 1:0:810:U:H2'   | 1:0:811:G:C8    | 2.48                     | 0.49              |
| 1:0:991:A:N6    | 1:0:2020:G:H21  | 2.11                     | 0.49              |
| 1:0:1055:A:O2'  | 1:0:1058:G:H1'  | 2.13                     | 0.49              |
| 1:0:1195:U:H2'  | 1:0:1196:G:H8   | 1.73                     | 0.49              |
| 1:0:1889:G:H2'  | 1:0:1890:G:C8   | 2.48                     | 0.49              |
| 1:0:1979:C:H42  | 1:0:2706:U:H6   | 1.60                     | 0.49              |
| 1:0:2299:A:H2'  | 1:0:2299:A:N3   | 2.27                     | 0.49              |
| 1:0:2532:G:H1'  | 1:0:2561:G:N3   | 2.28                     | 0.49              |
| 1:0:2805:G:O2'  | 1:0:2806:G:H5'  | 2.12                     | 0.49              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:215:G:H4'   | 1:0:617:U:O2'   | 2.12                     | 0.49              |
| 1:0:645:G:H2'   | 1:0:646:C:C6    | 2.48                     | 0.49              |
| 1:0:693:A:H2'   | 1:0:694:G:C8    | 2.47                     | 0.49              |
| 1:0:792:U:H2'   | 1:0:793:G:O4'   | 2.12                     | 0.49              |
| 1:0:1455:C:H2'  | 1:0:1456:C:C6   | 2.48                     | 0.49              |
| 1:0:1685:A:H1'  | 1:0:1686:A:N7   | 2.28                     | 0.49              |
| 1:0:45:C:H2'    | 1:0:46:C:C6     | 2.47                     | 0.49              |
| 1:0:431:G:H2'   | 1:0:432:C:C6    | 2.47                     | 0.49              |
| 1:0:459:A:H62   | 1:0:484:G:H1'   | 1.78                     | 0.49              |
| 1:0:780:U:H2'   | 1:0:781:G:C8    | 2.48                     | 0.49              |
| 1:0:1685:A:C6   | 1:0:1691:G:H1'  | 2.48                     | 0.49              |
| 1:0:1686:A:H2'  | 1:0:1687:C:H5'  | 1.94                     | 0.49              |
| 1:0:2235:G:H2'  | 1:0:2236:U:C6   | 2.48                     | 0.49              |
| 1:0:2244:C:N4   | 1:0:2245:A:N6   | 2.59                     | 0.49              |
| 1:0:338:G:H1    | 1:0:346:C:H42   | 1.60                     | 0.49              |
| 1:0:1445:A:H2'  | 1:0:1446:U:O4'  | 2.13                     | 0.49              |
| 1:0:1793:A:H2'  | 1:0:1794:A:C8   | 2.48                     | 0.49              |
| 1:0:1912:G:H2'  | 1:0:1912:G:N3   | 2.27                     | 0.49              |
| 1:0:2057:U:H1'  | 1:0:2577:A:H1'  | 1.93                     | 0.49              |
| 1:0:2161:C:O2'  | 1:0:2162:C:P    | 2.71                     | 0.49              |
| 1:0:2428:U:O2'  | 1:0:2429:A:H5'  | 2.12                     | 0.49              |
| 1:0:2799:C:H2'  | 1:0:2800:C:O4'  | 2.12                     | 0.49              |
| 1:0:1259:A:H2'  | 1:0:1260:A:O4'  | 2.12                     | 0.49              |
| 1:0:1665:C:N4   | 1:0:1993:G:H1   | 2.11                     | 0.49              |
| 1:0:1679:U:H2'  | 1:0:1680:U:H5'' | 1.94                     | 0.49              |
| 1:0:1785:A:H2'  | 1:0:1786:C:C6   | 2.47                     | 0.49              |
| 1:0:1807:A:HO2' | 1:0:1808:C:P    | 2.35                     | 0.49              |
| 1:0:2026:C:H2'  | 1:0:2027:C:C6   | 2.47                     | 0.49              |
| 1:0:2794:G:H3'  | 1:0:2796:A:N6   | 2.20                     | 0.49              |
| 1:0:83:A:C6     | 1:0:98:U:H1'    | 2.47                     | 0.49              |
| 1:0:109:A:H3'   | 1:0:110:U:C5'   | 2.39                     | 0.49              |
| 1:0:172:A:H4'   | 1:0:228:A:H4'   | 1.94                     | 0.49              |
| 1:0:203:G:O2'   | 1:0:204:A:H5'   | 2.13                     | 0.49              |
| 1:0:211:U:O2'   | 1:0:212:U:H5'   | 2.13                     | 0.49              |
| 1:0:860:U:O2'   | 1:0:861:G:H5'   | 2.13                     | 0.49              |
| 1:0:930:A:H5'   | 1:0:931:G:C8    | 2.47                     | 0.49              |
| 1:0:951:G:C3'   | 1:0:952:A:H5''  | 2.43                     | 0.49              |
| 1:0:1825:C:O2'  | 1:0:1826:U:H5'  | 2.13                     | 0.49              |
| 1:0:2093:G:H2'  | 1:0:2094:C:C6   | 2.47                     | 0.49              |
| 1:0:2503:G:C2'  | 1:0:2504:G:H5'' | 2.43                     | 0.49              |
| 1:0:2574:G:H2'  | 1:0:2574:G:N3   | 2.28                     | 0.49              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:58:C:N4     | 1:0:73:A:C6     | 2.81                     | 0.49              |
| 1:0:476:G:H21   | 1:0:696:U:H1'   | 1.78                     | 0.49              |
| 1:0:632:A:C2'   | 1:0:633:G:H5'   | 2.43                     | 0.49              |
| 1:0:1038:U:H2'  | 1:0:1039:A:C8   | 2.48                     | 0.49              |
| 1:0:1046:U:H2'  | 1:0:1047:G:C8   | 2.48                     | 0.49              |
| 1:0:1141:U:O2'  | 1:0:1142:G:OP1  | 2.26                     | 0.49              |
| 1:0:1182:U:C3'  | 1:0:1183:C:H5'' | 2.43                     | 0.49              |
| 1:0:1272:G:H2'  | 1:0:1273:G:C8   | 2.48                     | 0.49              |
| 1:0:1598:C:H2'  | 1:0:1599:G:O4'  | 2.13                     | 0.49              |
| 1:0:1729:C:H2'  | 1:0:1730:G:C8   | 2.48                     | 0.49              |
| 1:0:2783:U:H2'  | 1:0:2784:A:O4'  | 2.12                     | 0.49              |
| 1:0:84:G:H2'    | 1:0:85:C:C6     | 2.48                     | 0.48              |
| 1:0:173:A:H61   | 1:0:844:G:H21   | 1.59                     | 0.48              |
| 1:0:790:A:H2'   | 1:0:791:G:C8    | 2.48                     | 0.48              |
| 1:0:1040:A:H2'  | 1:0:1041:G:H5'  | 1.93                     | 0.48              |
| 1:0:1349:A:H2'  | 1:0:1350:G:C8   | 2.48                     | 0.48              |
| 1:0:1435:G:H21  | 1:0:1511:A:N6   | 2.12                     | 0.48              |
| 1:0:1937:G:N3   | 1:0:2530:C:H5'  | 2.28                     | 0.48              |
| 1:0:2308:A:H2'  | 1:0:2309:G:C8   | 2.47                     | 0.48              |
| 1:0:2852:G:H2'  | 1:0:2853:U:O4'  | 2.13                     | 0.48              |
| 1:0:109:A:C2'   | 1:0:110:U:H5''  | 2.43                     | 0.48              |
| 1:0:521:U:H2'   | 1:0:522:G:H5'   | 1.95                     | 0.48              |
| 1:0:565:A:H2'   | 1:0:566:U:C6    | 2.48                     | 0.48              |
| 1:0:626:A:O2'   | 1:0:627:A:H5'   | 2.13                     | 0.48              |
| 1:0:1629:G:N1   | 1:0:1633:C:N4   | 2.61                     | 0.48              |
| 1:0:1715:A:H1'  | 1:0:1717:A:C1'  | 2.42                     | 0.48              |
| 1:0:1871:G:N3   | 1:0:1871:G:C2'  | 2.76                     | 0.48              |
| 1:0:2025:A:H2'  | 1:0:2026:C:H5'' | 1.94                     | 0.48              |
| 1:0:427:C:H2'   | 1:0:428:A:C8    | 2.49                     | 0.48              |
| 1:0:864:C:H2'   | 1:0:865:A:C8    | 2.47                     | 0.48              |
| 1:0:942:U:C2'   | 1:0:943:U:H5'   | 2.43                     | 0.48              |
| 1:0:1099:A:H5'' | 1:0:1100:G:N7   | 2.27                     | 0.48              |
| 1:0:2872:U:H2'  | 1:0:2873:G:C8   | 2.49                     | 0.48              |
| 1:0:367:G:C3'   | 1:0:368:A:H5''  | 2.43                     | 0.48              |
| 1:0:429:C:H2'   | 1:0:430:C:O4'   | 2.13                     | 0.48              |
| 1:0:756:C:H2'   | 1:0:757:U:C6    | 2.48                     | 0.48              |
| 1:0:1033:G:H22  | 1:0:1150:C:C2'  | 2.26                     | 0.48              |
| 1:0:1495:G:HO2' | 1:0:1496:G:P    | 2.36                     | 0.48              |
| 1:0:1571:G:H2'  | 1:0:1572:C:C6   | 2.48                     | 0.48              |
| 1:0:1712:G:H3'  | 1:0:1712:G:N3   | 2.29                     | 0.48              |
| 1:0:2093:G:O2'  | 1:0:2094:C:P    | 2.72                     | 0.48              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:2301:A:H2' | 1:0:2302:G:O4'  | 2.14                     | 0.48              |
| 1:0:2343:C:H2' | 1:0:2344:G:O4'  | 2.14                     | 0.48              |
| 1:0:2780:A:H2' | 1:0:2781:G:C8   | 2.48                     | 0.48              |
| 1:0:42:G:H2'   | 1:0:43:A:O4'    | 2.13                     | 0.48              |
| 1:0:192:G:C4'  | 1:0:193:A:H4'   | 2.44                     | 0.48              |
| 1:0:210:A:N6   | 1:0:442:A:H61   | 2.11                     | 0.48              |
| 1:0:830:C:O2   | 1:0:852:U:H4'   | 2.13                     | 0.48              |
| 1:0:1678:G:H2' | 1:0:1679:U:C6   | 2.48                     | 0.48              |
| 1:0:1742:G:H2' | 1:0:1743:C:C6   | 2.48                     | 0.48              |
| 1:0:2059:U:H5  | 1:0:2575:U:N3   | 2.02                     | 0.48              |
| 1:0:2483:U:H2' | 1:0:2484:G:H5'  | 1.94                     | 0.48              |
| 1:0:71:A:O2'   | 1:0:72:A:OP1    | 2.21                     | 0.48              |
| 1:0:181:A:H4'  | 1:0:182:G:O5'   | 2.12                     | 0.48              |
| 1:0:477:A:H2'  | 1:0:478:G:O4'   | 2.14                     | 0.48              |
| 1:0:548:G:H2'  | 1:0:549:G:C8    | 2.48                     | 0.48              |
| 1:0:569:C:H2'  | 1:0:570:G:C8    | 2.49                     | 0.48              |
| 1:0:635:C:H3'  | 1:0:636:G:H5''  | 1.95                     | 0.48              |
| 1:0:742:G:N3   | 1:0:742:G:C2'   | 2.77                     | 0.48              |
| 1:0:845:U:H2'  | 1:0:846:A:C8    | 2.49                     | 0.48              |
| 1:0:1141:U:O2' | 1:0:1142:G:P    | 2.72                     | 0.48              |
| 1:0:1458:A:H3' | 1:0:1459:U:H5'  | 1.96                     | 0.48              |
| 1:0:1686:A:O2' | 1:0:2528:G:H5'  | 2.14                     | 0.48              |
| 1:0:2212:U:H2' | 1:0:2213:G:C8   | 2.49                     | 0.48              |
| 1:0:2721:A:N6  | 1:0:2743:G:H21  | 2.10                     | 0.48              |
| 1:0:2815:C:H2' | 1:0:2816:C:C6   | 2.49                     | 0.48              |
| 1:0:64:C:H2'   | 1:0:65:C:C6     | 2.48                     | 0.48              |
| 1:0:213:C:H42  | 1:0:238:G:H22   | 1.60                     | 0.48              |
| 1:0:583:C:O2'  | 1:0:584:A:OP2   | 2.31                     | 0.48              |
| 1:0:1391:A:H2' | 1:0:1392:U:C5   | 2.49                     | 0.48              |
| 1:0:1684:G:H2' | 1:0:1974:U:O4   | 2.14                     | 0.48              |
| 1:0:2085:G:H2' | 1:0:2086:U:C6   | 2.49                     | 0.48              |
| 1:0:2503:G:H2' | 1:0:2504:G:H5'' | 1.96                     | 0.48              |
| 1:0:240:U:H4'  | 1:0:443:A:H5'   | 1.96                     | 0.48              |
| 1:0:478:G:O2'  | 1:0:479:G:H5'   | 2.14                     | 0.48              |
| 1:0:1429:A:H1' | 1:0:1603:A:C6   | 2.49                     | 0.48              |
| 1:0:1436:G:H2' | 1:0:1437:A:C8   | 2.49                     | 0.48              |
| 1:0:2580:C:N4  | 1:0:2582:G:O6   | 2.47                     | 0.48              |
| 1:0:192:G:H4'  | 1:0:193:A:O5'   | 2.13                     | 0.48              |
| 1:0:239:A:H4'  | 1:0:620:G:H5'   | 1.95                     | 0.48              |
| 1:0:323:G:H2'  | 1:0:324:C:C6    | 2.48                     | 0.48              |
| 1:0:568:G:H5'' | 1:0:1019:U:H5'  | 1.96                     | 0.48              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:582:G:H2'   | 1:0:583:C:H3'   | 1.96                     | 0.48              |
| 1:0:583:C:O2'   | 1:0:584:A:P     | 2.71                     | 0.48              |
| 1:0:629:C:H2'   | 1:0:630:G:H5'   | 1.95                     | 0.48              |
| 1:0:979:A:H2'   | 1:0:980:G:C8    | 2.49                     | 0.48              |
| 1:0:1031:C:H1'  | 1:0:1151:U:O2   | 2.14                     | 0.48              |
| 1:0:1036:G:H1'  | 1:0:1145:C:C4'  | 2.44                     | 0.48              |
| 1:0:1316:G:H2'  | 1:0:1317:G:C8   | 2.49                     | 0.48              |
| 1:0:1682:A:H2'  | 1:0:1683:G:C8   | 2.48                     | 0.48              |
| 1:0:2316:G:H2'  | 1:0:2317:G:H8   | 1.78                     | 0.48              |
| 1:0:2377:U:O2'  | 1:0:2378:G:P    | 2.72                     | 0.48              |
| 1:0:2220:A:H2'  | 1:0:2221:G:C8   | 2.49                     | 0.48              |
| 1:0:2437:G:H4'  | 1:0:2438:A:N7   | 2.28                     | 0.48              |
| 1:0:664:C:H2'   | 1:0:665:A:C8    | 2.49                     | 0.47              |
| 1:0:703:A:H2'   | 1:0:704:G:C8    | 2.49                     | 0.47              |
| 1:0:941:U:H2'   | 1:0:942:U:C6    | 2.49                     | 0.47              |
| 1:0:1471:G:H1   | 1:0:2682:C:H42  | 1.61                     | 0.47              |
| 1:0:1679:U:C2'  | 1:0:1680:U:H5'' | 2.44                     | 0.47              |
| 1:0:2204:A:O2'  | 1:0:2205:C:OP2  | 2.32                     | 0.47              |
| 1:0:2424:G:H2'  | 1:0:2425:G:O4'  | 2.14                     | 0.47              |
| 1:0:2483:U:H1'  | 1:0:2551:A:C2   | 2.49                     | 0.47              |
| 1:0:2782:G:C2'  | 1:0:2783:U:OP1  | 2.62                     | 0.47              |
| 1:0:204:A:H4'   | 1:0:205:A:N7    | 2.29                     | 0.47              |
| 1:0:224:G:C5    | 1:0:226:C:H1'   | 2.48                     | 0.47              |
| 1:0:780:U:H2'   | 1:0:781:G:H8    | 1.79                     | 0.47              |
| 1:0:873:U:O2    | 1:0:2246:A:H5'' | 2.14                     | 0.47              |
| 1:0:1793:A:H2'  | 1:0:1794:A:H8   | 1.79                     | 0.47              |
| 1:0:1926:U:O2'  | 1:0:1927:U:H3'  | 2.14                     | 0.47              |
| 1:0:2402:U:H5'  | 1:0:2404:A:N7   | 2.29                     | 0.47              |
| 1:0:2830:U:H2'  | 1:0:2831:A:C8   | 2.49                     | 0.47              |
| 1:0:2168:A:C2'  | 1:0:2169:A:H5'  | 2.44                     | 0.47              |
| 1:0:2448:A:H2'  | 1:0:2449:G:O4'  | 2.13                     | 0.47              |
| 1:0:2651:U:H2'  | 1:0:2652:G:C8   | 2.49                     | 0.47              |
| 1:0:1016:C:H5'' | 1:0:1023:U:OP2  | 2.14                     | 0.47              |
| 1:0:1147:G:H2'  | 1:0:1148:G:C8   | 2.50                     | 0.47              |
| 1:0:2002:A:H61  | 1:0:2018:G:H21  | 1.62                     | 0.47              |
| 1:0:2421:C:O2'  | 1:0:2422:C:H5'  | 2.13                     | 0.47              |
| 1:0:2523:G:O2'  | 1:0:2524:G:H5'  | 2.14                     | 0.47              |
| 1:0:2708:U:H2'  | 1:0:2709:C:C6   | 2.49                     | 0.47              |
| 1:0:974:U:H2'   | 1:0:975:C:C6    | 2.49                     | 0.47              |
| 1:0:1226:A:C6   | 1:0:1250:A:H1'  | 2.49                     | 0.47              |
| 1:0:1326:U:H1'  | 1:0:1626:A:N3   | 2.30                     | 0.47              |

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| Atom-1          | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|----------------|--------------------------|-------------------|
| 1:0:1344:C:H2'  | 1:0:1346:C:OP1 | 2.14                     | 0.47              |
| 1:0:1386:A:H2'  | 1:0:1387:G:O4' | 2.14                     | 0.47              |
| 1:0:1436:G:C1'  | 1:0:1508:G:H21 | 2.21                     | 0.47              |
| 1:0:1993:G:H2'  | 1:0:1994:U:C6  | 2.50                     | 0.47              |
| 1:0:2009:U:H2'  | 1:0:2010:G:C8  | 2.49                     | 0.47              |
| 1:0:2204:A:H1'  | 1:0:2205:C:C5  | 2.49                     | 0.47              |
| 1:0:2432:A:H4'  | 1:0:2551:A:O2' | 2.15                     | 0.47              |
| 1:0:2434:G:H2'  | 1:0:2435:C:C6  | 2.50                     | 0.47              |
| 1:0:108:G:H2'   | 1:0:109:A:C8   | 2.50                     | 0.47              |
| 1:0:452:G:H2'   | 1:0:453:U:O4'  | 2.15                     | 0.47              |
| 1:0:1316:G:H2'  | 1:0:1317:G:H8  | 1.79                     | 0.47              |
| 1:0:1436:G:H1'  | 1:0:1508:G:N2  | 2.18                     | 0.47              |
| 1:0:1809:G:O2'  | 1:0:1810:U:H5' | 2.14                     | 0.47              |
| 1:0:1915:A:N6   | 1:0:1951:G:H21 | 1.99                     | 0.47              |
| 1:0:2278:A:H2'  | 1:0:2279:G:C8  | 2.49                     | 0.47              |
| 1:0:2393:G:H2'  | 1:0:2394:G:H8  | 1.80                     | 0.47              |
| 1:0:2494:C:H2'  | 1:0:2495:G:H8  | 1.80                     | 0.47              |
| 1:0:2782:G:H2'  | 1:0:2783:U:OP1 | 2.15                     | 0.47              |
| 1:0:70:A:P      | 1:0:111:G:H4'  | 2.55                     | 0.47              |
| 1:0:225:G:H21   | 1:0:2410:U:H1' | 1.78                     | 0.47              |
| 1:0:635:C:C3'   | 1:0:636:G:H5'' | 2.45                     | 0.47              |
| 1:0:670:U:H2'   | 1:0:671:A:C8   | 2.49                     | 0.47              |
| 1:0:701:U:H1'   | 1:0:800:U:H5'  | 1.97                     | 0.47              |
| 1:0:926:C:H2'   | 1:0:927:C:H5'  | 1.95                     | 0.47              |
| 1:0:1028:G:H2'  | 1:0:1029:C:C6  | 2.50                     | 0.47              |
| 1:0:1184:G:H2'  | 1:0:1185:C:H5' | 1.97                     | 0.47              |
| 1:0:1354:A:N6   | 1:0:1407:G:H22 | 2.11                     | 0.47              |
| 1:0:1821:A:H5'' | 1:0:1822:C:H5  | 1.80                     | 0.47              |
| 1:0:2021:G:H2'  | 1:0:2022:C:C6  | 2.50                     | 0.47              |
| 1:0:2069:U:H2'  | 1:0:2070:G:C8  | 2.49                     | 0.47              |
| 1:0:2199:C:H2'  | 1:0:2200:G:C8  | 2.48                     | 0.47              |
| 1:0:2307:A:H2'  | 1:0:2308:A:C8  | 2.50                     | 0.47              |
| 1:0:2378:G:H2'  | 1:0:2379:G:H8  | 1.80                     | 0.47              |
| 1:0:2426:G:H5'  | 1:0:2480:C:N4  | 2.23                     | 0.47              |
| 1:0:2486:C:H4'  | 2:5:34:C:O2'   | 2.15                     | 0.47              |
| 1:0:432:C:H2'   | 1:0:433:G:H8   | 1.80                     | 0.47              |
| 1:0:556:A:H2'   | 1:0:557:U:H5'  | 1.97                     | 0.47              |
| 1:0:643:A:H2'   | 1:0:644:A:C8   | 2.49                     | 0.47              |
| 1:0:763:A:C2    | 1:0:765:C:H1'  | 2.49                     | 0.47              |
| 1:0:819:C:H2'   | 1:0:820:U:C6   | 2.50                     | 0.47              |
| 1:0:1269:G:H2'  | 1:0:1270:C:C6  | 2.50                     | 0.47              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:1290:A:H2' | 1:0:1291:G:C8   | 2.50                     | 0.47              |
| 1:0:1418:C:H2' | 1:0:1419:G:H8   | 1.79                     | 0.47              |
| 1:0:1495:G:H2' | 1:0:1496:G:C8   | 2.50                     | 0.47              |
| 1:0:1578:U:H2' | 1:0:1579:G:C8   | 2.50                     | 0.47              |
| 1:0:1821:A:H3' | 1:0:1822:C:H6   | 1.80                     | 0.47              |
| 1:0:2429:A:O2' | 1:0:2430:A:H5'  | 2.14                     | 0.47              |
| 1:0:2484:G:H21 | 1:0:2485:U:H5   | 1.63                     | 0.47              |
| 1:0:2727:G:N1  | 1:0:2735:C:H5'' | 2.28                     | 0.47              |
| 1:0:1039:A:H2' | 1:0:1040:A:C8   | 2.49                     | 0.47              |
| 1:0:1576:G:H8  | 1:0:1576:G:H5'  | 1.80                     | 0.47              |
| 1:0:2062:U:H4' | 1:0:2412:A:H2   | 1.79                     | 0.47              |
| 1:0:2211:U:H2' | 1:0:2212:U:C6   | 2.50                     | 0.47              |
| 1:0:2329:C:N4  | 1:0:2361:G:H22  | 2.13                     | 0.47              |
| 1:0:2658:A:H2' | 1:0:2659:C:C6   | 2.50                     | 0.47              |
| 1:0:84:G:O2'   | 1:0:85:C:H5'    | 2.15                     | 0.47              |
| 1:0:1263:G:O2' | 1:0:1264:C:P    | 2.73                     | 0.47              |
| 1:0:2504:G:H2' | 1:0:2505:G:H8   | 1.79                     | 0.47              |
| 1:0:2559:U:C2' | 1:0:2560:G:H5'  | 2.44                     | 0.47              |
| 1:0:241:C:C2'  | 1:0:242:A:H5''  | 2.44                     | 0.46              |
| 1:0:771:C:H2'  | 1:0:772:G:H8    | 1.80                     | 0.46              |
| 1:0:2276:C:O2  | 1:0:2301:A:H1'  | 2.15                     | 0.46              |
| 1:0:2444:C:O2' | 1:0:2445:C:H5'  | 2.15                     | 0.46              |
| 1:0:173:A:N6   | 1:0:844:G:H21   | 2.14                     | 0.46              |
| 1:0:342:G:HO2' | 1:0:343:A:P     | 2.38                     | 0.46              |
| 1:0:758:G:N2   | 1:0:763:A:N1    | 2.62                     | 0.46              |
| 1:0:776:G:N3   | 1:0:776:G:C2'   | 2.79                     | 0.46              |
| 1:0:864:C:H2'  | 1:0:865:A:H8    | 1.80                     | 0.46              |
| 1:0:869:C:O2'  | 1:0:870:C:H5'   | 2.15                     | 0.46              |
| 1:0:971:A:H2   | 1:0:2475:C:H1'  | 1.80                     | 0.46              |
| 1:0:986:A:H2'  | 1:0:987:G:H5'   | 1.97                     | 0.46              |
| 1:0:1480:G:H2' | 1:0:1481:U:H5'  | 1.97                     | 0.46              |
| 1:0:2137:G:H2' | 1:0:2138:U:C6   | 2.50                     | 0.46              |
| 1:0:2324:G:C4' | 1:0:2326:C:H5'' | 2.43                     | 0.46              |
| 1:0:2858:A:H3' | 1:0:2859:U:C5'  | 2.44                     | 0.46              |
| 1:0:54:G:H2'   | 1:0:55:A:C8     | 2.50                     | 0.46              |
| 1:0:152:G:O2'  | 1:0:153:A:H5'   | 2.15                     | 0.46              |
| 1:0:878:C:O2'  | 1:0:879:A:P     | 2.72                     | 0.46              |
| 1:0:1014:G:O2' | 1:0:1015:U:H5'  | 2.15                     | 0.46              |
| 1:0:1223:G:H4' | 1:0:1224:A:O5'  | 2.15                     | 0.46              |
| 1:0:1829:C:C2' | 1:0:1830:C:H5'  | 2.45                     | 0.46              |
| 1:0:1949:A:H1' | 1:0:2572:U:H4'  | 1.98                     | 0.46              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:1975:G:H4' | 1:0:1976:U:H5   | 1.80                     | 0.46              |
| 1:0:2526:U:H2' | 1:0:2527:G:C8   | 2.50                     | 0.46              |
| 1:0:2717:G:H2' | 1:0:2718:A:C8   | 2.51                     | 0.46              |
| 1:0:387:A:H2'  | 1:0:388:G:O4'   | 2.15                     | 0.46              |
| 1:0:546:A:H2'  | 1:0:547:U:C6    | 2.51                     | 0.46              |
| 1:0:758:G:H2'  | 1:0:759:C:H5'   | 1.97                     | 0.46              |
| 1:0:760:U:O2   | 1:0:1997:A:H1'  | 2.16                     | 0.46              |
| 1:0:887:G:O2'  | 1:0:888:G:H5'   | 2.15                     | 0.46              |
| 1:0:1039:A:H2' | 1:0:1040:A:H8   | 1.80                     | 0.46              |
| 1:0:1301:U:H2' | 1:0:1664:G:N2   | 2.30                     | 0.46              |
| 1:0:2035:G:H2' | 1:0:2036:G:C8   | 2.46                     | 0.46              |
| 1:0:2372:A:H2' | 1:0:2373:C:H6   | 1.79                     | 0.46              |
| 1:0:2642:G:H2' | 1:0:2643:G:O4'  | 2.16                     | 0.46              |
| 1:0:2757:G:H5' | 1:0:2761:A:H1'  | 1.97                     | 0.46              |
| 1:0:198:A:O2'  | 1:0:199:A:P     | 2.74                     | 0.46              |
| 1:0:337:G:H2'  | 1:0:338:G:C8    | 2.51                     | 0.46              |
| 1:0:738:G:H2'  | 1:0:739:G:O4'   | 2.14                     | 0.46              |
| 1:0:2809:A:H2' | 1:0:2810:A:H5'  | 1.98                     | 0.46              |
| 1:0:2825:A:H2' | 1:0:2826:C:C6   | 2.50                     | 0.46              |
| 1:0:9:U:H2'    | 1:0:10:A:C8     | 2.51                     | 0.46              |
| 1:0:108:G:H2'  | 1:0:109:A:H8    | 1.81                     | 0.46              |
| 1:0:324:C:H2'  | 1:0:325:U:O4'   | 2.15                     | 0.46              |
| 1:0:798:G:H2'  | 1:0:799:C:H5'   | 1.97                     | 0.46              |
| 1:0:1069:G:O2' | 1:0:1070:G:H5'  | 2.16                     | 0.46              |
| 1:0:1452:U:H5' | 1:0:1532:A:O2'  | 2.15                     | 0.46              |
| 1:0:1760:G:H2' | 1:0:1761:G:C8   | 2.50                     | 0.46              |
| 1:0:584:A:H4'  | 1:0:2479:U:C5'  | 2.43                     | 0.46              |
| 1:0:1029:C:H3' | 1:0:1030:U:H5'' | 1.96                     | 0.46              |
| 1:0:1279:G:H2' | 1:0:1280:U:OP2  | 2.16                     | 0.46              |
| 1:0:1572:C:C3' | 1:0:1573:G:H5'' | 2.45                     | 0.46              |
| 1:0:1836:C:H2' | 1:0:1837:G:C8   | 2.50                     | 0.46              |
| 1:0:1981:A:H2' | 1:0:1982:C:C6   | 2.50                     | 0.46              |
| 1:0:2459:C:C2' | 1:0:2460:G:H5'  | 2.45                     | 0.46              |
| 1:0:2475:C:H2' | 1:0:2476:A:H5'  | 1.97                     | 0.46              |
| 1:0:2499:C:N4  | 1:0:2521:A:H2   | 2.11                     | 0.46              |
| 1:0:2800:C:H2' | 1:0:2801:A:O4'  | 2.15                     | 0.46              |
| 1:0:2807:U:C5  | 1:0:2859:U:H4'  | 2.51                     | 0.46              |
| 1:0:636:G:H2'  | 1:0:637:G:H5'   | 1.97                     | 0.46              |
| 1:0:694:G:H2'  | 1:0:695:G:H8    | 1.81                     | 0.46              |
| 1:0:697:G:C2'  | 1:0:698:A:H5'   | 2.46                     | 0.46              |
| 1:0:845:U:H2'  | 1:0:846:A:H8    | 1.80                     | 0.46              |

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| Atom-1          | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|----------------|--------------------------|-------------------|
| 1:0:1962:C:O2'  | 1:0:1963:G:H5' | 2.16                     | 0.46              |
| 1:0:19:C:H2'    | 1:0:20:C:C6    | 2.49                     | 0.46              |
| 1:0:85:C:O2'    | 1:0:86:U:H5'   | 2.16                     | 0.46              |
| 1:0:462:G:H2'   | 1:0:463:C:H5'  | 1.98                     | 0.46              |
| 1:0:777:A:H62   | 1:0:1766:U:H3  | 1.59                     | 0.46              |
| 1:0:918:A:H2'   | 1:0:919:U:C5'  | 2.42                     | 0.46              |
| 1:0:932:G:H2'   | 1:0:933:G:C8   | 2.51                     | 0.46              |
| 1:0:1427:G:C2'  | 1:0:1428:G:H5' | 2.44                     | 0.46              |
| 1:0:1429:A:N6   | 1:0:1602:G:H5' | 2.31                     | 0.46              |
| 1:0:2245:A:HO2' | 1:0:2246:A:P   | 2.39                     | 0.46              |
| 1:0:2698:G:H2'  | 1:0:2699:G:C8  | 2.51                     | 0.46              |
| 1:0:27:G:N2     | 1:0:522:G:HO2' | 2.14                     | 0.46              |
| 1:0:161:U:H2'   | 1:0:162:C:C6   | 2.51                     | 0.46              |
| 1:0:313:U:H2'   | 1:0:314:G:C8   | 2.50                     | 0.46              |
| 1:0:952:A:H2'   | 1:0:953:G:O4'  | 2.16                     | 0.46              |
| 1:0:1331:G:H2'  | 1:0:1332:G:C8  | 2.51                     | 0.46              |
| 1:0:1495:G:O2'  | 1:0:1496:G:P   | 2.73                     | 0.46              |
| 1:0:1703:C:H2'  | 1:0:1704:G:O4' | 2.16                     | 0.46              |
| 1:0:2161:C:H2'  | 1:0:2162:C:C6  | 2.50                     | 0.46              |
| 1:0:2488:G:N2   | 1:0:2559:U:H1' | 2.31                     | 0.46              |
| 1:0:2493:U:H2'  | 1:0:2494:C:C6  | 2.51                     | 0.46              |
| 1:0:2570:C:H2'  | 1:0:2571:G:H8  | 1.81                     | 0.46              |
| 2:5:26:A:H2'    | 2:5:27:G:H8    | 1.80                     | 0.46              |
| 1:0:207:U:H2'   | 1:0:208:C:C6   | 2.51                     | 0.45              |
| 1:0:331:U:H2'   | 1:0:332:C:H5'' | 1.97                     | 0.45              |
| 1:0:595:A:H2    | 1:0:822:G:N3   | 2.15                     | 0.45              |
| 1:0:697:G:O2'   | 1:0:698:A:H5'  | 2.16                     | 0.45              |
| 1:0:831:G:H5'   | 1:0:852:U:OP1  | 2.16                     | 0.45              |
| 1:0:1380:C:C2'  | 1:0:1381:G:H5' | 2.45                     | 0.45              |
| 1:0:1677:C:H2'  | 1:0:1678:G:H8  | 1.81                     | 0.45              |
| 1:0:1685:A:N6   | 1:0:1691:G:H1' | 2.31                     | 0.45              |
| 1:0:1835:C:H2'  | 1:0:1836:C:C6  | 2.51                     | 0.45              |
| 1:0:2093:G:H2'  | 1:0:2094:C:C5  | 2.51                     | 0.45              |
| 1:0:2106:G:H2'  | 1:0:2107:G:C8  | 2.51                     | 0.45              |
| 1:0:2193:C:H2'  | 1:0:2194:A:O4' | 2.16                     | 0.45              |
| 1:0:2333:A:H2'  | 1:0:2334:C:C6  | 2.52                     | 0.45              |
| 1:0:2426:G:HO2' | 1:0:2427:A:P   | 2.39                     | 0.45              |
| 1:0:2574:G:N3   | 1:0:2574:G:C2' | 2.79                     | 0.45              |
| 1:0:199:A:H61   | 1:0:209:G:H1'  | 1.81                     | 0.45              |
| 1:0:246:C:N3    | 1:0:247:A:N6   | 2.64                     | 0.45              |
| 1:0:689:A:C8    | 1:0:2422:C:H1' | 2.51                     | 0.45              |

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| Atom-1          | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|----------------|--------------------------|-------------------|
| 1:0:1068:A:H2'  | 1:0:1069:G:H8  | 1.81                     | 0.45              |
| 1:0:1120:C:H2'  | 1:0:2731:G:N2  | 2.31                     | 0.45              |
| 1:0:1163:C:O2'  | 1:0:1164:C:H5' | 2.15                     | 0.45              |
| 1:0:1278:A:H4'  | 1:0:1279:G:O5' | 2.17                     | 0.45              |
| 1:0:1313:U:O2'  | 1:0:1314:A:O5' | 2.32                     | 0.45              |
| 1:0:1486:A:H2'  | 1:0:1487:C:C6  | 2.50                     | 0.45              |
| 1:0:1888:C:H5'' | 1:0:1889:G:C5' | 2.46                     | 0.45              |
| 1:0:2017:U:O2'  | 1:0:2018:G:H5' | 2.16                     | 0.45              |
| 1:0:2136:G:H2'  | 1:0:2137:G:C8  | 2.51                     | 0.45              |
| 1:0:2560:G:H3'  | 1:0:2560:G:N3  | 2.31                     | 0.45              |
| 1:0:2633:A:N6   | 1:0:2646:C:N4  | 2.63                     | 0.45              |
| 1:0:2668:U:O2'  | 1:0:2669:C:P   | 2.74                     | 0.45              |
| 1:0:931:G:O2'   | 1:0:932:G:H5'  | 2.16                     | 0.45              |
| 1:0:2120:C:H2'  | 1:0:2121:U:O4' | 2.17                     | 0.45              |
| 1:0:2474:G:O2'  | 1:0:2475:C:H5' | 2.15                     | 0.45              |
| 1:0:2628:C:H2'  | 1:0:2629:U:C6  | 2.52                     | 0.45              |
| 1:0:2784:A:H3'  | 1:0:2785:A:C8  | 2.49                     | 0.45              |
| 1:0:40:U:H2'    | 1:0:41:G:C8    | 2.51                     | 0.45              |
| 1:0:130:C:H2'   | 1:0:131:C:C6   | 2.51                     | 0.45              |
| 1:0:307:C:H2'   | 1:0:308:C:C6   | 2.52                     | 0.45              |
| 1:0:317:U:H3'   | 1:0:318:G:H5'' | 1.97                     | 0.45              |
| 1:0:489:A:N6    | 1:0:491:A:H62  | 2.14                     | 0.45              |
| 1:0:560:G:H2'   | 1:0:561:U:C6   | 2.51                     | 0.45              |
| 1:0:1429:A:O2'  | 1:0:1430:G:H4' | 2.17                     | 0.45              |
| 1:0:1659:G:H2'  | 1:0:1660:G:C8  | 2.51                     | 0.45              |
| 1:0:1886:G:H2'  | 1:0:1887:G:C8  | 2.51                     | 0.45              |
| 1:0:1949:A:O2'  | 1:0:2572:U:H5' | 2.17                     | 0.45              |
| 1:0:2057:U:H2'  | 1:0:2058:U:C6  | 2.51                     | 0.45              |
| 1:0:2259:G:H2'  | 1:0:2260:C:C6  | 2.52                     | 0.45              |
| 1:0:2403:C:H2'  | 1:0:2408:G:O2' | 2.17                     | 0.45              |
| 1:0:2455:A:O2'  | 1:0:2456:U:H5' | 2.17                     | 0.45              |
| 1:0:2468:G:H2'  | 1:0:2469:G:O4' | 2.17                     | 0.45              |
| 1:0:2475:C:C2'  | 1:0:2476:A:H5' | 2.46                     | 0.45              |
| 1:0:2487:G:H4'  | 1:0:2533:U:O2' | 2.15                     | 0.45              |
| 1:0:2639:A:H2'  | 1:0:2640:G:O4' | 2.16                     | 0.45              |
| 1:0:2824:C:H1'  | 1:0:2843:A:C2  | 2.51                     | 0.45              |
| 1:0:601:A:H3'   | 1:0:602:C:C5'  | 2.46                     | 0.45              |
| 1:0:872:G:O2'   | 1:0:2247:A:N3  | 2.48                     | 0.45              |
| 1:0:2196:U:H2'  | 1:0:2197:U:C6  | 2.51                     | 0.45              |
| 1:0:2277:A:H2'  | 1:0:2278:A:O4' | 2.16                     | 0.45              |
| 1:0:2278:A:H2'  | 1:0:2279:G:H8  | 1.82                     | 0.45              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:2558:C:O2'  | 1:0:2559:U:H5'  | 2.17                     | 0.45              |
| 1:0:2676:G:H2'  | 1:0:2677:U:C6   | 2.51                     | 0.45              |
| 1:0:8:A:H2'     | 1:0:9:U:C6      | 2.51                     | 0.45              |
| 1:0:35:G:H1'    | 1:0:466:A:H1'   | 1.98                     | 0.45              |
| 1:0:365:U:H2'   | 1:0:366:U:C6    | 2.52                     | 0.45              |
| 1:0:421:G:H2'   | 1:0:422:C:C6    | 2.51                     | 0.45              |
| 1:0:529:U:H2'   | 1:0:530:G:C8    | 2.51                     | 0.45              |
| 1:0:594:G:N2    | 1:0:1267:A:H62  | 2.14                     | 0.45              |
| 1:0:675:C:H2'   | 1:0:676:G:C8    | 2.52                     | 0.45              |
| 1:0:1579:G:H2'  | 1:0:1580:C:C6   | 2.52                     | 0.45              |
| 1:0:1586:A:H2'  | 1:0:1587:A:C8   | 2.52                     | 0.45              |
| 1:0:1747:G:H1'  | 1:0:1749:G:C2   | 2.51                     | 0.45              |
| 1:0:2552:C:OP1  | 1:0:2553:G:H5'' | 2.17                     | 0.45              |
| 1:0:297:A:H2'   | 1:0:298:C:C6    | 2.51                     | 0.45              |
| 1:0:1140:A:N6   | 1:0:2469:G:H5'' | 2.32                     | 0.45              |
| 1:0:1307:U:H2'  | 1:0:1308:C:O4'  | 2.17                     | 0.45              |
| 1:0:1619:A:H3'  | 1:0:1619:A:N3   | 2.32                     | 0.45              |
| 1:0:1777:A:H5'  | 1:0:1963:G:H21  | 1.82                     | 0.45              |
| 1:0:2055:G:H2'  | 1:0:2056:C:C6   | 2.52                     | 0.45              |
| 1:0:2205:C:H2'  | 1:0:2206:C:H6   | 1.80                     | 0.45              |
| 2:5:30:C:H2'    | 2:5:31:C:H6     | 1.81                     | 0.45              |
| 1:0:13:A:H1'    | 1:0:536:A:H62   | 1.82                     | 0.45              |
| 1:0:81:C:H4'    | 1:0:307:C:H5'   | 1.98                     | 0.45              |
| 1:0:340:G:H1'   | 1:0:488:A:C4    | 2.52                     | 0.45              |
| 1:0:567:G:H2'   | 1:0:568:G:C8    | 2.52                     | 0.45              |
| 1:0:595:A:H62   | 1:0:1264:C:N4   | 2.14                     | 0.45              |
| 1:0:935:C:H2'   | 1:0:936:A:C8    | 2.51                     | 0.45              |
| 1:0:1223:G:O2'  | 1:0:1224:A:P    | 2.75                     | 0.45              |
| 1:0:1452:U:H5'' | 1:0:1533:G:H5'  | 1.99                     | 0.45              |
| 1:0:2022:C:H2'  | 1:0:2023:C:C6   | 2.52                     | 0.45              |
| 1:0:2393:G:H2'  | 1:0:2394:G:C8   | 2.52                     | 0.45              |
| 1:0:211:U:C2'   | 1:0:212:U:H5'   | 2.46                     | 0.45              |
| 1:0:916:U:H2'   | 1:0:917:U:C6    | 2.52                     | 0.45              |
| 1:0:968:C:H2'   | 1:0:970:A:OP1   | 2.17                     | 0.45              |
| 1:0:1257:U:H2'  | 1:0:1258:G:C8   | 2.52                     | 0.45              |
| 1:0:1886:G:H2'  | 1:0:1887:G:H8   | 1.82                     | 0.45              |
| 1:0:1888:C:C5'  | 1:0:1889:G:H5'' | 2.45                     | 0.45              |
| 1:0:2239:C:O2'  | 1:0:2240:C:H5'  | 2.17                     | 0.45              |
| 1:0:2376:G:H2'  | 1:0:2377:U:C6   | 2.52                     | 0.45              |
| 1:0:2600:A:H2'  | 1:0:2601:C:C6   | 2.52                     | 0.45              |
| 1:0:187:U:H2'   | 1:0:188:G:C8    | 2.52                     | 0.45              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:306:G:H2'   | 1:0:307:C:C6    | 2.52                     | 0.45              |
| 1:0:342:G:O2'   | 1:0:343:A:OP1   | 2.34                     | 0.45              |
| 1:0:1494:G:H2'  | 1:0:1495:G:C8   | 2.51                     | 0.45              |
| 1:0:1608:U:H2'  | 1:0:1609:G:C8   | 2.52                     | 0.45              |
| 1:0:1888:C:C4'  | 1:0:1889:G:H5'' | 2.47                     | 0.45              |
| 1:0:1966:C:H4'  | 1:0:2585:C:H4'  | 1.97                     | 0.45              |
| 1:0:2235:G:H2'  | 1:0:2236:U:H6   | 1.81                     | 0.45              |
| 1:0:2512:A:H2'  | 1:0:2513:A:O4'  | 2.17                     | 0.45              |
| 1:0:2572:U:C4   | 1:0:2573:C:N4   | 2.85                     | 0.45              |
| 1:0:91:A:H2'    | 1:0:92:U:C6     | 2.53                     | 0.44              |
| 1:0:736:G:H2'   | 1:0:737:C:O4'   | 2.16                     | 0.44              |
| 1:0:811:G:O2'   | 1:0:812:G:H5'   | 2.18                     | 0.44              |
| 1:0:1346:C:H2'  | 1:0:1347:C:C6   | 2.52                     | 0.44              |
| 1:0:1367:A:H2'  | 1:0:1368:G:O4'  | 2.17                     | 0.44              |
| 1:0:1628:C:H2'  | 1:0:1629:G:C8   | 2.52                     | 0.44              |
| 1:0:1855:G:H4'  | 1:0:2390:A:H4'  | 1.99                     | 0.44              |
| 1:0:1906:U:H2'  | 1:0:1907:C:C6   | 2.52                     | 0.44              |
| 1:0:2094:C:C4   | 1:0:2103:G:H1'  | 2.52                     | 0.44              |
| 1:0:2377:U:O2'  | 1:0:2378:G:OP1  | 2.33                     | 0.44              |
| 1:0:2619:G:H2'  | 1:0:2620:G:C8   | 2.52                     | 0.44              |
| 1:0:2694:G:H2'  | 1:0:2695:C:C6   | 2.52                     | 0.44              |
| 1:0:237:G:H2'   | 1:0:238:G:O4'   | 2.17                     | 0.44              |
| 1:0:709:A:H2'   | 1:0:710:C:C6    | 2.53                     | 0.44              |
| 1:0:1130:U:H2'  | 1:0:1131:G:C8   | 2.53                     | 0.44              |
| 1:0:1225:G:H2'  | 1:0:1249:G:H1   | 1.82                     | 0.44              |
| 1:0:1921:A:C3'  | 1:0:1922:U:H5'' | 2.47                     | 0.44              |
| 1:0:2240:C:H2'  | 1:0:2241:U:H5'  | 1.98                     | 0.44              |
| 1:0:2370:G:HO2' | 1:0:2371:A:H2   | 1.65                     | 0.44              |
| 1:0:2524:G:H2'  | 1:0:2525:U:O4'  | 2.17                     | 0.44              |
| 1:0:2591:C:O2'  | 1:0:2592:U:H5'  | 2.17                     | 0.44              |
| 1:0:210:A:N6    | 1:0:442:A:N6    | 2.66                     | 0.44              |
| 1:0:403:A:H4'   | 1:0:425:A:C5'   | 2.39                     | 0.44              |
| 1:0:514:G:N3    | 1:0:514:G:C2'   | 2.79                     | 0.44              |
| 1:0:644:A:H2'   | 1:0:645:G:H5'   | 1.99                     | 0.44              |
| 1:0:788:G:C5'   | 1:0:790:A:H1'   | 2.47                     | 0.44              |
| 1:0:987:G:H2'   | 1:0:988:G:H8    | 1.82                     | 0.44              |
| 1:0:1204:G:H2'  | 1:0:1205:G:C8   | 2.52                     | 0.44              |
| 1:0:1712:G:C2'  | 1:0:1713:G:H5'  | 2.46                     | 0.44              |
| 1:0:1859:A:H2'  | 1:0:1860:A:C8   | 2.53                     | 0.44              |
| 1:0:2159:A:H2'  | 1:0:2160:C:C6   | 2.52                     | 0.44              |
| 1:0:2426:G:H22  | 1:0:2431:C:N4   | 2.15                     | 0.44              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:2809:A:N6  | 1:0:2854:G:H2'  | 2.32                     | 0.44              |
| 1:0:2862:G:O2' | 1:0:2863:U:H5'  | 2.17                     | 0.44              |
| 1:0:351:A:H2'  | 1:0:352:G:O4'   | 2.18                     | 0.44              |
| 1:0:653:G:H21  | 1:0:655:A:H1'   | 1.82                     | 0.44              |
| 1:0:701:U:H2'  | 1:0:702:A:O4'   | 2.18                     | 0.44              |
| 1:0:1251:G:H2' | 1:0:1252:C:H6   | 1.80                     | 0.44              |
| 1:0:1286:U:H4' | 1:0:1288:A:OP1  | 2.17                     | 0.44              |
| 1:0:1292:A:H2' | 1:0:1293:A:H8   | 1.83                     | 0.44              |
| 1:0:2227:C:C2' | 1:0:2228:U:H5'  | 2.41                     | 0.44              |
| 1:0:2292:C:H2' | 1:0:2293:G:C8   | 2.53                     | 0.44              |
| 1:0:2860:C:H2' | 1:0:2861:A:O4'  | 2.18                     | 0.44              |
| 1:0:117:A:H4'  | 1:0:118:U:C6    | 2.53                     | 0.44              |
| 1:0:192:G:O2'  | 1:0:193:A:C5'   | 2.66                     | 0.44              |
| 1:0:520:C:O2'  | 1:0:1249:G:H5'' | 2.18                     | 0.44              |
| 1:0:532:A:H2'  | 1:0:533:C:C6    | 2.53                     | 0.44              |
| 1:0:540:G:O6   | 1:0:2006:G:OP1  | 2.36                     | 0.44              |
| 1:0:699:G:H3'  | 1:0:699:G:N3    | 2.33                     | 0.44              |
| 1:0:716:U:H2'  | 1:0:717:G:O4'   | 2.18                     | 0.44              |
| 1:0:837:U:H2'  | 1:0:838:A:C8    | 2.53                     | 0.44              |
| 1:0:1319:C:H2' | 1:0:1320:A:H8   | 1.82                     | 0.44              |
| 1:0:1518:C:C2' | 1:0:1519:G:O5'  | 2.66                     | 0.44              |
| 1:0:2709:C:H2' | 1:0:2710:C:C6   | 2.52                     | 0.44              |
| 1:0:2785:A:H2' | 1:0:2786:G:O4'  | 2.17                     | 0.44              |
| 1:0:245:C:H5'  | 1:0:372:U:O2'   | 2.17                     | 0.44              |
| 1:0:575:U:H2'  | 1:0:576:A:C8    | 2.53                     | 0.44              |
| 1:0:604:U:H2'  | 1:0:605:G:H8    | 1.82                     | 0.44              |
| 1:0:634:G:H2'  | 1:0:635:C:C6    | 2.52                     | 0.44              |
| 1:0:925:U:H4'  | 1:0:926:C:C6    | 2.53                     | 0.44              |
| 1:0:1002:C:H2' | 1:0:1003:C:C6   | 2.53                     | 0.44              |
| 1:0:2635:U:H2' | 1:0:2636:A:C8   | 2.52                     | 0.44              |
| 1:0:2668:U:C2' | 1:0:2669:C:OP2  | 2.66                     | 0.44              |
| 1:0:55:A:N6    | 1:0:69:G:O6     | 2.50                     | 0.44              |
| 1:0:575:U:H4'  | 1:0:822:G:OP2   | 2.17                     | 0.44              |
| 1:0:1840:A:H2' | 1:0:1841:G:H5'  | 2.00                     | 0.44              |
| 1:0:32:C:H2'   | 1:0:33:C:C6     | 2.53                     | 0.44              |
| 1:0:54:G:H2'   | 1:0:55:A:H8     | 1.83                     | 0.44              |
| 1:0:69:G:OP1   | 1:0:110:U:N3    | 2.51                     | 0.44              |
| 1:0:147:G:C2   | 1:0:148:C:H1'   | 2.53                     | 0.44              |
| 1:0:508:G:H2'  | 1:0:509:U:C6    | 2.52                     | 0.44              |
| 1:0:694:G:H2'  | 1:0:695:G:C8    | 2.53                     | 0.44              |
| 1:0:1466:C:H2' | 1:0:1467:U:O4'  | 2.17                     | 0.44              |

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| Atom-1          | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|----------------|--------------------------|-------------------|
| 1:0:1821:A:H5'' | 1:0:1822:C:C5  | 2.52                     | 0.44              |
| 1:0:1912:G:N3   | 1:0:1912:G:C2' | 2.79                     | 0.44              |
| 1:0:2458:U:OP1  | 1:0:2516:U:H1' | 2.18                     | 0.44              |
| 1:0:2492:G:H2'  | 1:0:2493:U:C6  | 2.53                     | 0.44              |
| 1:0:1031:C:H4'  | 1:0:1032:A:C8  | 2.53                     | 0.44              |
| 1:0:1353:A:H1'  | 1:0:1619:A:O4' | 2.17                     | 0.44              |
| 1:0:2018:G:H3'  | 1:0:2019:C:H5' | 2.00                     | 0.44              |
| 1:0:2356:A:H2'  | 1:0:2357:A:C8  | 2.53                     | 0.44              |
| 1:0:2668:U:HO2' | 1:0:2669:C:P   | 2.41                     | 0.44              |
| 1:0:2824:C:H2'  | 1:0:2825:A:OP2 | 2.17                     | 0.44              |
| 1:0:181:A:C4'   | 1:0:182:G:H4'  | 2.46                     | 0.43              |
| 1:0:415:A:C2'   | 1:0:416:U:H5'  | 2.47                     | 0.43              |
| 1:0:543:G:H2'   | 1:0:544:U:C6   | 2.53                     | 0.43              |
| 1:0:1008:G:H2'  | 1:0:1009:C:C6  | 2.53                     | 0.43              |
| 1:0:1055:A:H2   | 1:0:1121:G:H2' | 1.83                     | 0.43              |
| 1:0:1480:G:C2'  | 1:0:1481:U:H5' | 2.47                     | 0.43              |
| 1:0:1504:G:O2'  | 1:0:1505:U:H5' | 2.18                     | 0.43              |
| 1:0:1665:C:H2'  | 1:0:1666:G:C8  | 2.53                     | 0.43              |
| 1:0:2276:C:O2'  | 1:0:2277:A:H5' | 2.18                     | 0.43              |
| 1:0:2436:U:H2'  | 1:0:2437:G:O4' | 2.18                     | 0.43              |
| 1:0:2712:G:H5'  | 1:0:2713:A:C8  | 2.53                     | 0.43              |
| 1:0:2783:U:O2'  | 1:0:2784:A:H4' | 2.18                     | 0.43              |
| 1:0:168:A:H2'   | 1:0:169:C:H6   | 1.82                     | 0.43              |
| 1:0:437:G:O2'   | 1:0:438:G:H5'  | 2.17                     | 0.43              |
| 1:0:457:C:O2'   | 1:0:458:G:H5'  | 2.18                     | 0.43              |
| 1:0:715:U:H2'   | 1:0:716:U:C6   | 2.53                     | 0.43              |
| 1:0:841:G:H4'   | 1:0:844:G:N1   | 2.33                     | 0.43              |
| 1:0:859:U:H4'   | 1:0:860:U:C5   | 2.53                     | 0.43              |
| 1:0:1155:G:H2'  | 1:0:1156:U:O4' | 2.18                     | 0.43              |
| 1:0:1274:C:O2'  | 1:0:1275:A:H5' | 2.18                     | 0.43              |
| 1:0:1291:G:H2'  | 1:0:1292:A:C8  | 2.53                     | 0.43              |
| 1:0:1312:G:H5'' | 1:0:1313:U:C5' | 2.36                     | 0.43              |
| 1:0:1750:A:H1'  | 1:0:2690:A:C2  | 2.52                     | 0.43              |
| 1:0:1899:A:O2'  | 1:0:1946:U:H1' | 2.18                     | 0.43              |
| 1:0:2321:C:C2'  | 1:0:2322:U:H5' | 2.47                     | 0.43              |
| 1:0:2620:G:H2'  | 1:0:2621:G:H8  | 1.83                     | 0.43              |
| 1:0:2772:U:H2'  | 1:0:2773:G:C8  | 2.53                     | 0.43              |
| 1:0:67:G:C4     | 1:0:73:A:C8    | 3.06                     | 0.43              |
| 1:0:192:G:H4'   | 1:0:193:A:H4'  | 1.99                     | 0.43              |
| 1:0:538:A:C3'   | 1:0:539:A:H5'' | 2.48                     | 0.43              |
| 1:0:1227:A:H62  | 1:0:1248:G:H21 | 1.65                     | 0.43              |

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| Atom-1          | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|----------------|--------------------------|-------------------|
| 1:0:1518:C:O2'  | 1:0:1519:G:P   | 2.76                     | 0.43              |
| 1:0:1561:A:H2'  | 1:0:1562:G:O4' | 2.18                     | 0.43              |
| 1:0:2161:C:O2'  | 1:0:2162:C:OP1 | 2.34                     | 0.43              |
| 1:0:2392:G:H2'  | 1:0:2393:G:C8  | 2.54                     | 0.43              |
| 1:0:2485:U:O2'  | 1:0:2486:C:H5' | 2.17                     | 0.43              |
| 1:0:2510:A:N6   | 1:0:2641:A:H61 | 2.11                     | 0.43              |
| 1:0:2680:U:H3'  | 1:0:2681:A:C5' | 2.47                     | 0.43              |
| 2:5:24:U:H2'    | 2:5:25:U:C6    | 2.54                     | 0.43              |
| 1:0:242:A:O2'   | 1:0:243:G:OP2  | 2.37                     | 0.43              |
| 1:0:420:C:H2'   | 1:0:421:G:C8   | 2.53                     | 0.43              |
| 1:0:475:U:H2'   | 1:0:476:G:O4'  | 2.18                     | 0.43              |
| 1:0:1016:C:H2'  | 1:0:1017:C:H6  | 1.83                     | 0.43              |
| 1:0:1278:A:O2'  | 1:0:1279:G:O5' | 2.36                     | 0.43              |
| 1:0:1605:A:H2'  | 1:0:1606:C:C6  | 2.54                     | 0.43              |
| 1:0:173:A:N3    | 1:0:173:A:C2'  | 2.81                     | 0.43              |
| 1:0:456:C:H2'   | 1:0:457:C:C6   | 2.54                     | 0.43              |
| 1:0:871:U:H1'   | 1:0:2248:A:C5' | 2.47                     | 0.43              |
| 1:0:1614:C:H2'  | 1:0:1615:C:C6  | 2.53                     | 0.43              |
| 1:0:1774:A:N1   | 1:0:2566:A:H2' | 2.34                     | 0.43              |
| 1:0:1938:U:H2'  | 1:0:1939:U:H5' | 1.99                     | 0.43              |
| 1:0:2497:A:O5'  | 1:0:2497:A:N3  | 2.52                     | 0.43              |
| 1:0:2780:A:H2'  | 1:0:2781:G:H8  | 1.83                     | 0.43              |
| 1:0:2874:A:H2'  | 1:0:2875:C:C6  | 2.54                     | 0.43              |
| 1:0:114:C:H4'   | 1:0:124:A:O2'  | 2.17                     | 0.43              |
| 1:0:810:U:H2'   | 1:0:811:G:H8   | 1.83                     | 0.43              |
| 1:0:838:A:H4'   | 1:0:2407:G:C5  | 2.54                     | 0.43              |
| 1:0:1478:U:H2'  | 1:0:1479:G:C8  | 2.53                     | 0.43              |
| 1:0:1518:C:HO2' | 1:0:1519:G:P   | 2.41                     | 0.43              |
| 1:0:1975:G:H1'  | 1:0:1977:C:N4  | 2.33                     | 0.43              |
| 1:0:2033:C:H2'  | 1:0:2034:A:O4' | 2.18                     | 0.43              |
| 1:0:88:G:H3'    | 1:0:89:A:C5'   | 2.42                     | 0.43              |
| 1:0:109:A:H2'   | 1:0:110:U:H5'' | 2.00                     | 0.43              |
| 1:0:192:G:O2'   | 1:0:193:A:P    | 2.76                     | 0.43              |
| 1:0:215:G:H1'   | 1:0:617:U:O2   | 2.19                     | 0.43              |
| 1:0:547:U:H2'   | 1:0:548:G:C8   | 2.53                     | 0.43              |
| 1:0:959:C:H2'   | 1:0:960:U:C6   | 2.54                     | 0.43              |
| 1:0:1075:C:H2'  | 1:0:1076:U:C6  | 2.54                     | 0.43              |
| 1:0:1500:U:H2'  | 1:0:1501:C:C6  | 2.54                     | 0.43              |
| 1:0:1518:C:H2'  | 1:0:1519:G:H8  | 1.84                     | 0.43              |
| 1:0:1961:A:H2'  | 1:0:1962:C:O4' | 2.18                     | 0.43              |
| 2:5:32:A:C5     | 2:5:33:C:H1'   | 2.54                     | 0.43              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:201:G:H2'   | 1:0:202:A:H8    | 1.84                     | 0.43              |
| 1:0:653:G:C2    | 1:0:655:A:H1'   | 2.53                     | 0.43              |
| 1:0:820:U:H2'   | 1:0:821:A:C8    | 2.53                     | 0.43              |
| 1:0:840:U:H4'   | 1:0:841:G:C2    | 2.53                     | 0.43              |
| 1:0:967:G:H1'   | 1:0:970:A:N7    | 2.34                     | 0.43              |
| 1:0:1033:G:N2   | 1:0:1150:C:H2'  | 2.29                     | 0.43              |
| 1:0:1326:U:H4'  | 1:0:1345:G:H4'  | 2.01                     | 0.43              |
| 1:0:2002:A:H61  | 1:0:2018:G:N2   | 2.16                     | 0.43              |
| 1:0:2056:C:H2'  | 1:0:2057:U:H6   | 1.84                     | 0.43              |
| 1:0:2244:C:H1'  | 1:0:2255:G:N1   | 2.34                     | 0.43              |
| 1:0:2265:A:H5'' | 1:0:2266:A:O4'  | 2.19                     | 0.43              |
| 1:0:2602:G:OP1  | 1:0:2801:A:H1'  | 2.19                     | 0.43              |
| 1:0:338:G:H2'   | 1:0:339:U:O4'   | 2.19                     | 0.43              |
| 1:0:722:C:H2'   | 1:0:723:C:C6    | 2.54                     | 0.43              |
| 1:0:814:G:H3'   | 1:0:815:A:C5'   | 2.49                     | 0.43              |
| 1:0:878:C:HO2'  | 1:0:879:A:P     | 2.42                     | 0.43              |
| 1:0:1341:G:N2   | 1:0:1664:G:H1   | 2.15                     | 0.43              |
| 1:0:1455:C:HO2' | 1:0:1644:G:H5'' | 1.84                     | 0.43              |
| 1:0:1880:G:H2'  | 1:0:1881:U:C6   | 2.54                     | 0.43              |
| 1:0:2213:G:H2'  | 1:0:2214:G:H8   | 1.84                     | 0.43              |
| 1:0:2369:U:H2'  | 1:0:2370:G:C8   | 2.54                     | 0.43              |
| 1:0:2586:G:H2'  | 1:0:2587:G:O4'  | 2.18                     | 0.43              |
| 1:0:2785:A:O2'  | 1:0:2786:G:H5'  | 2.19                     | 0.43              |
| 1:0:2795:A:N3   | 1:0:2795:A:H2'  | 2.32                     | 0.43              |
| 1:0:121:G:H2'   | 1:0:122:G:O4'   | 2.19                     | 0.43              |
| 1:0:128:C:C3'   | 1:0:129:A:H5''  | 2.49                     | 0.43              |
| 1:0:187:U:H2'   | 1:0:188:G:H8    | 1.83                     | 0.43              |
| 1:0:211:U:H2'   | 1:0:212:U:O4'   | 2.19                     | 0.43              |
| 1:0:762:A:H5'   | 1:0:1284:G:H1'  | 1.99                     | 0.43              |
| 1:0:1194:U:H2'  | 1:0:1195:U:H6   | 1.79                     | 0.43              |
| 1:0:1604:A:H2'  | 1:0:1605:A:O4'  | 2.19                     | 0.43              |
| 1:0:1937:G:H4'  | 1:0:2529:G:H21  | 1.83                     | 0.43              |
| 1:0:2034:A:N6   | 1:0:2593:A:N7   | 2.66                     | 0.43              |
| 1:0:2310:G:H2'  | 1:0:2311:U:O4'  | 2.18                     | 0.43              |
| 1:0:2311:U:HO2' | 1:0:2312:A:H8   | 1.63                     | 0.43              |
| 2:5:7:A:H2'     | 2:5:8:A:C8      | 2.54                     | 0.43              |
| 1:0:192:G:O2'   | 1:0:193:A:H5''  | 2.19                     | 0.42              |
| 1:0:242:A:N6    | 1:0:441:A:N7    | 2.66                     | 0.42              |
| 1:0:539:A:N6    | 1:0:2024:U:H3   | 2.16                     | 0.42              |
| 1:0:591:G:H2'   | 1:0:592:G:C8    | 2.54                     | 0.42              |
| 1:0:628:A:H2'   | 1:0:629:C:H6    | 1.81                     | 0.42              |

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| Atom-1          | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|----------------|--------------------------|-------------------|
| 1:0:652:C:N4    | 1:0:657:A:H61  | 2.09                     | 0.42              |
| 1:0:1046:U:H2'  | 1:0:1047:G:H8  | 1.84                     | 0.42              |
| 1:0:1193:G:O2'  | 1:0:1194:U:P   | 2.76                     | 0.42              |
| 1:0:1591:U:H2'  | 1:0:1592:U:O4' | 2.18                     | 0.42              |
| 1:0:1917:C:H2'  | 1:0:1918:G:H5' | 2.01                     | 0.42              |
| 1:0:2083:G:H22  | 1:0:2172:U:H3  | 1.66                     | 0.42              |
| 1:0:2808:U:H3'  | 1:0:2809:A:C5' | 2.47                     | 0.42              |
| 1:0:81:C:O2'    | 1:0:82:G:H5'   | 2.19                     | 0.42              |
| 1:0:172:A:N3    | 1:0:227:G:N2   | 2.65                     | 0.42              |
| 1:0:758:G:N3    | 1:0:763:A:N6   | 2.64                     | 0.42              |
| 1:0:820:U:H1'   | 1:0:2424:G:OP1 | 2.18                     | 0.42              |
| 1:0:944:A:H2'   | 1:0:945:G:O4'  | 2.19                     | 0.42              |
| 1:0:987:G:H2'   | 1:0:988:G:C8   | 2.54                     | 0.42              |
| 1:0:1743:C:H2'  | 1:0:1744:G:C8  | 2.54                     | 0.42              |
| 1:0:2473:G:O2'  | 1:0:2474:G:H5' | 2.19                     | 0.42              |
| 1:0:2615:U:H3   | 1:0:2762:G:H1  | 1.66                     | 0.42              |
| 1:0:2786:G:H2'  | 1:0:2787:A:C8  | 2.54                     | 0.42              |
| 1:0:37:C:H2'    | 1:0:38:G:C8    | 2.54                     | 0.42              |
| 1:0:181:A:C5'   | 1:0:182:G:OP1  | 2.62                     | 0.42              |
| 1:0:953:G:H4'   | 1:0:1203:A:O2' | 2.19                     | 0.42              |
| 1:0:1017:C:H2'  | 1:0:1018:C:O4' | 2.18                     | 0.42              |
| 1:0:1147:G:H2'  | 1:0:1148:G:H8  | 1.84                     | 0.42              |
| 1:0:1259:A:H2'  | 1:0:1260:A:H8  | 1.83                     | 0.42              |
| 1:0:1489:C:H3'  | 1:0:1490:U:H5' | 2.00                     | 0.42              |
| 1:0:1532:A:H2'  | 1:0:1533:G:C8  | 2.53                     | 0.42              |
| 1:0:2225:G:O2'  | 1:0:2226:A:H5' | 2.20                     | 0.42              |
| 1:0:2380:U:C2'  | 1:0:2381:A:H5' | 2.44                     | 0.42              |
| 1:0:2564:U:C4'  | 1:0:2565:C:H5' | 2.49                     | 0.42              |
| 1:0:2658:A:H2'  | 1:0:2659:C:H6  | 1.84                     | 0.42              |
| 1:0:178:C:H4'   | 1:0:399:G:C2   | 2.54                     | 0.42              |
| 1:0:523:A:H2    | 1:0:591:G:H4'  | 1.83                     | 0.42              |
| 1:0:541:C:H42   | 1:0:572:G:C1'  | 2.33                     | 0.42              |
| 1:0:1057:A:H3'  | 1:0:1058:G:H5' | 2.00                     | 0.42              |
| 1:0:1626:A:H5'' | 1:0:1627:C:OP2 | 2.20                     | 0.42              |
| 1:0:2038:C:H5'  | 1:0:2039:G:C5' | 2.49                     | 0.42              |
| 1:0:2161:C:H2'  | 1:0:2162:C:C5  | 2.55                     | 0.42              |
| 1:0:2261:G:H4'  | 1:0:2368:G:O2' | 2.20                     | 0.42              |
| 1:0:2426:G:H22  | 1:0:2431:C:H41 | 1.67                     | 0.42              |
| 1:0:63:A:O2'    | 1:0:64:C:H5'   | 2.19                     | 0.42              |
| 1:0:415:A:O2'   | 1:0:416:U:H5'  | 2.20                     | 0.42              |
| 1:0:764:A:H3'   | 1:0:764:A:N3   | 2.35                     | 0.42              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:1029:C:C2'  | 1:0:1030:U:H5'' | 2.49                     | 0.42              |
| 1:0:1358:C:H2'  | 1:0:1359:G:H5'  | 2.01                     | 0.42              |
| 1:0:1708:C:H2'  | 1:0:1709:U:O4'  | 2.19                     | 0.42              |
| 1:0:2204:A:HO2' | 1:0:2205:C:H6   | 1.60                     | 0.42              |
| 1:0:2757:G:H5'  | 1:0:2761:A:C1'  | 2.50                     | 0.42              |
| 2:5:33:C:H3'    | 2:5:34:C:C5'    | 2.48                     | 0.42              |
| 1:0:3:U:H2'     | 1:0:4:C:C6      | 2.54                     | 0.42              |
| 1:0:404:A:H1'   | 1:0:424:G:O2'   | 2.19                     | 0.42              |
| 1:0:509:U:H2'   | 1:0:510:G:O4'   | 2.19                     | 0.42              |
| 1:0:860:U:H2'   | 1:0:860:U:O2    | 2.19                     | 0.42              |
| 1:0:984:A:H2'   | 1:0:1200:G:N2   | 2.33                     | 0.42              |
| 1:0:1343:C:H2'  | 1:0:1344:C:C6   | 2.55                     | 0.42              |
| 1:0:1489:C:H3'  | 1:0:1490:U:C5'  | 2.50                     | 0.42              |
| 1:0:1762:C:H2'  | 1:0:1763:G:C8   | 2.54                     | 0.42              |
| 1:0:1957:C:O2'  | 1:0:1958:G:H5'  | 2.19                     | 0.42              |
| 1:0:2633:A:H4'  | 1:0:2634:G:C4'  | 2.40                     | 0.42              |
| 1:0:119:G:H1'   | 1:0:129:A:N1    | 2.35                     | 0.42              |
| 1:0:354:C:H2'   | 1:0:355:G:O4'   | 2.20                     | 0.42              |
| 1:0:644:A:H2'   | 1:0:645:G:O4'   | 2.19                     | 0.42              |
| 1:0:646:C:O2'   | 1:0:650:U:H5''  | 2.19                     | 0.42              |
| 1:0:649:G:H2'   | 1:0:650:U:C6    | 2.54                     | 0.42              |
| 1:0:786:U:H2'   | 1:0:787:A:H5'   | 2.01                     | 0.42              |
| 1:0:879:A:C2'   | 1:0:880:C:H5'   | 2.49                     | 0.42              |
| 1:0:1065:A:H2'  | 1:0:1066:G:C8   | 2.55                     | 0.42              |
| 1:0:1187:A:HO2' | 1:0:1188:A:P    | 2.41                     | 0.42              |
| 1:0:1193:G:O2'  | 1:0:1194:U:OP1  | 2.36                     | 0.42              |
| 1:0:1281:A:N6   | 1:0:1995:G:O2'  | 2.52                     | 0.42              |
| 1:0:1451:C:H2'  | 1:0:1452:U:C6   | 2.54                     | 0.42              |
| 1:0:1566:G:H2'  | 1:0:1567:A:C8   | 2.55                     | 0.42              |
| 1:0:1634:A:O2'  | 1:0:1635:G:H5'  | 2.19                     | 0.42              |
| 1:0:1790:G:O3'  | 1:0:1791:C:H6   | 2.02                     | 0.42              |
| 1:0:1836:C:H2'  | 1:0:1837:G:H8   | 1.84                     | 0.42              |
| 1:0:2217:G:H5'  | 1:0:2219:U:O4   | 2.19                     | 0.42              |
| 1:0:2555:G:N3   | 1:0:2555:G:C2'  | 2.83                     | 0.42              |
| 1:0:48:A:O5'    | 1:0:50:G:H4'    | 2.20                     | 0.42              |
| 1:0:562:G:H2'   | 1:0:563:U:O4'   | 2.20                     | 0.42              |
| 1:0:964:A:H1'   | 1:0:2245:A:OP2  | 2.19                     | 0.42              |
| 1:0:1030:U:OP1  | 1:0:1046:U:H1'  | 2.20                     | 0.42              |
| 1:0:1499:A:H2'  | 1:0:1500:U:C6   | 2.54                     | 0.42              |
| 1:0:1671:A:C1'  | 1:0:2798:A:H5'  | 2.50                     | 0.42              |
| 1:0:1926:U:O2'  | 1:0:1927:U:O5'  | 2.36                     | 0.42              |

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| Atom-1          | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|----------------|--------------------------|-------------------|
| 1:0:2133:G:H2'  | 1:0:2134:U:C6  | 2.55                     | 0.42              |
| 1:0:2217:G:N3   | 1:0:2217:G:C2' | 2.83                     | 0.42              |
| 1:0:2245:A:C2'  | 1:0:2246:A:OP2 | 2.67                     | 0.42              |
| 1:0:2633:A:H5'' | 1:0:2634:G:OP1 | 2.20                     | 0.42              |
| 1:0:2824:C:HO2' | 1:0:2825:A:P   | 2.42                     | 0.42              |
| 1:0:198:A:O2'   | 1:0:199:A:OP2  | 2.30                     | 0.42              |
| 1:0:327:C:O2'   | 1:0:328:A:H5'  | 2.20                     | 0.42              |
| 1:0:430:C:H2'   | 1:0:431:G:C8   | 2.54                     | 0.42              |
| 1:0:617:U:H2'   | 1:0:618:A:O4'  | 2.20                     | 0.42              |
| 1:0:669:G:H2'   | 1:0:670:U:H6   | 1.83                     | 0.42              |
| 1:0:956:A:H2'   | 1:0:956:A:N3   | 2.34                     | 0.42              |
| 1:0:1332:G:H2'  | 1:0:1333:G:O4' | 2.20                     | 0.42              |
| 1:0:1801:C:H3'  | 1:0:1802:A:H5' | 2.02                     | 0.42              |
| 1:0:2027:C:H2'  | 1:0:2028:C:C6  | 2.55                     | 0.42              |
| 1:0:2500:C:H4'  | 1:0:2544:A:C4' | 2.50                     | 0.42              |
| 1:0:2633:A:H61  | 1:0:2646:C:N4  | 2.18                     | 0.42              |
| 1:0:2766:U:O2'  | 1:0:2767:C:H5' | 2.19                     | 0.42              |
| 1:0:520:C:H2'   | 1:0:521:U:O4'  | 2.20                     | 0.42              |
| 1:0:878:C:O2'   | 1:0:879:A:OP1  | 2.35                     | 0.42              |
| 1:0:1143:A:H2'  | 1:0:1144:U:C6  | 2.55                     | 0.42              |
| 1:0:1479:G:H2'  | 1:0:1480:G:C8  | 2.54                     | 0.42              |
| 1:0:1917:C:C2'  | 1:0:1918:G:H5' | 2.49                     | 0.42              |
| 1:0:2463:G:O2'  | 1:0:2464:G:H5' | 2.20                     | 0.42              |
| 1:0:2651:U:H2'  | 1:0:2652:G:H8  | 1.85                     | 0.42              |
| 1:0:2784:A:C8   | 1:0:2785:A:C8  | 3.07                     | 0.42              |
| 1:0:2836:U:H2'  | 1:0:2837:G:C8  | 2.55                     | 0.42              |
| 1:0:65:C:C3'    | 1:0:66:U:H5'   | 2.49                     | 0.41              |
| 1:0:314:G:H2'   | 1:0:315:G:H8   | 1.85                     | 0.41              |
| 1:0:616:U:C3'   | 1:0:617:U:H5'' | 2.50                     | 0.41              |
| 1:0:635:C:H2'   | 1:0:636:G:H5'' | 2.02                     | 0.41              |
| 1:0:1594:U:H2'  | 1:0:1595:A:C8  | 2.55                     | 0.41              |
| 1:0:1949:A:H1'  | 1:0:2572:U:H5' | 2.01                     | 0.41              |
| 1:0:1962:C:H2'  | 1:0:1963:G:H8  | 1.85                     | 0.41              |
| 1:0:2028:C:O2'  | 1:0:2029:G:H5' | 2.20                     | 0.41              |
| 1:0:2217:G:H4'  | 1:0:2219:U:C5  | 2.55                     | 0.41              |
| 1:0:2250:G:O2'  | 1:0:2251:U:H5' | 2.20                     | 0.41              |
| 1:0:2470:U:H1'  | 1:0:2548:G:O3' | 2.20                     | 0.41              |
| 1:0:2698:G:H2'  | 1:0:2699:G:O4' | 2.19                     | 0.41              |
| 1:0:63:A:N6     | 1:0:89:A:N1    | 2.69                     | 0.41              |
| 1:0:319:G:H1'   | 1:0:511:A:H5'  | 2.02                     | 0.41              |
| 1:0:438:G:H2'   | 1:0:439:C:C6   | 2.54                     | 0.41              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:873:U:C2   | 1:0:2246:A:H5'' | 2.55                     | 0.41              |
| 1:0:1142:G:OP1 | 1:0:2494:C:H4'  | 2.20                     | 0.41              |
| 1:0:1402:G:H2' | 1:0:1403:U:O4'  | 2.21                     | 0.41              |
| 1:0:1930:C:H2' | 1:0:1931:G:C8   | 2.55                     | 0.41              |
| 1:0:1938:U:O2' | 1:0:1939:U:H5'  | 2.20                     | 0.41              |
| 1:0:2710:C:O2' | 1:0:2711:G:H5'  | 2.20                     | 0.41              |
| 1:0:239:A:H5'  | 1:0:619:A:O2'   | 2.20                     | 0.41              |
| 1:0:579:G:H2'  | 1:0:2013:A:C5   | 2.55                     | 0.41              |
| 1:0:820:U:H5'  | 1:0:2424:G:H4'  | 2.01                     | 0.41              |
| 1:0:871:U:O2   | 1:0:2247:A:H2'  | 2.20                     | 0.41              |
| 1:0:1177:U:H2' | 1:0:1178:C:C6   | 2.55                     | 0.41              |
| 1:0:1225:G:H2' | 1:0:1249:G:N1   | 2.35                     | 0.41              |
| 1:0:1231:A:H2' | 1:0:1232:U:O4'  | 2.20                     | 0.41              |
| 1:0:1807:A:O2' | 1:0:1808:C:C4'  | 2.64                     | 0.41              |
| 1:0:1829:C:O2' | 1:0:1910:A:H1'  | 2.20                     | 0.41              |
| 1:0:1888:C:H2' | 1:0:1913:G:C6   | 2.55                     | 0.41              |
| 1:0:2096:U:C2' | 1:0:2097:A:H5'' | 2.44                     | 0.41              |
| 1:0:2392:G:H2' | 1:0:2393:G:H8   | 1.85                     | 0.41              |
| 1:0:2502:G:H2' | 1:0:2503:G:H8   | 1.85                     | 0.41              |
| 1:0:2564:U:H4' | 1:0:2565:C:H5'  | 2.02                     | 0.41              |
| 1:0:2640:G:H2' | 1:0:2641:A:O4'  | 2.19                     | 0.41              |
| 1:0:328:A:O2'  | 1:0:329:C:H5'   | 2.21                     | 0.41              |
| 1:0:334:G:N3   | 1:0:344:G:H1'   | 2.36                     | 0.41              |
| 1:0:833:A:H2'  | 1:0:834:A:C8    | 2.55                     | 0.41              |
| 1:0:1172:U:H2' | 1:0:1173:G:C8   | 2.55                     | 0.41              |
| 1:0:1189:G:O2' | 1:0:1190:C:H5'  | 2.21                     | 0.41              |
| 1:0:1354:A:C2  | 1:0:1411:C:H4'  | 2.55                     | 0.41              |
| 1:0:1495:G:O2' | 1:0:1496:G:OP1  | 2.35                     | 0.41              |
| 1:0:1671:A:H2' | 1:0:1672:A:H8   | 1.86                     | 0.41              |
| 1:0:1956:G:H2' | 1:0:1957:C:O4'  | 2.20                     | 0.41              |
| 1:0:2032:G:O2' | 1:0:2033:C:H5'  | 2.20                     | 0.41              |
| 1:0:2320:G:H2' | 1:0:2321:C:C6   | 2.56                     | 0.41              |
| 1:0:159:A:H2'  | 1:0:160:C:H5'   | 2.02                     | 0.41              |
| 1:0:317:U:H3'  | 1:0:318:G:C5'   | 2.51                     | 0.41              |
| 1:0:474:G:N2   | 1:0:476:G:H3'   | 2.36                     | 0.41              |
| 1:0:827:C:H2'  | 1:0:828:C:C6    | 2.55                     | 0.41              |
| 1:0:853:C:H2'  | 1:0:854:G:C8    | 2.56                     | 0.41              |
| 1:0:930:A:H3'  | 1:0:931:G:H8    | 1.85                     | 0.41              |
| 1:0:1365:U:H5' | 1:0:1587:A:H1'  | 2.03                     | 0.41              |
| 1:0:1448:A:H2' | 1:0:1449:C:C6   | 2.55                     | 0.41              |
| 1:0:1557:G:H2' | 1:0:1558:C:C6   | 2.56                     | 0.41              |

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| Atom-1          | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 1:0:2093:G:O2'  | 1:0:2094:C:OP1  | 2.34                     | 0.41              |
| 1:0:2245:A:O2'  | 1:0:2246:A:P    | 2.78                     | 0.41              |
| 1:0:155:G:O2'   | 1:0:156:G:H5'   | 2.21                     | 0.41              |
| 1:0:314:G:H2'   | 1:0:315:G:C8    | 2.54                     | 0.41              |
| 1:0:315:G:H2'   | 1:0:316:C:C6    | 2.55                     | 0.41              |
| 1:0:639:G:O2'   | 1:0:640:C:H5'   | 2.21                     | 0.41              |
| 1:0:769:C:H2'   | 1:0:770:U:O4'   | 2.20                     | 0.41              |
| 1:0:857:U:C2'   | 1:0:858:G:H5'   | 2.50                     | 0.41              |
| 1:0:1193:G:HO2' | 1:0:1194:U:P    | 2.43                     | 0.41              |
| 1:0:1329:U:H2'  | 1:0:1330:G:C8   | 2.56                     | 0.41              |
| 1:0:1341:G:N2   | 1:0:1343:C:H1'  | 2.36                     | 0.41              |
| 1:0:1415:C:O2'  | 1:0:1416:A:H5'  | 2.21                     | 0.41              |
| 1:0:1464:A:H4'  | 1:0:1545:G:C4'  | 2.51                     | 0.41              |
| 1:0:1656:U:O2'  | 1:0:2678:C:H4'  | 2.21                     | 0.41              |
| 1:0:1774:A:H1'  | 1:0:2586:G:N2   | 2.31                     | 0.41              |
| 1:0:2076:G:H2'  | 1:0:2077:G:C8   | 2.54                     | 0.41              |
| 1:0:2134:U:H2'  | 1:0:2135:C:C6   | 2.55                     | 0.41              |
| 1:0:2220:A:H2'  | 1:0:2221:G:H8   | 1.85                     | 0.41              |
| 1:0:2348:A:H2'  | 1:0:2349:G:C8   | 2.55                     | 0.41              |
| 1:0:2546:G:H2'  | 1:0:2547:C:C6   | 2.56                     | 0.41              |
| 1:0:2740:C:O2'  | 1:0:2741:G:H5'  | 2.20                     | 0.41              |
| 1:0:69:G:O3'    | 1:0:111:G:H4'   | 2.20                     | 0.41              |
| 1:0:189:A:H2'   | 1:0:190:A:C8    | 2.55                     | 0.41              |
| 1:0:307:C:H2'   | 1:0:308:C:H6    | 1.85                     | 0.41              |
| 1:0:1028:G:H2'  | 1:0:1029:C:H6   | 1.86                     | 0.41              |
| 1:0:2083:G:N2   | 1:0:2172:U:H3   | 2.18                     | 0.41              |
| 1:0:139:A:H2'   | 1:0:140:G:C8    | 2.55                     | 0.41              |
| 1:0:488:A:H2'   | 1:0:489:A:C8    | 2.55                     | 0.41              |
| 1:0:513:A:C4'   | 1:0:515:A:H5'   | 2.48                     | 0.41              |
| 1:0:690:A:O2'   | 1:0:691:C:H5'   | 2.21                     | 0.41              |
| 1:0:691:C:H2'   | 1:0:692:C:C6    | 2.56                     | 0.41              |
| 1:0:831:G:H2'   | 1:0:832:A:H5''  | 2.03                     | 0.41              |
| 1:0:874:A:H2'   | 1:0:875:G:H5'   | 2.03                     | 0.41              |
| 1:0:964:A:H2'   | 1:0:965:G:H8    | 1.85                     | 0.41              |
| 1:0:1286:U:H2'  | 1:0:2692:A:H2   | 1.85                     | 0.41              |
| 1:0:1521:U:H2'  | 1:0:1522:C:C6   | 2.56                     | 0.41              |
| 1:0:1888:C:H4'  | 1:0:1889:G:H5'' | 2.02                     | 0.41              |
| 1:0:1928:G:H2'  | 1:0:1929:U:C6   | 2.55                     | 0.41              |
| 1:0:1985:G:H2'  | 1:0:1986:G:C8   | 2.56                     | 0.41              |
| 1:0:2011:U:H2'  | 1:0:2012:A:C8   | 2.56                     | 0.41              |
| 1:0:2445:C:H2'  | 1:0:2446:C:O4'  | 2.20                     | 0.41              |

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| Atom-1         | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|----------------|--------------------------|-------------------|
| 1:0:2795:A:N3  | 1:0:2795:A:C2' | 2.84                     | 0.41              |
| 1:0:6:A:H2'    | 1:0:7:G:C8     | 2.56                     | 0.41              |
| 1:0:40:U:H2'   | 1:0:41:G:H8    | 1.86                     | 0.41              |
| 1:0:229:G:H2'  | 1:0:230:C:C6   | 2.56                     | 0.41              |
| 1:0:305:A:H2'  | 1:0:306:G:O4'  | 2.21                     | 0.41              |
| 1:0:344:G:O2'  | 1:0:345:U:H5'  | 2.21                     | 0.41              |
| 1:0:713:G:H2'  | 1:0:714:G:C8   | 2.56                     | 0.41              |
| 1:0:925:U:H5'' | 1:0:926:C:OP1  | 2.21                     | 0.41              |
| 1:0:1084:A:H4' | 1:0:2454:C:OP1 | 2.20                     | 0.41              |
| 1:0:1098:G:H21 | 1:0:1100:G:H4' | 1.86                     | 0.41              |
| 1:0:1168:G:H2' | 1:0:1169:C:C6  | 2.55                     | 0.41              |
| 1:0:1221:C:H2' | 1:0:1222:G:H8  | 1.85                     | 0.41              |
| 1:0:1242:A:H2' | 1:0:1243:G:C8  | 2.55                     | 0.41              |
| 1:0:1352:G:N2  | 1:0:1619:A:H8  | 2.19                     | 0.41              |
| 1:0:1586:A:H2' | 1:0:1587:A:H8  | 1.86                     | 0.41              |
| 1:0:1594:U:H2' | 1:0:1595:A:H8  | 1.85                     | 0.41              |
| 1:0:1671:A:H1' | 1:0:2798:A:H5' | 2.02                     | 0.41              |
| 1:0:1722:G:H2' | 1:0:1723:U:C6  | 2.55                     | 0.41              |
| 1:0:1887:G:O2' | 1:0:1888:C:H5' | 2.21                     | 0.41              |
| 1:0:1998:A:H2' | 1:0:1999:U:H5' | 2.02                     | 0.41              |
| 1:0:2200:G:H2' | 1:0:2201:G:C8  | 2.56                     | 0.41              |
| 1:0:2226:A:H2' | 1:0:2227:C:H6  | 1.86                     | 0.41              |
| 1:0:2365:U:O2' | 1:0:2366:U:H5' | 2.21                     | 0.41              |
| 1:0:2378:G:H2' | 1:0:2379:G:C8  | 2.55                     | 0.41              |
| 1:0:2383:C:H2' | 1:0:2384:G:O4' | 2.20                     | 0.41              |
| 1:0:2404:A:OP1 | 1:0:2406:C:H5' | 2.21                     | 0.41              |
| 1:0:2448:A:C2' | 1:0:2449:G:H5' | 2.50                     | 0.41              |
| 1:0:2555:G:N3  | 1:0:2555:G:H2' | 2.36                     | 0.41              |
| 1:0:2560:G:H4' | 1:0:2561:G:C8  | 2.56                     | 0.41              |
| 1:0:24:G:H2'   | 1:0:25:U:C6    | 2.55                     | 0.41              |
| 1:0:170:U:H5'  | 1:0:815:A:H2   | 1.86                     | 0.41              |
| 1:0:218:A:H1'  | 1:0:220:U:C4   | 2.56                     | 0.41              |
| 1:0:729:A:O2'  | 1:0:730:C:H5'  | 2.21                     | 0.41              |
| 1:0:1313:U:O2' | 1:0:1314:A:OP2 | 2.39                     | 0.41              |
| 1:0:1685:A:O2' | 1:0:1686:A:O5' | 2.39                     | 0.41              |
| 1:0:2014:A:H8  | 1:0:2014:A:O5' | 2.04                     | 0.41              |
| 1:0:2056:C:H2' | 1:0:2057:U:C6  | 2.56                     | 0.41              |
| 1:0:2390:A:H2' | 1:0:2391:A:C8  | 2.56                     | 0.41              |
| 1:0:2548:G:H2' | 1:0:2549:G:C5' | 2.33                     | 0.41              |
| 1:0:2686:C:H2' | 1:0:2687:G:H8  | 1.86                     | 0.41              |
| 1:0:2811:G:H2' | 1:0:2812:A:C8  | 2.56                     | 0.41              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:82:G:O2'   | 1:0:83:A:H5'    | 2.21                     | 0.40              |
| 1:0:322:A:H1'  | 1:0:343:A:N7    | 2.36                     | 0.40              |
| 1:0:322:A:H2   | 1:0:342:G:OP2   | 2.04                     | 0.40              |
| 1:0:432:C:H2'  | 1:0:433:G:C8    | 2.57                     | 0.40              |
| 1:0:1686:A:C2' | 1:0:1687:C:H5'  | 2.51                     | 0.40              |
| 1:0:2058:U:H3' | 1:0:2217:G:N1   | 2.36                     | 0.40              |
| 1:0:2539:C:H2' | 1:0:2540:A:C8   | 2.56                     | 0.40              |
| 1:0:2597:G:H2' | 1:0:2598:C:C6   | 2.56                     | 0.40              |
| 1:0:28:A:H2'   | 1:0:29:U:C6     | 2.56                     | 0.40              |
| 1:0:44:G:N2    | 1:0:192:G:N2    | 2.69                     | 0.40              |
| 1:0:67:G:N2    | 1:0:73:A:O4'    | 2.54                     | 0.40              |
| 1:0:477:A:H2'  | 1:0:478:G:H5'   | 2.02                     | 0.40              |
| 1:0:607:C:H2'  | 1:0:608:G:C8    | 2.57                     | 0.40              |
| 1:0:747:A:H2'  | 1:0:748:A:H8    | 1.85                     | 0.40              |
| 1:0:808:C:H2'  | 1:0:809:C:C6    | 2.57                     | 0.40              |
| 1:0:1026:U:H2' | 1:0:1027:C:C6   | 2.56                     | 0.40              |
| 1:0:1528:C:H3' | 1:0:1529:C:H5'' | 2.03                     | 0.40              |
| 1:0:1621:C:C4' | 1:0:1626:A:H61  | 2.31                     | 0.40              |
| 1:0:1850:G:H2' | 1:0:1851:A:C8   | 2.55                     | 0.40              |
| 1:0:1915:A:H2' | 1:0:1916:G:O4'  | 2.21                     | 0.40              |
| 1:0:2169:A:O2' | 1:0:2170:C:H5'  | 2.21                     | 0.40              |
| 1:0:2312:A:H1' | 1:0:2314:A:N9   | 2.36                     | 0.40              |
| 1:0:2329:C:H41 | 1:0:2361:G:N2   | 2.18                     | 0.40              |
| 1:0:2389:G:H2' | 1:0:2390:A:O4'  | 2.21                     | 0.40              |
| 1:0:2515:G:H2' | 1:0:2516:U:C6   | 2.56                     | 0.40              |
| 1:0:2824:C:C2' | 1:0:2825:A:OP2  | 2.70                     | 0.40              |
| 2:5:22:G:H2'   | 2:5:23:C:C6     | 2.57                     | 0.40              |
| 1:0:105:G:O2'  | 1:0:106:G:H5'   | 2.20                     | 0.40              |
| 1:0:185:C:H2'  | 1:0:186:C:C6    | 2.56                     | 0.40              |
| 1:0:198:A:H4'  | 1:0:199:A:OP2   | 2.21                     | 0.40              |
| 1:0:688:A:H1'  | 1:0:2422:C:O2'  | 2.21                     | 0.40              |
| 1:0:854:G:H2'  | 1:0:855:G:C8    | 2.57                     | 0.40              |
| 1:0:868:U:H2'  | 1:0:869:C:H6    | 1.86                     | 0.40              |
| 1:0:890:U:H2'  | 1:0:891:A:C8    | 2.57                     | 0.40              |
| 1:0:930:A:H5'  | 1:0:931:G:N7    | 2.37                     | 0.40              |
| 1:0:931:G:H2'  | 1:0:932:G:O4'   | 2.21                     | 0.40              |
| 1:0:953:G:H2'  | 1:0:954:U:O4'   | 2.21                     | 0.40              |
| 1:0:978:U:H2'  | 1:0:979:A:C8    | 2.56                     | 0.40              |
| 1:0:1040:A:C2' | 1:0:1041:G:H5'  | 2.51                     | 0.40              |
| 1:0:1162:A:H2' | 1:0:1163:C:H6   | 1.87                     | 0.40              |
| 1:0:1187:A:O2' | 1:0:1188:A:P    | 2.79                     | 0.40              |

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| Atom-1         | Atom-2          | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|-----------------|--------------------------|-------------------|
| 1:0:1466:C:O2' | 1:0:1467:U:H5'  | 2.21                     | 0.40              |
| 1:0:1653:C:H2' | 1:0:1654:A:C8   | 2.56                     | 0.40              |
| 1:0:1696:C:H42 | 1:0:1755:G:H5'' | 1.87                     | 0.40              |
| 1:0:2081:U:H2' | 1:0:2082:C:C5'  | 2.43                     | 0.40              |
| 1:0:2234:G:H2' | 1:0:2235:G:O4'  | 2.22                     | 0.40              |
| 1:0:2241:U:H4' | 1:0:2307:A:C2   | 2.56                     | 0.40              |
| 1:0:2417:U:H4' | 1:0:2419:C:OP1  | 2.22                     | 0.40              |
| 1:0:2437:G:C2  | 1:0:2469:G:H2'  | 2.55                     | 0.40              |
| 1:0:2594:U:H2' | 1:0:2595:C:C6   | 2.57                     | 0.40              |
| 1:0:105:G:H21  | 1:0:357:A:N6    | 2.19                     | 0.40              |
| 1:0:204:A:HO2' | 1:0:205:A:H8    | 1.67                     | 0.40              |
| 1:0:528:G:H2'  | 1:0:529:U:C6    | 2.57                     | 0.40              |
| 1:0:550:C:H2'  | 1:0:551:A:H8    | 1.86                     | 0.40              |
| 1:0:579:G:H2'  | 1:0:2013:A:C6   | 2.56                     | 0.40              |
| 1:0:633:G:O2'  | 1:0:634:G:H5'   | 2.22                     | 0.40              |
| 1:0:798:G:OP2  | 1:0:805:G:N7    | 2.54                     | 0.40              |
| 1:0:1370:U:H2' | 1:0:1371:G:O4'  | 2.22                     | 0.40              |
| 1:0:1418:C:H2' | 1:0:1419:G:C8   | 2.55                     | 0.40              |
| 1:0:1532:A:H2' | 1:0:1533:G:H8   | 1.86                     | 0.40              |
| 1:0:1625:A:C4  | 1:0:1632:A:H1'  | 2.56                     | 0.40              |
| 1:0:1736:C:H2' | 1:0:1737:G:C8   | 2.57                     | 0.40              |
| 1:0:1787:U:H2' | 1:0:1788:C:C6   | 2.57                     | 0.40              |
| 1:0:1982:C:H2' | 1:0:1983:G:H8   | 1.86                     | 0.40              |
| 1:0:2048:C:H2' | 1:0:2049:C:H6   | 1.86                     | 0.40              |
| 1:0:2378:G:O2' | 1:0:2379:G:H5'  | 2.21                     | 0.40              |
| 1:0:2383:C:C2' | 1:0:2384:G:H5'  | 2.51                     | 0.40              |
| 1:0:2418:A:N6  | 1:0:2581:A:OP1  | 2.54                     | 0.40              |
| 1:0:2553:G:H2' | 1:0:2554:C:O4'  | 2.21                     | 0.40              |
| 1:0:2851:G:H2' | 1:0:2852:G:C8   | 2.56                     | 0.40              |
| 1:0:689:A:H8   | 1:0:2422:C:H1'  | 1.86                     | 0.40              |
| 1:0:744:C:H2'  | 1:0:745:C:C6    | 2.56                     | 0.40              |
| 1:0:948:C:H2'  | 1:0:949:G:C8    | 2.57                     | 0.40              |
| 1:0:1036:G:H1' | 1:0:1145:C:H4'  | 2.03                     | 0.40              |
| 1:0:1253:C:H2' | 1:0:1254:G:O4'  | 2.21                     | 0.40              |
| 1:0:1337:G:H1' | 1:0:1632:A:C6   | 2.56                     | 0.40              |
| 1:0:1358:C:C2' | 1:0:1359:G:H5'' | 2.52                     | 0.40              |
| 1:0:1369:G:H2' | 1:0:1370:U:O4'  | 2.21                     | 0.40              |
| 1:0:1398:G:H2' | 1:0:1399:C:C6   | 2.56                     | 0.40              |
| 1:0:1539:U:H2' | 1:0:1540:C:C6   | 2.56                     | 0.40              |
| 1:0:1806:G:O6  | 1:0:1807:A:N6   | 2.54                     | 0.40              |
| 1:0:1918:G:H4' | 1:0:1920:A:C2   | 2.57                     | 0.40              |

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| Atom-1         | Atom-2         | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|----------------|--------------------------|-------------------|
| 1:0:2015:G:OP2 | 1:0:2434:G:H5' | 2.22                     | 0.40              |
| 1:0:2075:U:H1' | 1:0:2204:A:C2  | 2.56                     | 0.40              |
| 1:0:2502:G:H2' | 1:0:2503:G:C8  | 2.56                     | 0.40              |

There are no symmetry-related clashes.

### 5.3 Torsion angles [i](#)

#### 5.3.1 Protein backbone [i](#)

There are no protein backbone outliers to report in this entry.

#### 5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

#### 5.3.3 RNA [i](#)

| Mol | Chain | Analysed        | Backbone Outliers | Pucker Outliers |
|-----|-------|-----------------|-------------------|-----------------|
| 1   | 0     | 2757/2880 (95%) | 416 (15%)         | 44 (1%)         |
| 2   | 5     | 22/35 (62%)     | 2 (9%)            | 0               |
| All | All   | 2779/2915 (95%) | 418 (15%)         | 44 (1%)         |

All (418) RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | 0     | 15  | G    |
| 1   | 0     | 35  | G    |
| 1   | 0     | 45  | C    |
| 1   | 0     | 48  | A    |
| 1   | 0     | 49  | U    |
| 1   | 0     | 50  | G    |
| 1   | 0     | 59  | G    |
| 1   | 0     | 66  | U    |
| 1   | 0     | 67  | G    |
| 1   | 0     | 70  | A    |
| 1   | 0     | 71  | A    |
| 1   | 0     | 72  | A    |
| 1   | 0     | 74  | G    |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 87         | G           |
| 1          | 0            | 89         | A           |
| 1          | 0            | 90         | G           |
| 1          | 0            | 91         | A           |
| 1          | 0            | 99         | U           |
| 1          | 0            | 105        | G           |
| 1          | 0            | 110        | U           |
| 1          | 0            | 116        | A           |
| 1          | 0            | 118        | U           |
| 1          | 0            | 123        | A           |
| 1          | 0            | 129        | A           |
| 1          | 0            | 135        | U           |
| 1          | 0            | 155        | G           |
| 1          | 0            | 158        | A           |
| 1          | 0            | 173        | A           |
| 1          | 0            | 174        | A           |
| 1          | 0            | 176        | A           |
| 1          | 0            | 177        | U           |
| 1          | 0            | 181        | A           |
| 1          | 0            | 182        | G           |
| 1          | 0            | 193        | A           |
| 1          | 0            | 199        | A           |
| 1          | 0            | 200        | A           |
| 1          | 0            | 205        | A           |
| 1          | 0            | 206        | U           |
| 1          | 0            | 210        | A           |
| 1          | 0            | 218        | A           |
| 1          | 0            | 219        | G           |
| 1          | 0            | 225        | G           |
| 1          | 0            | 226        | C           |
| 1          | 0            | 227        | G           |
| 1          | 0            | 229        | G           |
| 1          | 0            | 242        | A           |
| 1          | 0            | 243        | G           |
| 1          | 0            | 245        | C           |
| 1          | 0            | 305        | A           |
| 1          | 0            | 318        | G           |
| 1          | 0            | 333        | A           |
| 1          | 0            | 334        | G           |
| 1          | 0            | 335        | A           |
| 1          | 0            | 340        | G           |
| 1          | 0            | 342        | G           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 343        | A           |
| 1          | 0            | 358        | C           |
| 1          | 0            | 363        | G           |
| 1          | 0            | 368        | A           |
| 1          | 0            | 373        | A           |
| 1          | 0            | 399        | G           |
| 1          | 0            | 401        | G           |
| 1          | 0            | 408        | U           |
| 1          | 0            | 414        | A           |
| 1          | 0            | 418        | C           |
| 1          | 0            | 424        | G           |
| 1          | 0            | 443        | A           |
| 1          | 0            | 455        | A           |
| 1          | 0            | 456        | C           |
| 1          | 0            | 460        | U           |
| 1          | 0            | 461        | A           |
| 1          | 0            | 463        | C           |
| 1          | 0            | 467        | U           |
| 1          | 0            | 469        | G           |
| 1          | 0            | 491        | A           |
| 1          | 0            | 492        | G           |
| 1          | 0            | 515        | A           |
| 1          | 0            | 518        | A           |
| 1          | 0            | 519        | C           |
| 1          | 0            | 537        | C           |
| 1          | 0            | 539        | A           |
| 1          | 0            | 541        | C           |
| 1          | 0            | 542        | A           |
| 1          | 0            | 554        | U           |
| 1          | 0            | 556        | A           |
| 1          | 0            | 558        | G           |
| 1          | 0            | 559        | C           |
| 1          | 0            | 572        | G           |
| 1          | 0            | 584        | A           |
| 1          | 0            | 602        | C           |
| 1          | 0            | 613        | A           |
| 1          | 0            | 617        | U           |
| 1          | 0            | 624        | A           |
| 1          | 0            | 632        | A           |
| 1          | 0            | 636        | G           |
| 1          | 0            | 638        | A           |
| 1          | 0            | 648        | A           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 652        | C           |
| 1          | 0            | 654        | A           |
| 1          | 0            | 657        | A           |
| 1          | 0            | 665        | A           |
| 1          | 0            | 666        | U           |
| 1          | 0            | 667        | U           |
| 1          | 0            | 684        | C           |
| 1          | 0            | 697        | G           |
| 1          | 0            | 699        | G           |
| 1          | 0            | 700        | C           |
| 1          | 0            | 728        | G           |
| 1          | 0            | 742        | G           |
| 1          | 0            | 743        | A           |
| 1          | 0            | 760        | U           |
| 1          | 0            | 761        | G           |
| 1          | 0            | 776        | G           |
| 1          | 0            | 778        | G           |
| 1          | 0            | 789        | G           |
| 1          | 0            | 794        | A           |
| 1          | 0            | 796        | A           |
| 1          | 0            | 797        | A           |
| 1          | 0            | 798        | G           |
| 1          | 0            | 803        | C           |
| 1          | 0            | 806        | A           |
| 1          | 0            | 813        | A           |
| 1          | 0            | 818        | G           |
| 1          | 0            | 825        | C           |
| 1          | 0            | 832        | A           |
| 1          | 0            | 840        | U           |
| 1          | 0            | 841        | G           |
| 1          | 0            | 844        | G           |
| 1          | 0            | 860        | U           |
| 1          | 0            | 873        | U           |
| 1          | 0            | 879        | A           |
| 1          | 0            | 919        | U           |
| 1          | 0            | 922        | A           |
| 1          | 0            | 926        | C           |
| 1          | 0            | 930        | A           |
| 1          | 0            | 931        | G           |
| 1          | 0            | 941        | U           |
| 1          | 0            | 944        | A           |
| 1          | 0            | 952        | A           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 957        | G           |
| 1          | 0            | 969        | U           |
| 1          | 0            | 970        | A           |
| 1          | 0            | 972        | C           |
| 1          | 0            | 973        | U           |
| 1          | 0            | 984        | A           |
| 1          | 0            | 994        | A           |
| 1          | 0            | 996        | C           |
| 1          | 0            | 1005       | U           |
| 1          | 0            | 1006       | C           |
| 1          | 0            | 1023       | U           |
| 1          | 0            | 1024       | G           |
| 1          | 0            | 1030       | U           |
| 1          | 0            | 1032       | A           |
| 1          | 0            | 1033       | G           |
| 1          | 0            | 1036       | G           |
| 1          | 0            | 1037       | U           |
| 1          | 0            | 1044       | U           |
| 1          | 0            | 1055       | A           |
| 1          | 0            | 1056       | U           |
| 1          | 0            | 1057       | A           |
| 1          | 0            | 1067       | G           |
| 1          | 0            | 1073       | G           |
| 1          | 0            | 1074       | G           |
| 1          | 0            | 1075       | C           |
| 1          | 0            | 1081       | A           |
| 1          | 0            | 1087       | C           |
| 1          | 0            | 1090       | C           |
| 1          | 0            | 1099       | A           |
| 1          | 0            | 1122       | A           |
| 1          | 0            | 1137       | A           |
| 1          | 0            | 1138       | A           |
| 1          | 0            | 1142       | G           |
| 1          | 0            | 1145       | C           |
| 1          | 0            | 1146       | G           |
| 1          | 0            | 1155       | G           |
| 1          | 0            | 1167       | A           |
| 1          | 0            | 1182       | U           |
| 1          | 0            | 1183       | C           |
| 1          | 0            | 1185       | C           |
| 1          | 0            | 1188       | A           |
| 1          | 0            | 1194       | U           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 1195       | U           |
| 1          | 0            | 1199       | U           |
| 1          | 0            | 1200       | G           |
| 1          | 0            | 1224       | A           |
| 1          | 0            | 1253       | C           |
| 1          | 0            | 1262       | U           |
| 1          | 0            | 1264       | C           |
| 1          | 0            | 1266       | G           |
| 1          | 0            | 1269       | G           |
| 1          | 0            | 1278       | A           |
| 1          | 0            | 1279       | G           |
| 1          | 0            | 1280       | U           |
| 1          | 0            | 1284       | G           |
| 1          | 0            | 1285       | A           |
| 1          | 0            | 1288       | A           |
| 1          | 0            | 1314       | A           |
| 1          | 0            | 1324       | G           |
| 1          | 0            | 1334       | A           |
| 1          | 0            | 1338       | G           |
| 1          | 0            | 1342       | U           |
| 1          | 0            | 1343       | C           |
| 1          | 0            | 1355       | A           |
| 1          | 0            | 1356       | G           |
| 1          | 0            | 1359       | G           |
| 1          | 0            | 1391       | A           |
| 1          | 0            | 1392       | U           |
| 1          | 0            | 1397       | A           |
| 1          | 0            | 1398       | G           |
| 1          | 0            | 1433       | A           |
| 1          | 0            | 1441       | A           |
| 1          | 0            | 1442       | C           |
| 1          | 0            | 1443       | G           |
| 1          | 0            | 1459       | U           |
| 1          | 0            | 1465       | G           |
| 1          | 0            | 1468       | A           |
| 1          | 0            | 1469       | U           |
| 1          | 0            | 1470       | G           |
| 1          | 0            | 1475       | U           |
| 1          | 0            | 1482       | U           |
| 1          | 0            | 1490       | U           |
| 1          | 0            | 1496       | G           |
| 1          | 0            | 1505       | U           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 1508       | G           |
| 1          | 0            | 1509       | A           |
| 1          | 0            | 1513       | U           |
| 1          | 0            | 1519       | G           |
| 1          | 0            | 1524       | C           |
| 1          | 0            | 1529       | C           |
| 1          | 0            | 1552       | C           |
| 1          | 0            | 1571       | G           |
| 1          | 0            | 1573       | G           |
| 1          | 0            | 1574       | A           |
| 1          | 0            | 1576       | G           |
| 1          | 0            | 1582       | A           |
| 1          | 0            | 1583       | A           |
| 1          | 0            | 1585       | A           |
| 1          | 0            | 1618       | U           |
| 1          | 0            | 1623       | C           |
| 1          | 0            | 1624       | A           |
| 1          | 0            | 1625       | A           |
| 1          | 0            | 1632       | A           |
| 1          | 0            | 1633       | C           |
| 1          | 0            | 1634       | A           |
| 1          | 0            | 1635       | G           |
| 1          | 0            | 1648       | C           |
| 1          | 0            | 1651       | U           |
| 1          | 0            | 1657       | A           |
| 1          | 0            | 1664       | G           |
| 1          | 0            | 1665       | C           |
| 1          | 0            | 1670       | G           |
| 1          | 0            | 1671       | A           |
| 1          | 0            | 1680       | U           |
| 1          | 0            | 1685       | A           |
| 1          | 0            | 1691       | G           |
| 1          | 0            | 1692       | C           |
| 1          | 0            | 1710       | U           |
| 1          | 0            | 1712       | G           |
| 1          | 0            | 1715       | A           |
| 1          | 0            | 1717       | A           |
| 1          | 0            | 1724       | C           |
| 1          | 0            | 1733       | U           |
| 1          | 0            | 1748       | U           |
| 1          | 0            | 1749       | G           |
| 1          | 0            | 1750       | A           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 1754       | G           |
| 1          | 0            | 1755       | G           |
| 1          | 0            | 1764       | A           |
| 1          | 0            | 1771       | A           |
| 1          | 0            | 1778       | U           |
| 1          | 0            | 1800       | A           |
| 1          | 0            | 1801       | C           |
| 1          | 0            | 1802       | A           |
| 1          | 0            | 1807       | A           |
| 1          | 0            | 1808       | C           |
| 1          | 0            | 1821       | A           |
| 1          | 0            | 1831       | G           |
| 1          | 0            | 1884       | A           |
| 1          | 0            | 1889       | G           |
| 1          | 0            | 1920       | A           |
| 1          | 0            | 1922       | U           |
| 1          | 0            | 1924       | C           |
| 1          | 0            | 1926       | U           |
| 1          | 0            | 1927       | U           |
| 1          | 0            | 1938       | U           |
| 1          | 0            | 1939       | U           |
| 1          | 0            | 1946       | U           |
| 1          | 0            | 1949       | A           |
| 1          | 0            | 1950       | C           |
| 1          | 0            | 1954       | A           |
| 1          | 0            | 1955       | G           |
| 1          | 0            | 1956       | G           |
| 1          | 0            | 1979       | C           |
| 1          | 0            | 1980       | A           |
| 1          | 0            | 2004       | U           |
| 1          | 0            | 2006       | G           |
| 1          | 0            | 2015       | G           |
| 1          | 0            | 2016       | A           |
| 1          | 0            | 2019       | C           |
| 1          | 0            | 2038       | C           |
| 1          | 0            | 2043       | A           |
| 1          | 0            | 2051       | U           |
| 1          | 0            | 2052       | G           |
| 1          | 0            | 2060       | A           |
| 1          | 0            | 2076       | G           |
| 1          | 0            | 2082       | C           |
| 1          | 0            | 2094       | C           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 2096       | U           |
| 1          | 0            | 2118       | A           |
| 1          | 0            | 2119       | A           |
| 1          | 0            | 2140       | G           |
| 1          | 0            | 2162       | C           |
| 1          | 0            | 2168       | A           |
| 1          | 0            | 2181       | A           |
| 1          | 0            | 2191       | A           |
| 1          | 0            | 2195       | C           |
| 1          | 0            | 2199       | C           |
| 1          | 0            | 2205       | C           |
| 1          | 0            | 2218       | G           |
| 1          | 0            | 2229       | G           |
| 1          | 0            | 2237       | C           |
| 1          | 0            | 2241       | U           |
| 1          | 0            | 2245       | A           |
| 1          | 0            | 2246       | A           |
| 1          | 0            | 2247       | A           |
| 1          | 0            | 2255       | G           |
| 1          | 0            | 2262       | C           |
| 1          | 0            | 2268       | G           |
| 1          | 0            | 2285       | U           |
| 1          | 0            | 2286       | G           |
| 1          | 0            | 2287       | G           |
| 1          | 0            | 2288       | A           |
| 1          | 0            | 2298       | U           |
| 1          | 0            | 2299       | A           |
| 1          | 0            | 2300       | G           |
| 1          | 0            | 2301       | A           |
| 1          | 0            | 2313       | G           |
| 1          | 0            | 2315       | A           |
| 1          | 0            | 2316       | G           |
| 1          | 0            | 2326       | C           |
| 1          | 0            | 2362       | G           |
| 1          | 0            | 2364       | C           |
| 1          | 0            | 2378       | G           |
| 1          | 0            | 2382       | C           |
| 1          | 0            | 2385       | U           |
| 1          | 0            | 2396       | C           |
| 1          | 0            | 2403       | C           |
| 1          | 0            | 2405       | A           |
| 1          | 0            | 2409       | A           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 2414       | A           |
| 1          | 0            | 2420       | C           |
| 1          | 0            | 2427       | A           |
| 1          | 0            | 2428       | U           |
| 1          | 0            | 2438       | A           |
| 1          | 0            | 2448       | A           |
| 1          | 0            | 2455       | A           |
| 1          | 0            | 2470       | U           |
| 1          | 0            | 2481       | G           |
| 1          | 0            | 2482       | A           |
| 1          | 0            | 2483       | U           |
| 1          | 0            | 2484       | G           |
| 1          | 0            | 2485       | U           |
| 1          | 0            | 2492       | G           |
| 1          | 0            | 2498       | U           |
| 1          | 0            | 2499       | C           |
| 1          | 0            | 2504       | G           |
| 1          | 0            | 2522       | G           |
| 1          | 0            | 2546       | G           |
| 1          | 0            | 2549       | G           |
| 1          | 0            | 2561       | G           |
| 1          | 0            | 2565       | C           |
| 1          | 0            | 2578       | G           |
| 1          | 0            | 2580       | C           |
| 1          | 0            | 2581       | A           |
| 1          | 0            | 2582       | G           |
| 1          | 0            | 2588       | U           |
| 1          | 0            | 2589       | C           |
| 1          | 0            | 2591       | C           |
| 1          | 0            | 2593       | A           |
| 1          | 0            | 2594       | U           |
| 1          | 0            | 2608       | A           |
| 1          | 0            | 2609       | G           |
| 1          | 0            | 2625       | U           |
| 1          | 0            | 2633       | A           |
| 1          | 0            | 2634       | G           |
| 1          | 0            | 2661       | G           |
| 1          | 0            | 2669       | C           |
| 1          | 0            | 2670       | C           |
| 1          | 0            | 2681       | A           |
| 1          | 0            | 2691       | C           |
| 1          | 0            | 2692       | A           |

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| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 2712       | G           |
| 1          | 0            | 2728       | A           |
| 1          | 0            | 2730       | A           |
| 1          | 0            | 2732       | C           |
| 1          | 0            | 2737       | A           |
| 1          | 0            | 2745       | A           |
| 1          | 0            | 2756       | A           |
| 1          | 0            | 2760       | G           |
| 1          | 0            | 2761       | A           |
| 1          | 0            | 2770       | A           |
| 1          | 0            | 2771       | C           |
| 1          | 0            | 2783       | U           |
| 1          | 0            | 2785       | A           |
| 1          | 0            | 2795       | A           |
| 1          | 0            | 2807       | U           |
| 1          | 0            | 2808       | U           |
| 1          | 0            | 2809       | A           |
| 1          | 0            | 2811       | G           |
| 1          | 0            | 2825       | A           |
| 1          | 0            | 2841       | U           |
| 1          | 0            | 2842       | C           |
| 1          | 0            | 2847       | G           |
| 1          | 0            | 2854       | G           |
| 1          | 0            | 2855       | C           |
| 1          | 0            | 2859       | U           |
| 2          | 5            | 32         | A           |
| 2          | 5            | 34         | C           |

All (44) RNA pucker outliers are listed below:

| <b>Mol</b> | <b>Chain</b> | <b>Res</b> | <b>Type</b> |
|------------|--------------|------------|-------------|
| 1          | 0            | 69         | G           |
| 1          | 0            | 71         | A           |
| 1          | 0            | 73         | A           |
| 1          | 0            | 173        | A           |
| 1          | 0            | 181        | A           |
| 1          | 0            | 192        | G           |
| 1          | 0            | 198        | A           |
| 1          | 0            | 242        | A           |
| 1          | 0            | 342        | G           |
| 1          | 0            | 583        | C           |
| 1          | 0            | 805        | G           |

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| Mol | Chain | Res  | Type |
|-----|-------|------|------|
| 1   | 0     | 843  | G    |
| 1   | 0     | 878  | C    |
| 1   | 0     | 1074 | G    |
| 1   | 0     | 1141 | U    |
| 1   | 0     | 1187 | A    |
| 1   | 0     | 1193 | G    |
| 1   | 0     | 1194 | U    |
| 1   | 0     | 1223 | G    |
| 1   | 0     | 1263 | G    |
| 1   | 0     | 1278 | A    |
| 1   | 0     | 1279 | G    |
| 1   | 0     | 1313 | U    |
| 1   | 0     | 1354 | A    |
| 1   | 0     | 1495 | G    |
| 1   | 0     | 1518 | C    |
| 1   | 0     | 1634 | A    |
| 1   | 0     | 1664 | G    |
| 1   | 0     | 1807 | A    |
| 1   | 0     | 1820 | G    |
| 1   | 0     | 1938 | U    |
| 1   | 0     | 2015 | G    |
| 1   | 0     | 2093 | G    |
| 1   | 0     | 2161 | C    |
| 1   | 0     | 2204 | A    |
| 1   | 0     | 2245 | A    |
| 1   | 0     | 2261 | G    |
| 1   | 0     | 2377 | U    |
| 1   | 0     | 2404 | A    |
| 1   | 0     | 2426 | G    |
| 1   | 0     | 2668 | U    |
| 1   | 0     | 2759 | U    |
| 1   | 0     | 2782 | G    |
| 1   | 0     | 2824 | C    |

## 5.4 Non-standard residues in protein, DNA, RNA chains

1 non-standard protein/DNA/RNA residue is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res | Link | Bond lengths |      |             | Bond angles |      |             |
|-----|------|-------|-----|------|--------------|------|-------------|-------------|------|-------------|
|     |      |       |     |      | Counts       | RMSZ | $\# Z  > 2$ | Counts      | RMSZ | $\# Z  > 2$ |
| 2   | PPU  | 5     | 35  | 2,1  | 32,40,41     | 2.81 | 6 (18%)     | 33,57,60    | 0.98 | 3 (9%)      |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res | Link | Chirals | Torsions   | Rings   |
|-----|------|-------|-----|------|---------|------------|---------|
| 2   | PPU  | 5     | 35  | 2,1  | -       | 0/21/43/44 | 0/4/4/4 |

All (6) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms  | Z     | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|--------|-------|-------------|----------|
| 2   | 5     | 35  | PPU  | C-N3'  | 12.63 | 1.61        | 1.34     |
| 2   | 5     | 35  | PPU  | OC-CM  | -4.96 | 1.27        | 1.42     |
| 2   | 5     | 35  | PPU  | C6-N1  | 3.86  | 1.38        | 1.33     |
| 2   | 5     | 35  | PPU  | CE1-CZ | 3.70  | 1.46        | 1.38     |
| 2   | 5     | 35  | PPU  | CE2-CZ | 2.70  | 1.44        | 1.38     |
| 2   | 5     | 35  | PPU  | CD2-CG | 2.54  | 1.44        | 1.38     |

All (3) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms    | Z    | Observed(°) | Ideal(°) |
|-----|-------|-----|------|----------|------|-------------|----------|
| 2   | 5     | 35  | PPU  | CM-OC-CZ | 2.93 | 123.86      | 117.51   |
| 2   | 5     | 35  | PPU  | C9-N6-C6 | 2.23 | 126.26      | 119.51   |
| 2   | 5     | 35  | PPU  | C-CA-N   | 2.22 | 117.97      | 109.40   |

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 2   | 5     | 35  | PPU  | 1       | 0            |

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

1 ligand is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res  | Link | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|------|------|--------------|------|----------|-------------|------|----------|
|     |      |       |      |      | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 5   | SPS  | 0     | 2881 | -    | 19,22,23     | 4.43 | 9 (47%)  | 17,28,30    | 4.15 | 8 (47%)  |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res  | Link | Chirals | Torsions   | Rings   |
|-----|------|-------|------|------|---------|------------|---------|
| 5   | SPS  | 0     | 2881 | -    | 1/1/2/6 | 9/15/16/18 | 0/1/1/1 |

All (9) bond length outliers are listed below:

| Mol | Chain | Res  | Type | Atoms   | Z    | Observed(Å) | Ideal(Å) |
|-----|-------|------|------|---------|------|-------------|----------|
| 5   | 0     | 2881 | SPS  | O10-C10 | 9.82 | 1.43        | 1.24     |
| 5   | 0     | 2881 | SPS  | C9-C8   | 8.40 | 1.54        | 1.33     |
| 5   | 0     | 2881 | SPS  | O1-C1   | 7.67 | 1.43        | 1.24     |
| 5   | 0     | 2881 | SPS  | C10-N11 | 6.56 | 1.50        | 1.34     |
| 5   | 0     | 2881 | SPS  | C5-N4   | 5.43 | 1.42        | 1.34     |
| 5   | 0     | 2881 | SPS  | C1-N2   | 5.39 | 1.42        | 1.33     |
| 5   | 0     | 2881 | SPS  | C6-C8   | 3.98 | 1.56        | 1.47     |
| 5   | 0     | 2881 | SPS  | C9-C10  | 2.96 | 1.54        | 1.48     |
| 5   | 0     | 2881 | SPS  | C7-C5   | 2.89 | 1.55        | 1.50     |

All (8) bond angle outliers are listed below:

| Mol | Chain | Res  | Type | Atoms       | Z     | Observed(°) | Ideal(°) |
|-----|-------|------|------|-------------|-------|-------------|----------|
| 5   | 0     | 2881 | SPS  | C12-N11-C10 | -7.47 | 112.03      | 122.57   |
| 5   | 0     | 2881 | SPS  | C3-N2-C1    | 6.40  | 120.55      | 115.14   |
| 5   | 0     | 2881 | SPS  | C8-C9-C10   | -6.14 | 109.55      | 121.56   |
| 5   | 0     | 2881 | SPS  | C14-S15-C16 | 6.14  | 109.42      | 101.04   |
| 5   | 0     | 2881 | SPS  | O10-C10-C9  | -5.96 | 109.44      | 123.03   |
| 5   | 0     | 2881 | SPS  | C6-C1-N2    | -5.87 | 120.31      | 124.40   |
| 5   | 0     | 2881 | SPS  | C9-C10-N11  | 5.63  | 125.37      | 114.56   |
| 5   | 0     | 2881 | SPS  | O10-C10-N11 | 2.15  | 125.19      | 122.35   |

All (1) chirality outliers are listed below:

| Mol | Chain | Res  | Type | Atom |
|-----|-------|------|------|------|
| 5   | 0     | 2881 | SPS  | C12  |

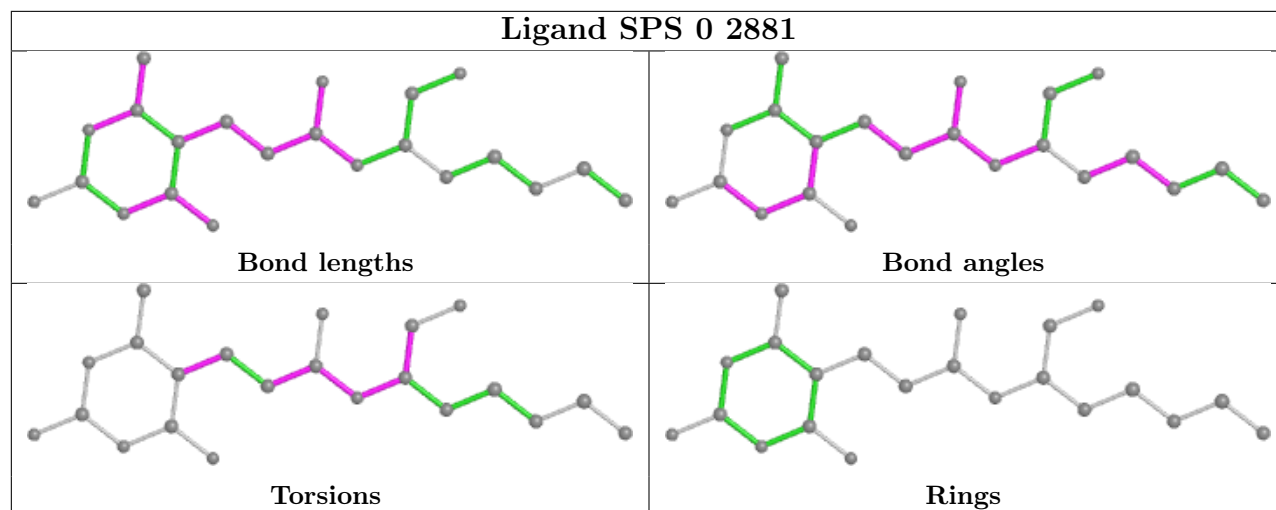
All (9) torsion outliers are listed below:

| Mol | Chain | Res  | Type | Atoms           |
|-----|-------|------|------|-----------------|
| 5   | 0     | 2881 | SPS  | C1-C6-C8-C9     |
| 5   | 0     | 2881 | SPS  | C9-C10-N11-C12  |
| 5   | 0     | 2881 | SPS  | O10-C10-N11-C12 |
| 5   | 0     | 2881 | SPS  | C14-C12-C13-O13 |
| 5   | 0     | 2881 | SPS  | N11-C12-C13-O13 |
| 5   | 0     | 2881 | SPS  | C13-C12-N11-C10 |
| 5   | 0     | 2881 | SPS  | O10-C10-C9-C8   |
| 5   | 0     | 2881 | SPS  | N11-C10-C9-C8   |
| 5   | 0     | 2881 | SPS  | C14-C12-N11-C10 |

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

EDS was not executed - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

### 6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.